EXHIBIT 2
RATE BASE

2025 Cost of Service

Centre Wellington Hydro Ltd.
EB-2024-0012

Filed on: May 1, 2024

TABLE OF CONTENTS

TABLE OF FIGURES

2.2 RATE BASE

2.2.1 RATE BASE OVERVIEW

CWH's Rate Base is determined by taking the average of the net fixed asset balances at the beginning and the end of the Test Year, plus a working capital allowance, which is 7.5% of the sum of the cost of power and controllable expenses. The use of the rate of 7.5% is consistent with the Board's policy.

CWH was not previously directed by the OEB to undertake a lead/lag study.

The net fixed assets include those distribution assets associated with activities that enable the conveyance of electricity for distribution purposes and general plant assets for the office and building. CWH does not have non-distribution assets. Controllable expenses include operations and maintenance, billing and collecting, community relations and administration expenses.

This exhibit will compare historical data with the 2024 Bridge Year and 2025 Test Year. CWH converted to International Financial Reporting Standards (IFRS) on January 1, 2016, and has prepared this application under IFRS.

CWH has calculated its 2025 Test Year rate base to be $20,262,732. This rate base is also used to determine the proposed revenue requirement found in Exhibit 6.

CWH confirms that capital expenditures in the rate base are equivalent to in-service additions. In the Bridge and Test year there are no capital projects expected to be accounted for as WIP.

CWH's materiality threshold is $50,000. Table 1 below presents CWH's Rate Base calculations for the Test Year and the 2018 Board Approved Rate Base.

Table 1: Test Year Rate Base

Particulars	Last Board Approved	2025	Variance from 2018 BA
Net Capital Assets in Service:			
Gross Fixed Asset	$27,128,241	$34,029,887	$6,901,646
Accumulated Depreciation	-$11,603,322	-$15,228,686	-$3,625,364
Average Balance	$15,524,919	$18,801,201	$3,276,282
Working Capital Allowance	$1,521,859	$1,461,531	-$60,328
Total Rate Base	**$17,046,778**	**$20,262,732**	$3,215,954

2.2.2 RATE BASE TREND

Table 2 below presents CWH's Rate Base calculations for all required years including the 2025 Test Year, the year over year variance analysis follows in section 2.1.3.

Table 2: Rate Base Trend

Particulars	**Last Board Approved**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Net Capital Assets in Service:									
Gross Fixed Asset	$27,128,241	$26,985,276	$28,101,261	$29,043,219	$29,543,652	$30,075,486	$30,728,773	$32,273,362	$34,029,887
Accumulated Depreciation	-$11,603,322	-$11,586,160	-$11,977,217	-$12,510,489	-$13,138,074	-$13,776,836	-$14,315,607	-$14,684,338	-$15,228,686
Average Balance	$15,524,919	$15,399,116	$16,124,044	$16,532,730	$16,405,578	$16,298,650	$16,413,166	$17,589,024	$18,801,201
Working Capital Allowance	$1,521,859	$1,479,506	$1,508,996	$1,688,901	$1,484,591	$1,523,205	$1,538,182	$1,595,024	$1,461,531
Total Rate Base	**$17,046,778**	**$16,878,622**	**$17,633,040**	**$18,221,630**	**$17,890,169**	**$17,821,855**	**$17,951,348**	**$19,184,048**	**$20,262,732**
Expenses for Working Capital	**Last Board Approved**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Eligible Distribution Expenses:									
3500-Distribution Expenses - Ops	$365,600	$353,176	$347,001	$392,585	$346,940	$435,131	$425,313	$441,893	$487,436
3550-Distribution Expenses - Mtce	$319,700	$418,665	$503,992	$384,407	$342,252	$453,141	$474,137	$461,833	$467,974
3650-Billing and Collecting	$520,700	$508,579	$538,923	$562,200	$598,189	$637,311	$621,430	$687,711	$713,824
3700-Community Relations	$39,500	$35,161	$32,743	$34,186	$43,349	$44,783	$44,020	$45,425	$46,162
3800-Admin and General Exp	$1,094,050	$1,111,012	$1,151,234	$1,059,712	$1,092,554	$1,122,032	$1,204,056	$1,303,143	$1,414,731
6105-Taxes Other Than Inc Taxes	$19,200	$15,523	$12,332	$11,111	$12,433	$8,619	$11,588	$13,390	$13,926
Total Eligible Distribution Exp	$2,363,500	$2,442,116	$2,586,226	$2,444,200	$2,435,718	$2,701,017	$2,780,545	$2,953,395	$3,144,053
3350-Power Supply Expenses	$17,927,954	$17,284,636	$17,533,719	$20,074,475	$17,358,833	$17,608,385	$17,728,544	$18,313,586	$16,343,031
Total Expenses for Working Cap	$20,291,454	$19,726,752	$20,119,945	$22,518,675	$19,794,550	$20,309,402	$20,509,089	$21,266,981	$19,487,083
Working Capital factor	7.50%	7.50%	7.50%	7.50%	7.50%	7.50%	7.50%	7.50%	7.50%
Total Working Capital	**$1,521,859**	**$1,479,506**	**$1,508,996**	**$1,688,901**	**$1,484,591**	**$1,523,205**	**$1,538,182**	**$1,595,024**	**$1,461,531**

Changes in Rate Base from 2018 Board Approved

The Total Rate Base for the 2025 Test Year has increased by $3,215,954, 18.87%, over the 2018 Board Approved Rate Base and the Working Capital Allowance has decreased by -$60,328 over the 2018 Board Approved Working Capital Allowance.

The reason for the decrease in Total Working Capital Allowance from the 2018 Board Approved and 2025 Test Year is due to the decrease in the Power Supply Expenses of $1.6M being greater than the increase in OMA (controllable expenses). Calculations of CWH's Working Capital Allowance can be found in Table 2 above.

The capital assets have steadily increased each year from the 2018 Board Approved to 2025 Test Year due to continuous upgrades, replacements, and additions to CWH's distribution and general plant. There were some years that the net assets decreased due to the annual accumulated depreciation being greater than the annual asset additions. In CWH's 2018 CoS, the forecast average annual net capital expenditure was $1M for the life of the DSP (2018-2022). CWH calculates this average using in-service assets, reduced by contributed capital received and does not consider WIP projects. Some years for CWH, capital expenditures were above the $1M while others were below, however the 5-year time frame of the DSP, 2018-2022, ended with CWH's annualized average net capital expenditure being $1.022M. This is the in-service net balance, being reduced for contributions received from developers /customers.

CWH's 2025 forecast for Eligible Distribution Expenses reflects an increase of $781K from the 2018 Board Approved amount. Details of the increases are provided in Exhibit 4.

2.2.3 RATE BASE VARIANCE ANALYSIS

The following paragraphs and tables provide a narrative on the changes that have driven the increase in rate base since CWH's 2018 Board Approved Cost of Service Application.

In CWH's DSP the historical capital investment categories are examined by comparing the original budget in the previous DSP and the actual capital spending. Variances are explained in section 5.4.1.1 commencing at Table 4-3 of the DSP in Appendix B of this exhibit.

All capital projects are listed by investment type in Chapter 2 Appendices tab 2AA, which is also presented in section 2.5.1 of this exhibit.

1 2018 ACTUAL VS. 2018 BOARD APPROVED:

2 **Table 3: 2018-2018 Board Approved Rate Base Variance**

Particulars	**Last Board Approved**	**2018**	**Var $**	**Var %**
Net Capital Assets in Service:				
Gross Fixed Asset	$27,128,241	$26,985,276	-$142,965	-0.53%
Accumulated Depreciation	-$11,603,322	-$11,586,160	$17,162	-0.15%
Average Balance	$15,524,919	$15,399,116	-$125,803	-0.81%
Working Capital Allowance	$1,521,859	$1,479,506	-$42,353	-2.78%
Total Rate Base	**$17,046,778**	**$16,878,622**	**-$168,156**	**-0.99%**

Expenses for Working Capital	**Last Board Approved**	**2018**	**Var $**	**Var %**
Eligible Distribution Expenses:				
3500-Distribution Expenses – Operation	$365,600	$353,176	-$12,424	-3.40%
3550-Distribution Expenses – Maintenance	$319,700	$418,665	$98,965	30.96%
3650-Billing and Collecting	$520,700	$508,579	-$12,121	-2.33%
3700-Community Relations	$39,500	$35,161	-$4,339	-10.98%
3800-Administrative and General Expenses	$1,094,050	$1,111,012	$16,962	1.55%
6105-Taxes Other Than Income Taxes	$19,200	$15,523	-$3,677	-19.15%
Total Eligible Distribution Expenses	$2,363,500	$2,442,116	$83,366	3.33%
3350-Power Supply Expenses	$17,927,954	$17,284,636	-$643,318	-3.59%
Total Expenses for Working Capital	$20,291,454	$19,726,752	-$559,952	-2.78%
Working Capital factor	7.50%	7.50%		
Total Working Capital	**$1,521,859**	**$1,479,506**	**-$41,996**	**-2.78%**

3

4 The total Rate Base balance in 2018 of $16.8M is $168K or 0.99% less than 2018 Board
5 Approved. CWH’s capital additions for 2018 were $1.17M which were in line with the Board
6 Approved $1.12M. The power supply expense was $643K lower than the Board Approved value.

2019 ACTUAL VS. 2018 ACTUAL:

Table 4: 2019-2018 Rate Base Variance

Particulars	**2018**	**2019**	**Var $**	**Var %**
Net Capital Assets in Service:				
Gross Fixed Asset	$26,985,276	$28,101,261	$1,115,984	4.14%
Accumulated Depreciation	-$11,586,160	-$11,977,217	-$391,057	3.38%
Average Balance	$15,399,116	$16,124,044	$724,928	4.71%
Working Capital Allowance	$1,479,506	$1,508,996	$29,489	1.99%
Total Rate Base	**$16,878,622**	**$17,633,040**	**$754,417**	**4.47%**

Expenses for Working Capital	**2018**	**2019**	**Var $**	**Var %**
Eligible Distribution Expenses:				
3500-Distribution Expenses – Operation	$353,176	$347,001	-$6,175	-1.75%
3550-Distribution Expenses – Maintenance	$418,665	$503,992	$85,326	20.38%
3650-Billing and Collecting	$508,579	$538,923	$30,344	5.97%
3700-Community Relations	$35,161	$32,743	-$2,418	-6.88%
3800-Administrative and General Expenses	$1,111,012	$1,151,234	$40,222	3.62%
6105-Taxes Other Than Income Taxes	$15,523	$12,332	-$3,190	-20.55%
Total Eligible Distribution Expenses	$2,442,116	$2,586,226	$144,110	5.90%
3350-Power Supply Expenses	$17,284,636	$17,533,719	$249,083	1.44%
Total Expenses for Working Capital	$19,726,752	$20,119,945	$393,193	1.99%
Working Capital factor	7.50%	7.50%		
Total Working Capital	**$1,479,506**	**$1,508,996**	**$29,489**	**1.99%**

The total Rate Base balance in 2019 of $17.6M is $754K or 4.47% greater than 2018. The 2019 capital additions were $1.9M. The main driver of this was the replacement of a transformer in CWH's FMS-2 station. This replacement was in CWH's 2018-2022 DSP, as a project in 2022, however the failure in 2019 required the job to be completed earlier. Details of this replacement can be found in the System Renewal section of Table 4-4 within the DSP.

2020 ACTUAL VS. 2019 ACTUAL:

Table 5: 2020-2019 Rate Base Variance

Particulars	**2019**	**2020**	**Var $**	**Var %**
Net Capital Assets in Service:				
Gross Fixed Asset	$28,101,261	$29,043,219	$941,958	3.35%
Accumulated Depreciation	-$11,977,217	-$12,510,489	-$533,272	4.45%
Average Balance	$16,124,044	$16,532,730	$408,686	2.53%
Working Capital Allowance	$1,508,996	$1,688,901	$179,905	11.92%
Total Rate Base	**$17,633,040**	**$18,221,630**	**$588,591**	**3.34%**

Expenses for Working Capital	**2019**	**2020**	**Var $**	**Var %**
Eligible Distribution Expenses:				
3500-Distribution Expenses – Operation	$347,001	$392,585	$45,584	13.14%
3550-Distribution Expenses – Maintenance	$503,992	$384,407	-$119,585	-23.73%
3650-Billing and Collecting	$538,923	$562,200	$23,276	4.32%
3700-Community Relations	$32,743	$34,186	$1,442	4.40%
3800-Administrative and General Expenses	$1,151,234	$1,059,712	-$91,522	-7.95%
6105-Taxes Other Than Income Taxes	$12,332	$11,111	-$1,222	-9.91%
Total Eligible Distribution Expenses	$2,586,226	$2,444,200	-$142,026	-5.49%
3350-Power Supply Expenses	$17,533,719	$20,074,475	$2,540,756	14.49%
Total Expenses for Working Capital	$20,119,945	$22,518,675	$2,398,730	11.92%
Working Capital factor	7.50%	7.50%		
Total Working Capital	**$1,508,996**	**$1,688,901**	**$179,905**	**11.92%**

The total Rate Base balance in 2020 of $18.2M is $588K or 3.34% greater than 2019. The capital additions in 2020 were $631K. The 2020 capital projects were made up of 15 smaller capital projects, the largest project being $123K for a pole line rebuild on Gzowski Street in Fergus, which had 12 poles replaced that were near end of life.

The power supply expense in 2020 increased over 14.5% more than 2019, this also contributed to a higher rate base value.

2021 ACTUAL VS. 2020 ACTUAL:

Table 6: 2021-2020 Rate Base Variance

Particulars	**2020**	**2021**	**Var $**	**Var %**
Net Capital Assets in Service:				
Gross Fixed Asset	$29,043,219	$29,543,652	$500,433	1.72%
Accumulated Depreciation	-$12,510,489	-$13,138,074	-$627,585	5.02%
Average Balance	$16,532,730	$16,405,578	-$127,152	-0.77%
Working Capital Allowance	$1,688,901	$1,484,591	-$204,309	-12.10%
Total Rate Base	**$18,221,630**	**$17,890,169**	**-$331,461**	**-1.82%**

Expenses for Working Capital	**2020**	**2021**	**Var $**	**Var %**
Eligible Distribution Expenses:				
3500-Distribution Expenses – Operation	$392,585	$346,940	-$45,645	-11.63%
3550-Distribution Expenses – Maintenance	$384,407	$342,252	-$42,155	-10.97%
3650-Billing and Collecting	$562,200	$598,189	$35,989	6.40%
3700-Community Relations	$34,186	$43,349	$9,163	26.80%
3800-Administrative and General Expenses	$1,059,712	$1,092,554	$32,842	3.10%
6105-Taxes Other Than Income Taxes	$11,111	$12,433	$1,322	11.90%
Total Eligible Distribution Expenses	$2,444,200	$2,435,718	-$8,483	-0.35%
3350-Power Supply Expenses	$20,074,475	$17,358,833	-$2,715,642	-13.53%
Total Expenses for Working Capital	$22,518,675	$19,794,550	-$2,724,124	-12.10%
Working Capital factor	7.50%	7.50%		
Total Working Capital	**$1,688,901**	**$1,484,591**	**-$204,309**	**-12.10%**

The total Rate Base balance in 2021 of $17.9M is $331K or 1.82% less than 2020. In 2021 the capital additions were $678K, which was lower than the annual depreciation. The power supply expenses in 2021 were $2.7M lower than in 2020, this was a driver for the reduction in rate base.

2022 ACTUAL VS. 2021 ACTUAL:

Table 7: 2022-2021 Rate Base Variances

Particulars	**2021**	**2022**	**Var $**	**Var %**
Net Capital Assets in Service:				
Gross Fixed Asset	$29,543,652	$30,075,486	$531,834	1.80%
Accumulated Depreciation	-$13,138,074	-$13,776,836	-$638,762	4.86%
Average Balance	$16,405,578	$16,298,650	-$106,928	-0.65%
Working Capital Allowance	$1,484,591	$1,523,205	$38,614	2.60%
Total Rate Base	**$17,890,169**	**$17,821,855**	**-$68,314**	**-0.38%**

Expenses for Working Capital	**2021**	**2022**	**Var $**	**Var %**
Eligible Distribution Expenses:				
3500-Distribution Expenses – Operation	$346,940	$435,131	$88,191	25.42%
3550-Distribution Expenses – Maintenance	$342,252	$453,141	$110,888	32.40%
3650-Billing and Collecting	$598,189	$637,311	$39,123	6.54%
3700-Community Relations	$43,349	$44,783	$1,434	3.31%
3800-Administrative and General Expenses	$1,092,554	$1,122,032	$29,478	2.70%
6105-Taxes Other Than Income Taxes	$12,433	$8,619	-$3,814	-30.67%
Total Eligible Distribution Expenses	$2,435,718	$2,701,017	$265,300	10.89%
3350-Power Supply Expenses	$17,358,833	$17,608,385	$249,552	1.44%
Total Expenses for Working Capital	$19,794,550	$20,309,402	$514,852	2.60%
Working Capital factor	7.50%	7.50%		
Total Working Capital	**$1,484,591**	**$1,523,205**	**$38,614**	**2.6%**

The total Rate Base in 2022 of $17.8M is -$68K or 0.38% lower than 2021. In 2022 the capital additions were $684K, which was lower than the annual depreciation, therefore a decrease in the rate base.

2023 ACTUAL VS. 2022 ACTUAL:

Table 8: 2023-2022 Rate Base Variances

Particulars	**2022**	**2023**	**Var $**	**Var %**
Net Capital Assets in Service:				
Gross Fixed Asset	$30,075,486	$30,728,773	$653,287	2.17%
Accumulated Depreciation	-$13,776,836	-$14,315,607	-$538,771	3.91%
Average Balance	$16,298,650	$16,413,166	$114,516	0.70%
Working Capital Allowance	$1,523,205	$1,538,182	$14,977	0.98%
Total Rate Base	**$17,821,855**	**$17,951,348**	**$129,493**	**0.73%**

Expenses for Working Capital	**2022**	**2023**	**Var $**	**Var %**
Eligible Distribution Expenses:				
3500-Distribution Expenses – Operation	$435,131	$425,313	-$9,818	-2.26%
3550-Distribution Expenses – Maintenance	$453,141	$474,137	$20,996	4.63%
3650-Billing and Collecting	$637,311	$621,430	-$15,881	-2.49%
3700-Community Relations	$44,783	$44,020	-$763	-1.70%
3800-Administrative and General Expenses	$1,122,032	$1,204,056	$82,025	7.31%
6105-Taxes Other Than Income Taxes	$8,619	$11,588	$2,969	34.44%
Total Eligible Distribution Expenses	$2,701,017	$2,780,545	$79,528	2.94%
3350-Power Supply Expenses	$17,608,385	$17,728,544	$120,160	0.68%
Total Expenses for Working Capital	$20,309,402	$20,509,089	$199,687	0.98%
Working Capital factor	7.50%	7.50%		
Total Working Capital	**$1,523,205**	**$1,538,182**	**$14,977**	**0.98%**

The total Rate Base balance in 2023 of $18M is $130K or 0.73% greater than 2022. The increase is due to capital additions. The total capital additions (in-service additions) were $1.14M. The largest capital project in 2023 was a pole line rebuild at $263K on McNab St in Elora which included replacing 37 poles.

2024 BRIDGE YEAR VS. 2023 ACTUAL:

Table 9: 2024-2023 Rate Base Variances

Particulars	**2023**	**2024**	**Var $**	**Var %**
Net Capital Assets in Service:				
Gross Fixed Asset	$30,728,773	$32,273,362	$1,544,589	5.03%
Accumulated Depreciation	-$14,315,607	-$14,684,338	-$368,731	2.58%
Average Balance	$16,413,166	$17,589,024	$1,175,858	7.15%
Working Capital Allowance	$1,538,182	$1,595,024	$56,842	3.70%
Total Rate Base	**$17,951,348**	**$19,184,048**	**$1,232,700**	**6.87%**

Expenses for Working Capital	**2023**	**2024**	**Var $**	**Var %**
Eligible Distribution Expenses:				
3500-Distribution Expenses - Operation	$425,313	$441,893	$16,580	3.90%
3550-Distribution Expenses - Maintenance	$474,137	$461,833	-$12,304	-2.59%
3650-Billing and Collecting	$621,430	$687,711	$66,281	10.67%
3700-Community Relations	$44,020	$45,425	$1,405	3.19%
3800-Administrative and General Expenses	$1,204,056	$1,303,143	$99,087	8.23%
6105-Taxes Other Than Income Taxes	$11,588	$13,390	$1,802	15.55%
Total Eligible Distribution Expenses	$2,780,545	$2,953,395	$172,850	6.22%
3350-Power Supply Expenses	$17,728,544	$18,313,586	$585,042	3.30%
Total Expenses for Working Capital	$20,509,089	$21,266,981	$757,892	3.70%
Working Capital factor	7.50%	7.50%		
Total Working Capital	**$1,538,182**	**$1,595,024**	**$56,842**	**3.70%**

The total projected Rate Base in 2024 of $19.2M is $1.3M, or 6.87% greater than 2023. CWH's 2024 in-service capital additions are projected to be $3M, the main drivers are:

- a station transformer replacement, which is anticipated to cost $994K. This project will replace a 5MVA transformer that was manufactured in 1973, refurbished in 1997 and is located within the Elora MS-2 station. It was identified within CWH's 2018 to 2022 DSP as a risk due to the transformer age, and the status quo 5MVA size was identified as not adequate to service Elora's total load if required during peak load seasons in the event the Elora MS-1 station is taken out of service for any reason.
- the purchase of a new digger truck, $640K. CWH started the process of the truck specifications and obtaining quotes in 2021. CWH's current RBD/Digger truck was purchased in 2007 and is currently fully depreciated. Like many other types of equipment, fleet costs have escalated substantially, and the truck being replaced which is of similar capabilities and specifications was purchased in 2007 for $295K.
- pole line projects have a total cost of $366K. Of all the capital labour hours, the pole line projects for 2024 account for 47% of capital labour. Some of the pole line projects were

started in 2023 and are in WIP as of December 31, 2023. These projects will be in-service in 2024.

2025 TEST YEAR VS. 2024 BRIDGE YEAR:

Table 10: 2025-2024 Rate Base Variances

Particulars	2024	2025	Var $	Var %
Net Capital Assets in Service:				
Gross Fixed Asset	$32,273,362	$34,029,087	$1,756,525	5.44%
Accumulated Depreciation	-$14,684,338	-$15,228,686	-$544,349	3.71%
Average Balance	$17,589,024	$18,801,201	$1,212,177	6.89%
Working Capital Allowance	$1,595,024	$1,461,531	-$133,492	-8.37%
Total Rate Base	**$19,184,048**	**$20,262,732**	**$1,078,684**	**5.62%**

Expenses for Working Capital	2024	2025	Var $	Var %
Eligible Distribution Expenses:				
3500-Distribution Expenses - Operation	$441,893	$487,436	$45,543	10.31%
3550-Distribution Expenses - Maintenance	$461,833	$467,974	$6,141	1.33%
3650-Billing and Collecting	$687,711	$713,824	$26,113	3.80%
3700-Community Relations	$45,425	$46,162	$737	1.62%
3800-Administrative and General Expenses	$1,303,143	$1,414,731	$111,588	8.56%
6105-Taxes Other Than Income Taxes	$13,390	$13,926	$536	4.00%
Total Eligible Distribution Expenses	$2,953,395	$3,144,053	$190,658	6.45%
3350-Power Supply Expenses	$18,313,586	$16,343,031	-$990,827	-10.76%
Total Expenses for Working Capital	$21,266,981	$19,487,083	-$800,984	-8.37%
Working Capital factor	7.50%	7.50%		0%
Total Working Capital	**$1,595,024**	**$1,461,531**	**-$133,492**	**-8.37%**

The total rate base balance in 2025 of $20.3M is $1.1M or 5.62% higher than 2024. The capital additions for 2025 are $1.3M, with the main drivers being:

- purchasing multiple transformers at a cost of $306K, with transformers being recorded as an asset in account 1850 upon receiving them. These transformers include 7 underground transformers and 4 overhead transformers
- A pole line extension project ($423K), titled Gartshore Extension, which is detailed in Appendix A of the DSP, within “Material Investment Narratives”
- a pole line replacement ($121K) to replace a current line of poles to update to current framing standards and replace wooden cross arms
- pole replacement ($115K) which differs from the pole line replacement project above, as this project is for replacing individual or a few poles that are in poor condition rather than

the whole pole line. Details of annual pole inspections completed can be found in the DSP, section 5.3.3.2. This program allows CWH to monitor and minimize large impacts to customer bills, by not completing a whole line replacement if there are only a select few poles that need to be replaced.

2.3 FIXED ASSETS

2.3.1 FIXED ASSET CONTINUITY SCHEDULE

This schedule presents a continuity schedule of its investment in capital assets, the associated accumulated amortization, and the net book value for each Capital USoA account for the 2018 to 2023 Historic Years, 2024 Bridge Year and 2025 Test Year.

CWH attests that the continuity statements reconcile with the calculated depreciation expenses under Exhibit 4 – Operating Costs and are presented by asset account.

CWH does not have any Asset Retirement Obligations.

All asset disposals are recorded clearly on the continuity schedules.

CWH is filing this application using MIFRS and is not aware of any deviations from the practice of depreciating significant parts or components of PP&E separately.

Table 11: Fixed Asset Continuity Schedule for 2018

Year 2018

			Cost				Accumulated Depreciation				
CCA Class	OEB	Description	Opening Balance	Additions	Disposals	Closing Balance	Opening Balance	Additions	Disposals	Closing Balance	Net Book Value
12	1611	Computer Software (Formally known as Account 1925)	$364,934	$6,900	$0	$371,834	$353,598	$12,486	$0	$366,084	$5,750
CEC	1612	Land Rights (Formally known as Account 1906 and 1806)	$37,132	$0	$0	$37,132	$10,680	$743	$0	$11,424	$25,708
N/A	1805	Land	$46,066	$0	$0	$46,066	$0	$0	$0	$0	$46,066
47	1808	Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0
13	1810	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1815	Transformer Station Equipment >50 kV	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1820	Distribution Station Equipment <50 kV	$6,887,892	$40,752	$0	$6,928,644	$955,329	$160,023	$0	$1,115,352	$5,813,292
47	1825	Storage Battery Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1830	Poles, Towers & Fixtures (wood)	$2,172,169	$194,153	-$22,044	$2,344,277	$767,153	$42,170	-$18,980	$790,344	$1,553,934
47	1830	Poles, Towers & Fixtures (steel/concrete)	$687,270	$0	$0	$687,270	$349,913	$7,936	$0	$357,849	$329,421
47	1835	Overhead Conductors & Devices	$2,001,752	$172,157	-$11,313	$2,162,596	$748,501	$26,166	-$6,120	$768,547	$1,394,049
47	1840	Underground Conduit	$1,996,295	$204,859	$0	$2,201,154	$782,608	$22,201	$0	$804,809	$1,396,344
47	1845	Underground Conductors & Devices	$2,179,116	$333,064	$0	$2,512,179	$1,083,716	$29,009	$0	$1,112,725	$1,399,455
47	1850	Line Transformers - Overhead	$791,633	$16,445	-$38,728	$769,350	$573,672	$12,023	-$37,161	$548,534	$220,815
47	1850	Line Transformers - Underground	$2,759,610	$152,281	-$4,750	$2,907,140	$1,494,772	$68,670	-$4,709	$1,558,733	$1,348,407
47	1855	Services (Overhead)	$535,629	$112,010	-$16,554	$631,085	$311,401	$7,064	-$8,747	$309,718	$321,367
47	1855	Services (Underground)	$3,177,473	$70,971	-$707	$3,247,736	$1,991,061	$28,908	-$491	$2,019,478	$1,228,258
47	1860	Meters	$1,308,386	$22,649	-$32,178	$1,298,857	$687,814	$91,051	-$18,611	$760,254	$538,603
47	1860	Meters CTs PTs	$101,377	$11,279		$112,656	$46,443	$2,165		$48,608	$64,048
47	1860	Meters (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
N/A	1905	Land	$8,640	$0	$0	$8,640	$0	$0	$0	$0	$8,640
47	1908	Buildings & Fixtures (25 years)	$201,324	$40,965	$0	$242,289	$47,400	$8,872	$0	$56,272	$186,017
47	1908	Buildings & Fixtures (50 years)	$1,055,104	$0	$0	$1,055,104	$399,472	$21,781	$0	$421,253	$633,851
13	1910	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1915	Office Furniture & Equipment (10 years)	$113,893	$15,625	$0	$129,518	$85,545	$5,292	$0	$90,837	$38,681
8	1915	Office Furniture & Equipment (5 years)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1920	Computer Equipment - Hardware -3 years	$101,043	$8,649	$0	$109,692	$60,650	$23,330		$83,980	$25,712
10	1920	Computer Equipment - Hardware - 4 years	$89,845	$6,984	-$2,847	$93,983	$76,911	$5,952	-$2,847	$80,016	$13,967
10	1920	Computer Equipment - Hardware - 5 years	$17,463			$17,463	$17,463	$0		$17,463	$0
10	1920	Computer Equipment - Hardware - 6 years	$61,132			$61,132	$25,472	$10,189		$35,661	$25,472
10	1920	Computer Equipment - Hardware - 10 years	$16,667			$16,667	$2,500	$1,667		$4,167	$12,500
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$0	$0	$0	$0	$0	$0	$0	$0	$0
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1930	Transportation Equipment <3 Tonnes	$185,710	$0		$185,710	$135,933	$10,139		$146,072	$39,638
10	1930	Transportation Equipment >3 Tonnes	$1,254,442		-$225,878	$1,028,563	$611,904	$66,271	-$225,878	$452,297	$576,267
10	1930	Transportation Equipment Trailer	$111,357			$111,357	$51,994	$13,920		$65,914	$45,443
8	1935	Stores Equipment	$14,318	$0	$0	$14,318	$14,318	$0	$0	$14,318	$0
8	1940	Tools, Shop & Garage Equipment	$102,233	$6,400	-$1,339	$107,294	$73,952	$5,205	-$1,339	$77,818	$29,476
8	1945	Measurement & Testing Equipment	$43,117	$975	-$594	$43,498	$37,982	$1,473	-$594	$38,861	$4,637
8	1950	Power Operated Equipment	$74,455	$0	-$14,484	$59,971	$68,508	$1,036	-$14,484	$55,060	$4,911
8	1955	Communications Equipment	$18,412	$0	$0	$18,412	$5,939	$1,792	$0	$7,730	$10,682
8	1955	Communication Equipment (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1960	Miscellaneous Equipment	$17,092	$1,895	$0	$18,987	$12,897	$1,122	$0	$14,018	$4,968
47	1970	Load Management Controls Customer Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1975	Load Management Controls Utility Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1980	System Supervisor Equipment	$258,806	$0	-$12,092	$246,715	$208,940	$6,958	-$12,092	$203,807	$42,908
47	1985	Sentinel Lights	$2,516	$0	$0	$2,516	$2,516	$0	$0	$2,516	$0
47	1990	Other Tangible Property	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1995	Contributions & Grants - PolesTwrsFix	-$157,252	$0	$0	-$157,252	-$35,155	-$3,279	$0	-$38,434	-$118,818
47	1995	Contributions & Grants - O/H Conductor	-$70,035	$0	$0	-$70,035	-$16,584	-$1,039	$0	-$17,623	-$52,412
47	1995	Contributions & Grants - UG Conduit	-$350,698	$0	$0	-$350,698	-$129,499	-$3,833	$0	-$133,332	-$217,366
47	1995	Contributions & Grants - UG Cond&Dev	-$408,830	$0	$0	-$408,830	-$151,447	-$5,991	$0	-$157,438	-$251,392
47	1995	Contributions & Grants - OHLine Trans	-$4,186	$0	$0	-$4,186	-$1,900	-$87	$0	-$1,986	-$2,199
47	1995	Contributions & Grants - UGLine Trans	-$331,205	$0	$0	-$331,205	-$169,053	-$9,657	$0	-$178,710	-$152,495
47	1995	Contributions & Grants - OHServices	-$7,927	$0	$0	-$7,927	-$1,789	-$119	$0	-$1,908	-$6,019
47	1995	Contributions & Grants - UGServices	-$368,587	$0	$0	-$368,587	-$147,988	-$5,225	$0	-$153,212	-$215,374
47	1995	Contributions & Grants - Meters	-$36,762	$0	$0	-$36,762	-$26,864	-$2,263	$0	-$29,128	-$7,634
47	1995	Contributions & Grants - Meters PTs CTs	-$2,632	$0	$0	-$2,632	-$313	-$52	$0	-$365	-$2,267
14.1	1609	Capital Contribution Pd Contracts	$4,603	$34,393	$0	$38,995	$358	$484	$0	$842	$38,153
	2440	Deferred Revenue	-$481,304	-$258,316	$0	-$739,620	$7,637	$11,096	$0	$18,733	-$720,887
			$0	$0	$0	$0	$0	$0	$0	$0	$0
		Sub-Total	**$26,579,486**	**$1,195,088**	**-$383,508**	**$27,391,066**	**$11,424,362**	**$675,647**	**-$352,052**	**$11,747,958**	**$15,680,574**
		Less Socialized Renewable Energy Generation Investments (input as negative)Less Socialized Renewable Energy Generation Investments (input as negative)				$0				$0	$0
		Less Other Non Rate-Regulated Utility Assets (input as negative)Less Other Non Rate-Regulated Utility Assets (input as negative)				$0				$0	$0
		Total PP&E for Rate Base Purposes	**$ 26,579,486**	**$ 1,195,088**	**-$ 383,508**	**$ 27,391,066**	**$ 11,424,362**	**$ 675,647**	**-$ 352,052**	**$ 11,747,958**	**$ 15,680,574**
		Construction Work In Progress	$ 23,714	-$ 23,714		$ -					$ -
		Total PP&E	**$26,603,200**	**$1,171,375**	**-$383,508**	**$27,391,066**	**$11,424,362**	**$675,647**	**-$352,052**	**$11,747,958**	**$15,680,574**
		Depreciation Expense adj. from gain or loss on the retirement of assets (pool of like assets)									
		Total						**$675,647**			

10		Transportation
8		Stores Equipment
8		Tools, Shop
8		Meas/Testing
		Deferred Revenue

Less: *Fully Allocated Depreciation*	
Transportation	-$ 90,330
Stores Equipment	$ -
Tools, Shop	
Meas/Testing	
Deferred Revenue	-$ 11,096
Net Depreciation	$574,222

Table 12: Fixed Asset Continuity Schedule for 2019

Year 2019

CCA Class	OEB	Description	Cost: Opening Balance	Cost: Additions	Cost: Disposals	Cost: Closing Balance	Accumulated Depreciation: Opening Balance	Accumulated Depreciation: Additions	Accumulated Depreciation: Disposals	Accumulated Depreciation: Closing Balance	Net Book Value
12	1611	Computer Software (Formally known as Account 1925)	$371,834	$52,827	-$2,186	$422,475	$366,084	$7,180	-$2,186	$371,078	$51,397
CEC	1612	Land Rights (Formally known as Account 1906 and 1806)	$37,132	$0	$0	$37,132	$11,424	$743	$0	$12,167	$24,965
N/A	1805	Land	$46,066	$0	$0	$46,066	$0	$0	$0	$0	$46,066
47	1808	Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0
13	1810	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1815	Transformer Station Equipment >50 kV	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1820	Distribution Station Equipment <50 kV	$6,928,644	$805,689	-$10,855	$7,723,478	$1,115,352	$168,906	-$18,659	$1,265,599	$6,457,879
47	1825	Storage Battery Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1830	Poles, Towers & Fixtures (wood)	$2,344,277	$159,941	-$28,374	$2,475,844	$790,344	$45,771	-$15,665	$820,449	$1,655,394
47	1830	Poles, Towers & Fixtures (steel/concrete)	$687,270		-$3,563	$683,707	$357,849	$7,934	-$574	$365,208	$318,498
47	1835	Overhead Conductors & Devices	$2,162,596	$36,858	-$3,127	$2,196,327	$768,547	$27,556	-$1,681	$794,422	$1,401,905
47	1840	Underground Conduit	$2,201,154	$30,922	$0	$2,232,076	$804,809	$23,957	$0	$828,766	$1,403,310
47	1845	Underground Conductors & Devices	$2,512,179	$306,856	$0	$2,819,035	$1,112,725	$34,882	$0	$1,147,607	$1,671,428
47	1850	Line Transformers - Overhead	$769,350	$18,578	-$9,077	$778,851	$548,534	$12,261	-$8,610	$552,185	$226,666
47	1850	Line Transformers - Underground	$2,907,140	$108,990	-$13,426	$3,002,704	$1,558,733	$72,846	-$9,565	$1,622,014	$1,380,690
47	1855	Services (Overhead)	$631,085	$43,720	-$7,337	$667,468	$309,718	$8,091	-$4,665	$313,144	$354,323
47	1855	Services (Underground)	$3,247,736	$79,632	-$2,950	$3,324,418	$2,019,478	$29,557	-$2,201	$2,046,834	$1,277,584
47	1860	Meters	$1,298,857	$101,311	-$23,829	$1,376,339	$760,254	$93,656	-$14,788	$839,123	$537,216
47	1860	Meters CTs PTs	$112,656	$0	$0	$112,656	$48,608	$2,273		$50,881	$61,775
47	1860	Meters (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
N/A	1905	Land	$8,640	$0	$0	$8,640	$0	$0	$0	$0	$8,640
47	1908	Buildings & Fixtures (25 years)	$242,289	$7,504	$0	$249,793	$56,272	$9,841	$0	$66,113	$183,680
47	1908	Buildings & Fixtures (50 years)	$1,055,104			$1,055,104	$421,253	$21,781		$443,034	$612,070
13	1910	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1915	Office Furniture & Equipment (10 years)	$129,518	$0	-$39,808	$89,711	$90,837	$5,315	-$39,808	$56,345	$33,366
8	1915	Office Furniture & Equipment (5 years)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1920	Computer Equipment - Hardware - 3 years	$109,692	$5,825	-$61,496	$54,021	$83,980	$12,059	-$54,695	$41,345	$12,676
10	1920	Computer Equipment - Hardware - 4 years	$93,983	$2,950	-$14,636	$82,297	$80,016	$6,286	-$14,272	$72,029	$10,268
10	1920	Computer Equipment - Hardware - 5 years	$17,463	$7,405		$24,868	$17,463	$741		$18,204	$6,664
10	1920	Computer Equipment - Hardware - 6 years	$61,132			$61,132	$35,661	$10,189		$45,849	$15,283
10	1920	Computer Equipment - Hardware - 10 years	$16,667			$16,667	$4,167	$1,667		$5,833	$10,833
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$0	$0	$0	$0	$0	$0	$0	$0	$0
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1930	Transportation Equipment <3 Tonnes	$185,710	$168,738	-$57,836	$296,612	$146,072	$22,192	-$57,836	$110,427	$186,184
10	1930	Transportation Equipment >3 Tonnes	$1,028,563			$1,028,563	$452,297	$61,215		$513,512	$515,052
10	1930	Transportation Equipment Trailer	$111,357			$111,357	$65,914	$11,720		$77,634	$33,723
8	1935	Stores Equipment	$14,318	$2,735	$0	$17,053	$14,318	$137	$0	$14,455	$2,598
8	1940	Tools, Shop & Garage Equipment	$107,294	$2,600	-$1,101	$108,792	$77,818	$4,950	-$1,101	$81,667	$27,125
8	1945	Measurement & Testing Equipment	$43,498	$5,027	-$2,868	$45,657	$38,861	$1,713	-$2,868	$37,706	$7,950
8	1950	Power Operated Equipment	$59,971	$0	$0	$59,971	$55,060	$1,036	$0	$56,095	$3,876
8	1955	Communications Equipment	$18,412	$0	$0	$18,412	$7,730	$1,792	$0	$9,522	$8,890
8	1955	Communication Equipment (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1960	Miscellaneous Equipment	$18,987	$0	$0	$18,987	$14,018	$1,311	$0	$15,330	$3,657
47	1970	Load Management Controls Customer Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1975	Load Management Controls Utility Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1980	System Supervisor Equipment	$246,715	$0	$0	$246,715	$203,807	$6,958	$0	$210,765	$35,950
47	1985	Sentinel Lights	$2,516	$0	$0	$2,516	$2,516	$0	$0	$2,516	$0
47	1990	Other Tangible Property	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1995	Contributions & Grants - PolesTwrsFix	-$157,252	$0	$0	-$157,252	-$38,434	-$3,279	$0	-$41,712	-$115,539
47	1995	Contributions & Grants - O/H Conductor	-$70,035	$0	$0	-$70,035	-$17,623	-$1,039	$0	-$18,663	-$51,373
47	1995	Contributions & Grants - UG Conduit	-$350,698	$0	$0	-$350,698	-$133,332	-$3,833	$0	-$137,166	-$213,532
47	1995	Contributions & Grants - UG Cond&Dev	-$408,830	$0	$0	-$408,830	-$157,438	-$5,991	$0	-$163,429	-$245,401
47	1995	Contributions & Grants - OHLine Trans	-$4,186	$0	$0	-$4,186	-$1,986	-$87	$0	-$2,073	-$2,113
47	1995	Contributions & Grants - UGLine Trans	-$331,205	$0	$0	-$331,205	-$178,710	-$9,657	$0	-$188,366	-$142,839
47	1995	Contributions & Grants - OHServices	-$7,927	$0	$0	-$7,927	-$1,908	-$119	$0	-$2,028	-$5,899
47	1995	Contributions & Grants - UGServices	-$368,587	$0	$0	-$368,587	-$153,212	-$5,225	$0	-$158,437	-$210,150
47	1995	Contributions & Grants - Meters	-$36,762	$0	$0	-$36,762	-$29,128	-$1,080	$0	-$30,208	-$6,554
47	1995	Contributions & Grants - Meters PTs CTs	-$2,632	$0	$0	-$2,632	-$365	-$52	$0	-$417	-$2,215
14.1	1609	Capital Contribution Pd Contracts	$38,995	$0	$0	$38,995	$842	$867	$0	$1,709	$37,286
	2440	Deferred Revenue	-$739,620	-$245,249	$0	-$984,869	$18,733	$20,674	$0	$39,407	-$945,462
			$0	$0	$0	$0	$0	$0	$0	$0	$0
		Sub-Total	**$27,391,066**	**$1,702,859**	**-$282,470**	**$28,811,455**	**$11,747,958**	**$707,691**	**-$249,173**	**$12,206,475**	**$16,683,794**
		Less Socialized Renewable Energy Generation Investments (input as negative)Less Socialized Renewable Energy Generation Investments (input as negative)				$ -				$ -	$ -
		Less Other Non Rate-Regulated Utility Assets (input as negative)Less Other Non Rate-Regulated Utility Assets (input as negative)				$ -				$ -	$ -
		Total PP&E for Rate Base Purposes	**$ 27,391,066**	**$ 1,702,859**	**-$ 282,470**	**$ 28,811,455**	**$ 11,747,958**	**$ 707,691**	**-$ 249,173**	**$ 12,206,475**	**$ 16,683,794**
		Construction Work In Progress	$ -			$ -					$ -
		Total PP&E	**$27,391,066**	**$1,702,859**	**-$282,470**	**$28,811,455**	**$11,747,958**	**$707,691**	**-$249,173**	**$12,206,475**	**$16,683,794**
		Depreciation Expense adj. from gain or loss on the retirement of assets (pool of like assets)									
		Total						**$707,691**			

10		Transportation
8		Stores Equipment
8		Tools, Shop
8		Meas/Testing
		Deferred Revenue

Less: *Fully Allocated Depreciation*

Transportation	-$ 95,127
Stores Equipment	-$ 137
Tools, Shop	
Meas/Testing	
Deferred Revenue	-$ 20,674
Net Depreciation	$591,753

Table 13: Fixed Asset Continuity Schedule for 2020

Year 2020

CCA Class	OEB	Description	Cost: Opening Balance	Cost: Additions	Cost: Disposals	Cost: Closing Balance	Accumulated Depreciation: Opening Balance	Accumulated Depreciation: Additions	Accumulated Depreciation: Disposals	Accumulated Depreciation: Closing Balance	Net Book Value
12	1611	Computer Software (Formally known as Account 1925)	$422,475	$26,060	-$1,841	$446,694	$371,078	$16,403	-$1,841	$385,640	$61,054
CEC	1612	Land Rights (Formally known as Account 1906 and 1806)	$37,132	$0	$0	$37,132	$12,167	$743	$0	$12,911	$24,222
N/A	1805	Land	$46,066	$0	$0	$46,066	$0	$0	$0	$0	$46,066
47	1808	Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0
13	1810	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1815	Transformer Station Equipment >50 kV	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1820	Distribution Station Equipment <50 kV	$7,723,478	$0	$0	$7,723,478	$1,265,599	$177,694	$0	$1,443,293	$6,280,185
47	1825	Storage Battery Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1830	Poles, Towers & Fixtures (wood)	$2,475,844	$191,685	-$17,224	$2,650,305	$820,449	$49,069	-$8,818	$860,700	$1,789,605
47	1830	Poles, Towers & Fixtures (steel/concrete)	$683,707	$5,183		$688,890	$365,208	$7,480		$372,689	$316,201
47	1835	Overhead Conductors & Devices	$2,196,327	$155,258	-$864	$2,350,721	$794,422	$29,182	-$322	$823,282	$1,527,439
47	1840	Underground Conduit	$2,232,076	$0	$0	$2,232,076	$828,766	$23,470	$0	$852,236	$1,379,840
47	1845	Underground Conductors & Devices	$2,819,035	$38,822	-$534	$2,857,324	$1,147,607	$38,606	-$444	$1,185,769	$1,671,555
47	1850	Line Transformers - Overhead	$778,851	$724	-$22,033	$757,543	$552,185	$11,725	-$18,965	$544,945	$212,598
47	1850	Line Transformers - Underground	$3,002,704	$88,234	-$28,645	$3,062,292	$1,622,014	$74,922	-$22,348	$1,674,587	$1,387,705
47	1855	Services (Overhead)	$667,468	$6,923	-$2,623	$671,768	$313,144	$8,273	-$1,910	$319,507	$352,261
47	1855	Services (Underground)	$3,324,418	$77,625	-$860	$3,401,183	$2,046,834	$31,404	-$845	$2,077,392	$1,323,791
47	1860	Meters	$1,376,339	$35,951	-$19,835	$1,392,455	$839,123	$97,081	-$14,149	$922,054	$470,401
47	1860	Meters CTs PTs	$112,656	$1,735		$114,391	$50,881	$2,290		$53,171	$61,220
47	1860	Meters (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
N/A	1905	Land	$8,640	$0	$0	$8,640	$0	$0	$0	$0	$8,640
47	1908	Buildings & Fixtures (25 Years)	$249,793	$0	$0	$249,793	$66,113	$9,991	$0	$76,105	$173,688
47	1908	Buildings & Fixtures (50 Years)	$1,055,104	$0	$0	$1,055,104	$443,034	$21,781	$0	$464,815	$590,289
13	1910	Leasehold Improvements	$0	$0	$0	$0	$0		$0	$0	$0
8	1915	Office Furniture & Equipment (10 years)	$89,711	$0	$0	$89,711	$56,345	$5,315	$0	$61,660	$28,051
8	1915	Office Furniture & Equipment (5 years)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1920	Computer Equipment - Hardware - 3 years	$54,021	$7,718	$0	$61,739	$41,345	$6,977		$48,322	$13,417
10	1920	Computer Equipment - Hardware - 4 years	$82,297	$15,489	-$4,396	$93,390	$72,029	$9,043	-$4,396	$76,677	$16,713
10	1920	Computer Equipment - Hardware - 5 years	$24,868			$24,868	$18,204	$1,481		$19,685	$5,183
10	1920	Computer Equipment - Hardware - 6 years	$61,132	$4,285		$65,417	$45,849	$10,546		$56,395	$9,022
10	1920	Computer Equipment - Hardware - 10 years	$16,667			$16,667	$5,833	$1,667		$7,500	$9,167
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$0	$0	$0	$0	$0	$0	$0	$0	$0
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1930	Transportation Equipment <3 Tonnes	$296,612	$0	-$56,902	$239,710	$110,427	$34,244	-$56,902	$87,770	$151,940
10	1930	Transportation Equipment >3 Tonnes	$1,028,563			$1,028,563	$513,512	$61,127		$574,638	$453,925
10	1930	Transportation Equipment Trailer	$111,357			$111,357	$77,634	$9,521		$87,155	$24,202
8	1935	Stores Equipment	$17,053	$0	$0	$17,053	$14,455	$274	$0	$14,729	$2,325
8	1940	Tools, Shop & Garage Equipment	$108,792	$2,584	-$305	$111,072	$81,667	$5,006	-$137	$86,536	$24,536
8	1945	Measurement & Testing Equipment	$45,657	$2,393	-$11,597	$36,452	$37,706	$1,890	-$11,597	$28,000	$8,452
8	1950	Power Operated Equipment	$59,971	$0	$0	$59,971	$56,095	$1,036	$0	$57,131	$2,840
8	1955	Communications Equipment	$18,412	$8,216	$0	$26,628	$9,522	$2,202	$0	$11,724	$14,904
8	1955	Communication Equipment (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1960	Miscellaneous Equipment	$18,987	$2,611	$0	$21,597	$15,330	$1,572	$0	$16,902	$4,695
47	1970	Load Management Controls Customer Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1975	Load Management Controls Utility Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1980	System Supervisor Equipment	$246,715	$0	$0	$246,715	$210,765	$6,958	$0	$217,723	$28,992
47	1985	Sentinel Lights	$2,516	$0	$0	$2,516	$2,516	$0	$0	$2,516	$0
47	1990	Other Tangible Property	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1995	Contributions & Grants	-$157,252	$0	$0	-$157,252	-$41,712	-$3,279	$0	-$44,991	-$112,261
47	1995	Contributions & Grants - O/H Conductor	-$70,035	$0	$0	-$70,035	-$18,663	-$1,039	$0	-$19,702	-$50,333
47	1995	Contributions & Grants - UG Conduit	-$350,698	$0	$0	-$350,698	-$137,166	-$3,833	$0	-$140,999	-$209,699
47	1995	Contributions & Grants - UG Cond&Dev	-$408,830	$0	$0	-$408,830	-$163,429	-$5,991	$0	-$169,420	-$239,410
47	1995	Contributions & Grants - OHLine Trans	-$4,186	$0	$0	-$4,186	-$2,073	-$87	$0	-$2,160	-$2,026
47	1995	Contributions & Grants - UGLine Trans	-$331,205	$0	$0	-$331,205	-$188,366	-$9,657	$0	-$198,023	-$133,182
47	1995	Contributions & Grants - OHServices	-$7,927	$0	$0	-$7,927	-$2,028	-$119	$0	-$2,147	-$5,780
47	1995	Contributions & Grants - UGServices	-$368,587	$0	$0	-$368,587	-$158,437	-$5,225	$0	-$163,662	-$204,925
47	1995	Contributions & Grants - Meters	-$36,762	$0	$0	-$36,762	-$30,208	-$1,157	$0	-$31,365	-$5,397
47	1995	Contributions & Grants - Meters PTs CTs	-$2,632	$0	$0	-$2,632	-$417	-$52	$0	-$470	-$2,163
14.1	1609	Capital Contribution Pd Contracts	$38,995	$0	$0	$38,995	$1,709	$867	$0	$2,576	$36,420
	2440	Deferred Revenue	-$984,869	-$40,311	$0	-$1,025,181	$39,407	$21,301	$0	$60,708	-$964,473
	etc.			$0	$0	$0		$0	$0	$0	$0
		Sub-Total	**$28,811,455**	**$631,186**	**-$167,659**	**$29,274,982**	**$12,206,475**	**$750,702**	**-$142,675**	**$12,814,502**	**$16,581,895**
		Less Socialized Renewable Energy Generation Investments (input as negative)Less Socialized Renewable Energy Generation Investments (input as negative)		$0	$0	$0		$0	$0	$0	$0
		Less Other Non Rate-Regulated Utility Assets *(input as negative)Less Other Non Rate-Regulated Utility Assets (input as negative)*				$0				$0	$0
		Total PP&E for Rate Base Purposes	**$ 28,811,455**	**$ 631,186**	**-$ 167,659**	**$ 29,274,982**	**$ 12,206,475**	**$ 750,702**	**-$ 142,675**	**$ 12,814,502**	**$ 16,581,895**
		Construction Work In Progress	$ -	$ 18,086		$ 18,086					$ -
		Total PP&E	**$28,811,455**	**$649,271**	**-$167,659**	**$29,293,068**	**$12,206,475**	**$750,702**	**-$142,675**	**$12,814,502**	**$16,581,895**
		Depreciation Expense adj. from gain or loss on the retirement of assets (pool of like assets)									
		Total						**$750,702**			

10		Transportation
8		Stores Equipment
8		Tools, Shop
8		Meas/Testing
		Deferred Revenue

Less: *Fully Allocated Depreciation*	
Transportation	-$ 104,892
Stores Equipment	-$ 274
Tools, Shop	
Meas/Testing	
Deferred Revenue	-$ 21,301
Net Depreciation	$624,236

Table 14: Fixed Asset Continuity Schedule for 2021

Year 2021

CCA Class	OEB	Description	Cost: Opening Balance	Cost: Additions	Cost: Disposals	Cost: Closing Balance	Accumulated Depreciation: Opening Balance	Accumulated Depreciation: Additions	Accumulated Depreciation: Disposals	Accumulated Depreciation: Closing Balance	Net Book Value
12	1611	Computer Software (Formally known as Account 1925)	$446,694	$20,815	-$8,565	$458,944	$385,640	$23,066	-$8,565	$400,141	$58,803
CEC	1612	Land Rights (Formally known as Account 1906 and 1806)	$37,132	$0	$0	$37,132	$12,911	$743	$0	$13,654	$23,478
N/A	1805	Land	$46,066	$0	$0	$46,066	$0	$0	$0	$0	$46,066
47	1808	Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0
13	1810	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1815	Transformer Station Equipment >50 kV	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1820	Distribution Station Equipment <50 kV	$7,723,478	$0	$0	$7,723,478	$1,443,293	$184,543	$0	$1,627,836	$6,095,641
47	1825	Storage Battery Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1830	Poles, Towers & Fixtures (wood)	$2,650,305	$262,396	-$18,911	$2,893,790	$860,700	$53,650	-$13,697	$900,653	$1,993,137
47	1830	Poles, Towers & Fixtures (steel/concrete)	$688,890	$6,342		$695,232	$372,689	$7,957	$0	$380,645	$314,586
47	1835	Overhead Conductors & Devices	$2,350,721	$177,190	-$24,395	$2,503,517	$823,282	$31,036	-$14,591	$839,727	$1,663,789
47	1840	Underground Conduit	$2,232,076	$217	$0	$2,232,294	$852,236	$23,917	$0	$876,153	$1,356,140
47	1845	Underground Conductors & Devices	$2,857,324	$112,466	-$15,335	$2,954,454	$1,185,769	$39,222	-$8,580	$1,216,412	$1,738,043
47	1850	Line Transformers (Overhead)	$757,543	$13,248	-$3,592	$767,198	$544,945	$10,900	-$3,296	$552,548	$214,651
47	1850	Line Transformers (Underground)	$3,062,292	$601	-$1,583	$3,061,310	$1,674,587	$75,057	-$1,274	$1,748,370	$1,312,939
47	1855	Services (Overhead)	$671,768	$63,894	-$6,553	$729,109	$319,507	$8,598	-$4,868	$323,237	$405,873
47	1855	Services (Underground)	$3,401,183	$67,610	-$12,187	$3,456,606	$2,077,392	$32,338	-$6,872	$2,102,858	$1,353,748
47	1860	Meters	$1,392,455	$22,067	-$22,574	$1,391,947	$922,054	$85,745	-$17,154	$990,645	$401,302
47	1860	Meters - CTs PTs	$114,391	$3,758		$118,149	$53,171	$2,297	$0	$55,467	$62,682
47	1860	Meters (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
N/A	1905	Land	$8,640	$0	$0	$8,640	$0	$0	$0	$0	$8,640
47	1908	Buildings & Fixtures (25 years)	$249,793		$0	$249,793	$76,105	$9,991	$0	$86,096	$163,697
47	1908	Buildings & Fixtures (50 years)	$1,055,104		$0	$1,055,104	$464,815	$21,781	$0	$486,596	$568,508
13	1910	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1915	Office Furniture & Equipment (10 years)	$89,711	$0	$0	$89,711	$61,660	$5,004	$0	$66,664	$23,047
8	1915	Office Furniture & Equipment (5 years)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1920	Computer Equipment - Hardware - 3 years	$61,739	$7,986	-$20,943	$48,783	$48,322	$5,313	-$19,768	$33,867	$14,916
10	1920	Computer Equipment - Hardware - 4 years	$93,390		-$6,345	$87,045	$76,677	$7,629	-$6,347	$77,958	$9,087
10	1920	Computer Equipment - Hardware - 5 years	$24,868			$24,868	$19,685	$1,481		$21,166	$3,702
10	1920	Computer Equipment - Hardware - 6 years	$65,417			$65,417	$56,395	$5,809		$62,204	$3,214
10	1920	Computer Equipment - Hardware - 10 years	$16,667			$16,667	$7,500	$1,667		$9,167	$7,500
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$0	$0	$0	$0	$0		$0	$0	$0
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$0	$0	$0	$0	$0		$0	$0	$0
10	1930	Transportation Equipment <3 Tonnes	$239,710	$0	$0	$239,710	$87,770	$31,557	$0	$119,327	$120,383
10	1930	Transportation Equipment >3 Tonnes	$1,028,563			$1,028,563	$574,638	$61,127	$0	$635,765	$392,799
10	1930	Transportation Equipment Trailer	$111,357			$111,357	$87,155	$8,574	$0	$95,729	$15,628
8	1935	Stores Equipment	$17,053	$0	$0	$17,053	$14,729	$274	$0	$15,002	$2,051
8	1940	Tools, Shop & Garage Equipment	$111,072	$5,859		$116,931	$86,536	$5,074	$0	$91,610	$25,321
8	1945	Measurement & Testing Equipment	$36,452		$0	$36,452	$28,000	$1,678	$0	$29,678	$6,774
8	1950	Power Operated Equipment	$59,971	$1,894	$0	$61,866	$57,131	$1,154	$0	$58,285	$3,581
8	1955	Communications Equipment	$26,628	$0	$0	$26,628	$11,724	$2,613	$0	$14,337	$12,291
8	1955	Communication Equipment (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1960	Miscellaneous Equipment	$21,597	$2,600	$0	$24,197	$16,902	$2,093	$0	$18,995	$5,202
47	1970	Load Management Controls Customer Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1975	Load Management Controls Utility Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1980	System Supervisor Equipment	$246,715	$0	$0	$246,715	$217,723	$6,958	$0	$224,681	$22,034
47	1985	Sentinel Lights	$2,516	$0	$0	$2,516	$2,516	$0	$0	$2,516	$0
47	1990	Other Tangible Property	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1995	Contributions & Grants	-$157,252	$0	$0	-$157,252	-$44,991	-$3,279	$0	-$48,269	-$108,982
47	1995	Contributions & Grants - O/H Conductor	-$70,035	$0	$0	-$70,035	-$19,702	-$1,039	$0	-$20,741	-$49,294
47	1995	Contributions & Grants - UG Conduit	-$350,698	$0	$0	-$350,698	-$140,999	-$3,833	$0	-$144,833	-$205,866
47	1995	Contributions & Grants - UG Cond&Dev	-$408,830	$0	$0	-$408,830	-$169,420	-$5,991	$0	-$175,411	-$233,419
47	1995	Contributions & Grants - OHLine Trans	-$4,186	$0	$0	-$4,186	-$2,160	-$87	$0	-$2,247	-$1,939
47	1995	Contributions & Grants - UGLine Trans	-$331,205	$0	$0	-$331,205	-$198,023	-$9,657	$0	-$207,680	-$123,525
47	1995	Contributions & Grants - OHServices	-$7,927	$0	$0	-$7,927	-$2,147	-$119	$0	-$2,266	-$5,660
47	1995	Contributions & Grants - UGServices	-$368,587	$0	$0	-$368,587	-$163,662	-$5,225	$0	-$168,887	-$199,700
47	1995	Contributions & Grants - Meters	-$36,762	$0	$0	-$36,762	-$31,365	-$980	$0	-$32,345	-$4,417
47	1995	Contributions & Grants - Meters PTs CTs	-$2,632	$0	$0	-$2,632	-$470	-$52	$0	-$522	-$2,111
14.1	1609	Capital Contribution Pd Contracts	$38,995	$0	$0	$38,995	$2,576	$867	$0	$3,442	$35,553
	2440	Deferred Revenue	-$1,025,181	-$90,620	$0	-$1,115,800	$60,708	$22,709	$0	$83,417	-$1,032,384
	etc.		$0	$0	$0	$0	$0	$0	$0	$0	$0
	etc.		$0	$0	$0	$0	$0	$0	$0	$0	$0
	etc.		$0	$0	$0	$0	$0	$0	$0	$0	$0
	etc.		$0	$0	$0	$0	$0	$0	$0	$0	$0
	etc.		$0	$0	$0	$0	$0	$0	$0	$0	$0
	etc.		$0	$0	$0	$0	$0	$0	$0	$0	$0
	etc.		$0	$0	$0	$0	$0	$0	$0	$0	$0
	etc.		$0	$0	$0	$0	$0	$0	$0	$0	$0
	etc.		$0	$0	$0	$0	$0	$0	$0	$0	$0
			$0	$0	$0	$0	$0	$0	$0	$0	$0
		Sub-Total	**$29,274,982**	**$678,323**	**-$140,984**	**$29,812,322**	**$12,814,502**	**$752,157**	**-$105,013**	**$13,461,646**	**$16,517,509**
		Less Socialized Renewable Energy Generation Investments (input as negative)Less Socialized Renewable Energy Generation Investments (input as negative)				$0				$0	$0
		Less Other Non Rate-Regulated Utility Assets *(input as negative)Less Other Non Rate-Regulated Utility Assets (input as negative)*				$0				$0	$0
		Total PP&E for Rate Base Purposes	**$ 29,274,982**	**$ 678,323**	**-$ 140,984**	**$ 29,812,322**	**$ 12,814,502**	**$ 752,157**	**-$ 105,013**	**$ 13,461,646**	**$ 16,517,509**
		Construction Work In Progress	$ 18,086	-$ 10,451		$ 7,635					$ -
		Total PP&E	**$29,293,068**	**$667,873**	**-$140,984**	**$29,819,957**	**$12,814,502**	**$752,157**	**-$105,013**	**$13,461,646**	**$16,517,509**
		Depreciation Expense adj. from gain or loss on the retirement of assets (pool of like assets)									
		Total						**$752,157**			

10		Transportation
8		Stores Equipment
8		Tools, Shop
8		Meas/Testing
		Deferred Revenue

Less: *Fully Allocated Depreciation*	
Transportation	-$ 101,257
Stores Equipment	-$ 274
Tools, Shop	
Meas/Testing	
Deferred Revenue	-$ 22,709
Net Depreciation	$627,917

Table 15: Fixed Asset Continuity Schedule for 2022

Year 2022

			Cost				Accumulated Depreciation				
CCA Class	OEB	Description	Opening Balance	Additions	Disposals	Closing Balance	Opening Balance	Additions	Disposals	Closing Balance	Net Book Value
12	1611	Computer Software (Formally known as Account 1925)	$458,944	$124,708	-$69,059	$514,593	$400,141	$45,214	-$69,059	$376,296	$138,297
CEC	1612	Land Rights (Formally known as Account 1906 and 1806)	$37,132	$0	$0	$37,132	$13,654	$743	$0	$14,397	$22,735
N/A	1805	Land	$46,066	$0	$0	$46,066	$0	$0	$0	$0	$46,066
47	1808	Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0
13	1810	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1815	Transformer Station Equipment >50 kV	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1820	Distribution Station Equipment <50 kV	$7,723,478		-$251,750	$7,471,727	$1,627,836	$175,480	-$251,750	$1,551,566	$5,920,161
47	1825	Storage Battery Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1830	Poles, Towers & Fixtures (Wood)	$2,893,790	$178,898	$221,599	$3,294,287	$900,653	$58,326	$228,893	$1,187,872	$2,106,415
47	1830	Poles, Towers & Fixtures (steel/concrete)	$695,232	$0	$0	$695,232	$380,645	$8,011	$0	$388,656	$306,576
47	1835	Overhead Conductors & Devices	$2,503,517	$99,807	-$2,777	$2,600,546	$839,727	$33,058	-$2,542	$870,243	$1,730,303
47	1840	Underground Conduit	$2,232,294	$0	$0	$2,232,294	$876,153	$23,918	$0	$900,072	$1,332,222
47	1845	Underground Conductors & Devices	$2,954,454	$41,772	-$1,308	$2,994,918	$1,216,412	$40,636	-$1,170	$1,255,877	$1,739,041
47	1850	Line Transformers (Overhead)	$767,198	$43,461	-$5,430	$805,229	$552,548	$11,737	-$4,974	$559,311	$245,918
47	1850	Line Transformers (Underground)	$3,061,310	$1,146	$0	$3,062,456	$1,748,370	$75,050	$0	$1,823,420	$1,239,036
47	1855	Services (Overhead)	$729,109	$43,725	-$2,162	$770,672	$323,237	$9,286	-$1,605	$330,918	$439,754
47	1855	Services (Underground)	$3,456,606	$34,502	-$1,633	$3,489,475	$2,102,858	$33,272	-$1,495	$2,134,634	$1,354,841
47	1860	Meters	$1,391,947	$73,623	-$19,440	$1,446,130	$990,645	$87,367	-$16,184	$1,061,827	$384,303
47	1860	Meters - CTs PTs	$118,149	$5,931	$0	$124,080	$55,467	$2,394	$0	$57,862	$66,219
47	1860	Meters (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
N/A	1905	Land	$8,640	$0	$0	$8,640	$0	$0	$0	$0	$8,640
47	1908	Buildings & Fixtures (25 years)	$249,793	$0	$0	$249,793	$86,096	$9,991	$0	$96,088	$153,705
47	1908	Buildings & Fixtures (50 years)	$1,055,104			$1,055,104	$486,596	$21,781	$0	$508,377	$546,727
13	1910	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1915	Office Furniture & Equipment (10 years)	$89,711	$14,253	-$16,405	$87,559	$66,664	$5,248	-$16,405	$55,506	$32,052
8	1915	Office Furniture & Equipment (5 years)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1920	Computer Equipment - Hardware - 3 years	$48,783	$29,158	-$6,174	$71,767	$33,867	$10,808	-$6,174	$38,501	$33,266
10	1920	Computer Equipment - Hardware - 4 years	$87,045			$87,045	$77,958	$6,935	$0	$84,893	$2,151
10	1920	Computer Equipment - Hardware - 5 years	$24,868			$24,868	$21,166	$1,481	$0	$22,647	$2,221
10	1920	Computer Equipment - Hardware - 6 years	$65,417			$65,417	$62,204	714.14	$0	$62,918	$2,499
10	1920	Computer Equipment - Hardware - 10 years	$16,667			$16,667	$9,167	$1,667	$0	$10,833	$5,833
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$0	$0	$0	$0	$0	$0	$0	$0	$0
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1930	Transportation Equipment <3 Tonnes	$239,710	$0	$0	$239,710	$119,327	$28,869	$0	$148,196	$91,514
10	1930	Transportation Equipment >3 Tonnes	$1,028,563	$0	$0	$1,028,563	$635,765	$61,127	$0	$696,891	$331,672
10	1930	Transportation Equipment Trailer	$111,357	$0	$0	$111,357	$95,729	$7,627	$0	$103,356	$8,001
8	1935	Stores Equipment	$17,053	$0	$0	$17,053	$15,002	$274	$0	$15,276	$1,778
8	1940	Tools, Shop & Garage Equipment	$116,931	$2,026	-$3,215	$115,742	$91,610	$5,145	-$3,215	$93,540	$22,202
8	1945	Measurement & Testing Equipment	$36,452	$18,805	$0	$55,257	$29,678	$2,118	$0	$31,796	$23,461
8	1950	Power Operated Equipment	$61,866	$0	$0	$61,866	$58,285	$1,272	$0	$59,557	$2,308
8	1955	Communications Equipment	$26,628	$4,994	$0	$31,622	$14,337	$2,863	$0	$17,200	$14,422
8	1955	Communication Equipment (Smart Meters)	$0	$0	$0	$0	$0		$0	$0	$0
8	1960	Miscellaneous Equipment	$24,197	$0	$0	$24,197	$18,995	$1,887	$0	$20,882	$3,315
47	1970	Load Management Controls Customer Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1975	Load Management Controls Utility Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1980	System Supervisor Equipment	$246,715	$0	$0	$246,715	$224,681	$6,958	$0	$231,639	$15,076
47	1985	Sentinel Lights	$2,516	$0	$0	$2,516	$2,516	$0	$0	$2,516	$0
47	1990	Other Tangible Property	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1995	Contributions & Grants	-$157,252	$0	$0	-$157,252	-$48,269	-$3,279	$0	-$51,548	-$105,704
47	1995	Contributions & Grants - O/H Conductor	-$70,035	$0	$0	-$70,035	-$20,741	-$1,039	$0	-$21,781	-$48,255
47	1995	Contributions & Grants - UG Conduit	-$350,698	$0	$0	-$350,698	-$144,833	-$3,833	$0	-$148,666	-$202,032
47	1995	Contributions & Grants - UG Cond&Dev	-$408,830	$0	$0	-$408,830	-$175,411	-$5,991	$0	-$181,403	-$227,427
47	1995	Contributions & Grants - OHLine Trans	-$4,186	$0	$0	-$4,186	-$2,247	-$87	$0	-$2,334	-$1,852
47	1995	Contributions & Grants - UGLine Trans	-$331,205	$0	$0	-$331,205	-$207,680	-$9,657	$0	-$217,337	-$113,868
47	1995	Contributions & Grants - OHServices	-$7,927	$0	$0	-$7,927	-$2,266	-$119	$0	-$2,386	-$5,541
47	1995	Contributions & Grants - UGServices	-$368,587	$0	$0	-$368,587	-$168,887	-$5,225	$0	-$174,111	-$194,475
47	1995	Contributions & Grants - Meters	-$36,762	$0	$0	-$36,762	-$32,345	-$804	$0	-$33,149	-$3,613
47	1995	Contributions & Grants - Meters PTs CTs	-$2,632	$0	$0	-$2,632	-$522	-$52	$0	-$574	-$2,059
14.1	1609	Capital Contribution Pd Contracts	$38,995	$0	$0	$38,995	$3,442	$867	$0	$4,309	$34,687
	2440	Deferred Revenue	-$1,115,800	-$32,727	$0	-$1,148,528	$83,417	$24,023	$0	$107,439	-$1,041,089
			$0	$0	$0	$0	$0	$0	$0	$0	$0
		Sub-Total	**$29,812,322**	**$684,081**	**-$157,753**	**$30,338,650**	**$13,461,646**	**$776,059**	**$0**	**$14,092,025**	**$16,461,502**
		Less Socialized Renewable Energy Generation Investments (input as negative)Less Socialized Renewable Energy Generation Investments (input as negative)				$0				$0	$0
		Less Other Non Rate-Regulated Utility Assets (input as negative)Less Other Non Rate-Regulated Utility Assets (input as negative)				$0				$0	$0
		Total PP&E for Rate Base Purposes	**$ 29,812,322**	**$ 684,081**	**-$ 157,753**	**$ 30,338,650**	**$ 13,461,646**	**$ 776,059**	**$ -**	**$ 14,092,025**	**$ 16,461,502**
		Construction Work In Progress	$ 7,635	$ 137,747		$ 145,382					$ -
		Total PP&E	**$29,819,957**	**$821,828**	**-$157,753**	**$30,484,032**	**$13,461,646**	**$776,059**	**$0**	**$14,092,025**	**$16,461,502**
		Depreciation Expense adj. from gain or loss on the retirement of assets (pool of like assets)									
		Total						**$776,059**			

10		Transportation
8		Stores Equipment
8		Tools, Shop
8		Meas/Testing
		Deferred Revenue

Less: *Fully Allocated Depreciation*	
Transportation	-$ 97,623
Stores Equipment	-$ 274
Tools, Shop	
Adj to Accum 1830 poles	-$ 251,750
Deferred Revenue	-$ 24,023
Net Depreciation	$402,390

Table 16: Fixed Asset Continuity Schedule for 2023

Year 2023

			Cost				Accumulated Depreciation				
CCA Class	OEB	Description	Opening Balance	Additions	Disposals	Closing Balance	Opening Balance	Additions	Disposals	Closing Balance	Net Book Value
12	1611	Computer Software (Formally known as Account 1925)	$514,593	$4,000	$0	$518,593	$376,296	$61,367	$0	$437,662	$80,930
CEC	1612	Land Rights (Formally known as Account 1906 and 1806)	$37,132	$0	$0	$37,132	$14,397	$743	$0	$15,141	$21,991
N/A	1805	Land	$46,066	$0	$0	$46,066	$0	$0	$0	$0	$46,066
47	1808	Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0
13	1810	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1815	Transformer Station Equipment >50 kV	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1820	Distribution Station Equipment <50 kV	$7,471,727	$103,275	$0	$7,575,003	$1,551,566	$178,012	$0	$1,729,578	$5,845,424
47	1825	Storage Battery Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1830	Poles, Towers & Fixtures (Wood)	$3,294,287	$343,605	-$130,364	$3,507,528	$1,187,872	$63,903	-$123,712	$1,128,064	$2,379,464
47	1830	Poles, Towers & Fixtures (steel/concrete)	$695,232	$108,330	$0	$803,562	$388,656	$8,913	$0	$397,569	$405,992
47	1835	Overhead Conductors & Devices	$2,600,546	$181,397	-$5,945	$2,775,999	$870,243	$34,966	-$4,472	$900,737	$1,875,262
47	1840	Underground Conduit	$2,232,294		$0	$2,232,294	$900,072	$23,918	$0	$923,990	$1,308,303
47	1845	Underground Conductors & Devices	$2,994,918	$27,696	-$12,055	$3,010,560	$1,255,877	$41,085	-$4,694	$1,292,268	$1,718,292
47	1850	Line Transformers (Overhead)	$805,229	$46,751	-$17,348	$834,632	$559,311	$11,799	-$14,025	$557,084	$277,548
47	1850	Line Transformers (Underground)	$3,062,456	$42,521	-$45,351	$3,059,626	$1,823,420	$75,388	-$41,710	$1,857,098	$1,202,527
47	1855	Services (Overhead)	$770,672	$47,818	-$4,931	$813,559	$330,918	$9,891	-$3,774	$337,035	$476,524
47	1855	Services (Underground)	$3,489,475	$40,814	-$189	$3,530,100	$2,134,634	$32,708	-$188	$2,167,155	$1,362,946
47	1860	Meters	$1,446,130	$21,773	-$17,431	$1,450,472	$1,061,827	$56,322	-$15,294	$1,102,855	$347,617
47	1860	Meters CTs PTs	$124,080	$948	$0	$125,028	$57,862	$2,455	$0	$60,317	$64,712
47	1860	Meters (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
N/A	1905	Land	$8,640	$0	$0	$8,640	$0	$0	$0	$0	$8,640
47	1908	Buildings & Fixtures (25 years)	$249,793	$117,560	$0	$367,353	$96,088	$10,331	$0	$106,418	$260,935
47	1908	Buildings & Fixtures (50 years)	$1,055,104	$0	$0	$1,055,104	$508,377	$21,781	$0	$530,158	$524,946
13	1910	Leasehold Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1915	Office Furniture & Equipment (10 years)	$87,559	$2,420	-$8,411	$81,568	$55,506	$5,493	-$8,196	$52,803	$28,765
8	1915	Office Furniture & Equipment (5 years)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1920	Computer Equipment - Hardware - 3 years	$71,767	$8,385	-$20,830	$59,322	$38,501	$14,104	-$20,830	$31,775	$27,547
10	1920	Computer Equipment - Hardware - 4 years	$87,045		-$52,594	$34,451	$84,893	$4,865	-$52,594	$37,165	-$2,714
10	1920	Computer Equipment - Hardware - 5 years	$24,868	$4,824	-$1,896	$27,796	$22,647	$1,963	-$1,896	$22,714	$5,082
10	1920	Computer Equipment - Hardware - 6 years	$65,417			$65,417	$62,918	$714	$0	$63,632	$1,785
10	1920	Computer Equipment - Hardware - smart meter	$16,667			$16,667	$10,833	$1,667		$12,500	$4,167
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$0	$0	$0	$0	$0	$0	$0	$0	$0
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	1930	Transportation Equipment <3 Tonnes	$239,710	$77,079	-$37,626	$279,164	$148,196	$34,375	-$37,626	$144,945	$134,218
10	1930	Transportation Equipment >3 Tonnes	$1,028,563			$1,028,563	$696,891	$61,127		$758,018	$270,545
10	1930	Transportation Equipment Trailer	$111,357			$111,357	$103,356	$5,907		$109,264	$2,094
8	1935	Stores Equipment	$17,053	$6,338	$0	$23,392	$15,276	$590	$0	$15,866	$7,526
8	1940	Tools, Shop & Garage Equipment	$115,742	$3,136		$118,879	$93,540	$5,058	$0	$98,598	$20,280
8	1945	Measurement & Testing Equipment	$55,257	$0	$0	$55,257	$31,796	$2,720	$0	$34,516	$20,741
8	1950	Power Operated Equipment	$61,866	$0	$0	$61,866	$59,557	$880	$0	$60,437	$1,429
8	1955	Communications Equipment	$31,622	$0	$0	$31,622	$17,200	$2,872	$0	$20,072	$11,550
8	1955	Communication Equipment (Smart Meters)	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	1960	Miscellaneous Equipment	$24,197	$2,355	-$1,336	$25,216	$20,882	$1,467	-$1,336	$21,013	$4,203
47	1970	Load Management Controls Customer Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1975	Load Management Controls Utility Premises	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1980	System Supervisor Equipment	$246,715	$0	$0	$246,715	$231,639	$6,958	$0	$238,597	$8,117
47	1985	Sentinel Lights	$2,516	$0	-$2,516	$0	$2,516	$0	-$2,516	$0	$0
47	1990	Other Tangible Property	$0	$0	$0	$0	$0	$0	$0	$0	$0
47	1995	Contributions & Grants - PolesTwrs Fix	-$157,252	$0	$0	-$157,252	-$51,548	-$3,279	$0	-$54,827	-$102,425
47	1995	Contributions & Grants - O/H Conductor	-$70,035	$0	$0	-$70,035	-$21,781	-$1,039	$0	-$22,820	-$47,216
47	1995	Contributions & Grants - UG Conduit	-$350,698	$0	$0	-$350,698	-$148,666	-$3,833	$0	-$152,499	-$198,199
47	1995	Contributions & Grants - UG Cond&Dev	-$408,830	$0	$0	-$408,830	-$181,403	-$5,991	$0	-$187,394	-$221,436
47	1995	Contributions & Grants - OHLine Trans	-$4,186	$0	$0	-$4,186	-$2,334	-$87	$0	-$2,421	-$1,765
47	1995	Contributions & Grants - UGLine Trans	-$331,205	$0	$0	-$331,205	-$217,337	-$9,657	$0	-$226,994	-$104,211
47	1995	Contributions & Grants - OHServices	-$7,927	$0	$0	-$7,927	-$2,386	-$119	$0	-$2,505	-$5,422
47	1995	Contributions & Grants - UGServices	-$368,587	$0	$0	-$368,587	-$174,111	-$5,225	$0	-$179,336	-$189,250
47	1995	Contributions & Grants - Meters	-$36,762	$0	$0	-$36,762	-$33,149	-$804	$0	-$33,953	-$2,809
47	1995	Contributions & Grants - Meters PTs CTs	-$2,632	$0	$0	-$2,632	-$574	-$52	$0	-$626	-$2,007
14.1	1609	Capital Contribution Pd Contracts	$38,995	$0	$0	$38,995	$4,309	$867	$0	$5,176	$33,820
	2440	Deferred Revenue	-$1,148,528	-$51,957	$0	-$1,200,485	$107,439	$24,902	$0	$132,342	-$1,068,143
			$0		$0	$0	$0	$0	$0	$0	$0
		Sub-Total	**$30,338,650**	**$1,139,070**	**-$358,822**	**$31,118,897**	**$14,092,025**	**$780,025**	**-$332,862**	**$14,539,189**	**$16,844,391**
		Less Socialized Renewable Energy Generation Investments (input as negative)Less Socialized Renewable Energy Generation Investments (input as negative)				$0				$0	$0
		Less Other Non Rate-Regulated Utility Assets (input as negative)Less Other Non Rate-Regulated Utility Assets (input as negative)				$0				$0	$0
		Total PP&E for Rate Base Purposes	**$ 30,338,650**	**$ 1,139,070**	**-$ 358,822**	**$ 31,118,897**	**$ 14,092,025**	**$ 780,025**	**-$ 332,862**	**$ 14,539,189**	**$ 16,844,391**
		Construction Work In Progress	$ 145,382	$ 62,520		$ 207,902					$ -
		Total PP&E	**$30,484,032**	**$1,201,589**	**-$358,822**	**$31,326,798**	**$14,092,025**	**$780,025**	**-$332,862**	**$14,539,189**	**$16,844,391**
		Depreciation Expense adj. from gain or loss on the retirement of assets (pool of like assets)									
		Total						**$780,025**			

10		Transportation
8		Stores Equipment
8		Tools, Shop
8		Meas/Testing
		Deferred Revenue

Less: *Fully Allocated Depreciation*	
Transportation	-$ 101,409
Stores Equipment	-$ 590
Tools, Shop	
Meas/Testing	
Deferred Revenue	-$ 24,902
Net Depreciation	$653,124

Table 17: Fixed Asset Continuity Schedule for 2024

Year 2024

CCA Class	OEB	Description	Cost: Opening Balance	Cost: Additions	Cost: Disposals	Cost: Closing Balance	Accumulated Depreciation: Opening Balance	Accumulated Depreciation: Additions	Accumulated Depreciation: Disposals	Accumulated Depreciation: Closing Balance	Net Book Value
12	1611	Computer Software (Formally known as Account 1925)	$518,593	$246,400	-$15,000	$749,993	$437,662	$78,861	$0	$516,523	$233,469
CEC	1612	Land Rights (Formally known as Account 1906 and 1806)	$37,132			$37,132	$15,141	$743	$0	$15,884	$21,248
N/A	1805	Land	$46,066			$46,066	$0		$0	$0	$46,066
47	1808	Buildings	$0			$0	$0		$0	$0	$0
13	1810	Leasehold Improvements	$0			$0	$0		$0	$0	$0
47	1815	Transformer Station Equipment >50 kV	$0			$0	$0		$0	$0	$0
47	1820	Distribution Station Equipment <50 kV	$7,575,003	$931,700	-$204,373	$8,302,329	$1,729,578	$172,798	-$45,300	$1,857,076	$6,445,253
47	1825	Storage Battery Equipment	$0			$0	$0		$0	$0	$0
47	1830	Poles, Towers & Fixtures (Wood)	$3,507,528	$286,500	-$15,000	$3,779,028	$1,128,064	$70,992	-$10,000	$1,189,055	$2,589,973
47	1830	Poles, Towers & Fixtures (steel/concrete)	$803,562		$0	$803,562	$397,569	$9,831	$0	$407,401	$396,161
47	1835	Overhead Conductors & Devices	$2,775,999	$206,010	-$10,000	$2,972,009	$900,737	$37,737	-$9,000	$929,474	$2,042,535
47	1840	Underground Conduit	$2,232,294	$16,319	$0	$2,248,613	$923,990	$24,035	$0	$948,025	$1,300,587
47	1845	Underground Conductors & Devices	$3,010,560	$170,594	$0	$3,181,154	$1,292,268	$42,892	$0	$1,335,160	$1,845,994
47	1850	Line Transformers (Overhead)	$834,632	$114,300	-$15,600	$933,332	$557,084	$13,695	-$14,000	$556,779	$376,553
47	1850	Line Transformers (Underground)	$3,059,626	$190,107	-$9,600	$3,240,133	$1,857,098	$79,110	-$8,000	$1,928,208	$1,311,924
47	1855	Services (Overhead)	$813,559	$46,400	-$6,800	$853,159	$337,035	$10,502	-$6,000	$341,537	$511,622
47	1855	Services (Underground)	$3,530,100	$62,966	-$3,200	$3,589,866	$2,167,155	$35,226	-$3,000	$2,199,381	$1,390,486
47	1860	Meters	$1,450,472	$52,500	-$23,000	$1,479,972	$1,102,855	$57,943	-$19,000	$1,141,798	$338,174
47	1860	Meters CTs PTs	$125,028			$125,028	$60,317	$2,474	$0	$62,791	$62,238
47	1860	Meters (Smart Meters)	$0			$0	$0		$0	$0	$0
N/A	1905	Land	$8,640			$8,640	$0		$0	$0	$8,640
47	1908	Buildings & Fixtures (25 years)	$367,353	$45,000		$412,353	$106,418	$17,605	$0	$124,024	$288,329
47	1908	Buildings & Fixtures (50 years)	$1,055,104			$1,055,104	$530,158	$15,530	$0	$545,688	$509,417
13	1910	Leasehold Improvements	$0			$0	$0		$0	$0	$0
8	1915	Office Furniture & Equipment (10 years)	$81,568			$81,568	$52,803	$5,553	$0	$58,356	$23,212
8	1915	Office Furniture & Equipment (5 years)	$0			$0	$0		$0	$0	$0
10	1920	Computer Equipment - Hardware - 3 years	$59,322	$12,000	-$6,116	$65,207	$31,775	$15,498	-$6,116	$41,157	$24,049
10	1920	Computer Equipment - Hardware - 4 years	$34,451		-$12,040	$22,411	$37,165	$2,283	-$12,040	$27,408	-$4,997
10	1920	Computer Equipment - Hardware - 5 years	$27,796		-$15,567	$12,229	$22,714	$1,708	-$15,567	$8,855	$3,374
10	1920	Computer Equipment - Hardware - 6 years	$65,417	$53,200	-$61,132	$57,485	$63,632	$5,147	-$61,132	$7,647	$49,838
10	1920	Computer Equipment - Hardware - 10 years	$16,667			$16,667	$12,500	$1,667	$0	$14,167	$2,500
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$0			$0	$0		$0	$0	$0
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$0			$0	$0		$0	$0	$0
10	1930	Transportation Equipment <3 Tonnes	$279,164			$279,164	$144,945	$37,499	$0	$182,444	$96,720
10	1930	Transportation Equipment >3 Tonnes	$1,028,563	$640,000	-$295,138	$1,373,425	$758,018	$87,793	-$295,138	$550,673	$822,752
10	1930	Transportation Equipment Trailer	$111,357			$111,357	$109,264	$2,094	$0	$111,358	$0
8	1935	Stores Equipment	$23,392			$23,392	$15,866	$1,174	$0	$17,040	$6,352
8	1940	Tools, Shop & Garage Equipment	$118,879	$5,100		$123,979	$98,598	$4,631	$0	$103,229	$20,749
8	1945	Measurement & Testing Equipment	$55,257	$1,500		$56,757	$34,516	$2,795	$0	$37,311	$19,446
8	1950	Power Operated Equipment	$61,866			$61,866	$60,437	$363	$0	$60,800	$1,066
8	1955	Communications Equipment	$31,622			$31,622	$20,072	$2,631	$0	$22,703	$8,919
8	1955	Communication Equipment (Smart Meters)	$0			$0	$0	$0	$0	$0	$0
8	1960	Miscellaneous Equipment	$25,216			$25,216	$21,013	$1,513	$0	$22,526	$2,690
47	1970	Load Management Controls Customer Premises	$0			$0	$0	$0	$0	$0	$0
47	1975	Load Management Controls Utility Premises	$0			$0	$0	$0	$0	$0	$0
47	1980	System Supervisor Equipment	$246,715			$246,715	$238,597	$6,958	$0	$245,555	$1,159
47	1985	Sentinel Lights	$0			$0	$0	$0	$0	$0	$0
47	1990	Other Tangible Property	$0			$0	$0	$0	$0	$0	$0
47	1995	Contributions & Grants - PolesTwrs Fix	-$157,252			-$157,252	-$54,827	-$3,279	$0	-$58,106	-$99,146
47	1995	Contributions & Grants - O/H Conductor	-$70,035			-$70,035	-$22,820	-$1,039	$0	-$23,859	-$46,177
47	1995	Contributions & Grants - UG Conduit	-$350,698			-$350,698	-$152,499	-$3,833	$0	-$156,332	-$194,366
47	1995	Contributions & Grants - UG Cond&Dev	-$408,830			-$408,830	-$187,394	-$5,991	$0	-$193,385	-$215,445
47	1995	Contributions & Grants - OHLine Trans	-$4,186			-$4,186	-$2,421	-$87	$0	-$2,508	-$1,678
47	1995	Contributions & Grants - UGLine Trans	-$331,205			-$331,205	-$226,994	-$9,657	$0	-$236,651	-$94,554
47	1995	Contributions & Grants - OHServices	-$7,927			-$7,927	-$2,505	-$119	$0	-$2,624	-$5,303
47	1995	Contributions & Grants - UGServices	-$368,587			-$368,587	-$179,336	-$5,225	$0	-$184,561	-$184,025
47	1995	Contributions & Grants - Meters	-$36,762			-$36,762	-$33,953	-$804	$0	-$34,757	-$2,005
47	1995	Contributions & Grants - Meters PTs CTs	-$2,632			-$2,632	-$626	-$52	$0	-$678	-$1,955
14.1	1609	Capital Contribution Pd Contracts	$38,995			$38,995	$5,176	$867	$0	$6,043	$32,953
	2440	Deferred Revenue	-$1,200,485	-$79,100		-$1,279,585	$132,342	-$25,472	$0	$106,870	-$1,172,715
			$0			$0	$0	$0	$0	$0	$0
			$0		$0	$0	$0	$0	$0	$0	$0
		Sub-Total	**$31,118,897**	**$3,001,496**	**-$692,566**	**$33,427,827**	**$14,539,189**	**$794,591**	**-$504,293**	**$14,829,487**	**$18,812,080**
		Less Socialized Renewable Energy Generation Investments (input as negative)Less Socialized Renewable Energy Generation Investments (input as negative)				$0				$0	$0
		Less Other Non Rate-Regulated Utility Assets (input as negative)Less Other Non Rate-Regulated Utility Assets (input as negative)	$0			$0				$0	$0
		Total PP&E for Rate Base Purposes	**$ 31,118,897**	**$ 3,001,496**	**-$ 692,566**	**$ 33,427,827**	**$ 14,539,189**	**$ 794,591**	**-$ 504,293**	**$ 14,829,487**	**$ 18,812,080**
		Construction Work In Progress				$ -					$ -
		Total PP&E	**$31,118,897**	**$3,001,496**	**-$692,566**	**$33,427,827**	**$14,539,189**	**$794,591**	**-$504,293**	**$14,829,487**	**$18,812,080**
		Depreciation Expense adj. from gain or loss on the retirement of assets (pool of like assets)									
		Total						**$794,591**			

10		Transportation
8		Stores Equipment
8		Tools, Shop
8		Meas/Testing
		Deferred Revenue

Less: *Fully Allocated Depreciation*	
Transportation	-$ 127,386
Stores Equipment	-$ 1,174
Tools, Shop	
Meas/Testing	
Deferred Revenue	$ 25,472
Net Depreciation	$691,503

Table 18: Fixed Asset Continuity Schedule for 2025

Year 2025

			Cost				Accumulated Depreciation				
CCA Class	**OEB**	**Description**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Net Book Value**
12	1611	Computer Software (Formally known as Account 1925)	$749,993			$749,993	$516,523	$75,333	$0	$591,856	$158,136
CEC	1612	Land Rights (Formally known as Account 1906 and 1806)	$37,132			$37,132	$15,884	$743	$0	$16,627	$20,505
N/A	1805	Land	$46,066			$46,066	$0		$0	$0	$46,066
47	1808	Buildings	$0			$0	$0		$0	$0	$0
13	1810	Leasehold Improvements	$0			$0	$0		$0	$0	$0
47	1815	Transformer Station Equipment >50 kV	$0			$0	$0		$0	$0	$0
47	1820	Distribution Station Equipment <50 kV	$8,302,329			$8,302,329	$1,857,076	$183,137	$0	$2,040,213	$6,262,116
47	1825	Storage Battery Equipment	$0			$0	$0		$0	$0	$0
47	1830	Poles, Towers & Fixtures (Wood)	$3,779,028	$376,200	-$15,000	$4,140,228	$1,189,055	$78,427	-$10,000	$1,257,482	$2,882,746
47	1830	Poles, Towers & Fixtures (steel/concrete)	$803,562		$0	$803,562	$407,401	$9,831	$0	$417,232	$386,330
47	1835	Overhead Conductors & Devices	$2,972,009	$253,400	-$10,000	$3,215,409	$929,474	$38,620	-$9,000	$959,094	$2,256,315
47	1840	Underground Conduit	$2,248,613	$32,600	$0	$2,281,213	$948,025	$24,386	$0	$972,411	$1,308,801
47	1845	Underground Conductors & Devices	$3,181,154	$82,400	$0	$3,263,554	$1,335,160	$45,221	$0	$1,380,381	$1,883,173
47	1850	Line Transformers (Overhead)	$933,332	$62,100	-$15,600	$979,832	$556,779	$15,715	-$14,000	$558,494	$421,338
47	1850	Line Transformers (Underground)	$3,240,133	$249,100	-$9,600	$3,479,633	$1,928,208	$86,586	-$8,000	$2,006,794	$1,472,838
47	1855	Services (Overhead)	$853,159	$54,400	-$6,800	$900,759	$341,537	$9,860	-$6,000	$345,397	$555,362
47	1855	Services (Underground)	$3,589,866	$40,300	-$3,200	$3,626,966	$2,199,381	$36,175	-$3,000	$2,232,556	$1,394,411
47	1860	Meters	$1,479,972	$24,900	-$23,000	$1,481,872	$1,141,798	$59,311	-$19,000	$1,182,109	$299,763
47	1860	Meters CTs PTs	$125,028			$125,028	$62,791	$2,474	$0	$65,265	$59,764
47	1860	Meters (Smart Meters)	$0			$0	$0		$0	$0	$0
N/A	1905	Land	$8,640			$8,640	$0		$0	$0	$8,640
47	1908	Buildings & Fixtures (25 years)	$412,353	$72,300		$484,653	$124,024	$17,593	$0	$141,617	$343,036
47	1908	Buildings & Fixtures (50 years)	$1,055,104			$1,055,104	$545,688	$17,888	$0	$563,575	$491,529
13	1910	Leasehold Improvements	$0			$0	$0		$0	$0	$0
8	1915	Office Furniture & Equipment (10 years)	$81,568			$81,568	$58,356	$5,327	$0	$63,683	$17,885
8	1915	Office Furniture & Equipment (5 years)	$0			$0	$0		$0	$0	$0
10	1920	Computer Equipment - Hardware - 3 years	$65,207	$27,400	-$5,903	$86,704	$41,157	$16,221	-$5,903	$51,476	$35,228
10	1920	Computer Equipment - Hardware - 4 years	$22,411	$30,000	-$17,571	$34,840	$27,408	$3,750	-$17,571	$13,587	$21,253
10	1920	Computer Equipment - Hardware - 5 years	$12,229		-$7,405	$4,824	$8,855	$965	-$7,405	$2,415	$2,409
10	1920	Computer Equipment - Hardware - 6 years	$57,485			$57,485	$7,647	$9,581	$0	$17,228	$40,257
10	1920	Computer Equipment - Hardware - smart meter	$16,667			$16,667	$14,167	$1,667		$15,833	$833
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$0			$0	$0		$0	$0	$0
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$0			$0	$0		$0	$0	$0
10	1930	Transportation Equipment <3 Tonnes	$279,164			$279,164	$182,444	$35,117	$0	$217,560	$61,603
10	1930	Transportation Equipment >3 Tonnes	$1,373,425			$1,373,425	$550,673	$114,460		$665,133	$708,292
10	1930	Transportation Equipment Trailer	$111,357			$111,357	$111,358	$0		$111,358	$0
8	1935	Stores Equipment	$23,392			$23,392	$17,040	$1,174	$0	$18,214	$5,178
8	1940	Tools, Shop & Garage Equipment	$123,979	$11,600		$135,579	$103,229	$4,868	$0	$108,097	$27,481
8	1945	Measurement & Testing Equipment	$56,757	$1,500		$58,257	$37,311	$2,945	$0	$40,256	$18,001
8	1950	Power Operated Equipment	$61,866			$61,866	$60,800	$237	$0	$61,037	$829
8	1955	Communications Equipment	$31,622			$31,622	$22,703	$1,976	$0	$24,679	$6,943
8	1955	Communication Equipment (Smart Meters)	$0			$0	$0	$0	$0	$0	$0
8	1960	Miscellaneous Equipment	$25,216			$25,216	$22,526	$1,252	$0	$23,778	$1,438
47	1970	Load Management Controls Customer Premises	$0			$0	$0	$0	$0	$0	$0
47	1975	Load Management Controls Utility Premises	$0			$0	$0	$0	$0	$0	$0
47	1980	System Supervisor Equipment	$246,715			$246,715	$245,555	$1,159	$0	$246,714	$0
47	1985	Sentinel Lights	$0			$0	$0	$0	$0	$0	$0
47	1990	Other Tangible Property	$0			$0	$0	$0	$0	$0	$0
47	1995	Contributions & Grants - PolesTwrs Fix	-$157,252			-$157,252	-$58,106	-$3,279	$0	-$61,385	-$95,867
47	1995	Contributions & Grants - O/H Conductor	-$70,035			-$70,035	-$23,859	-$1,039	$0	-$24,898	-$45,138
47	1995	Contributions & Grants - UG Conduit	-$350,698			-$350,698	-$156,332	-$3,833	$0	-$160,165	-$190,533
47	1995	Contributions & Grants - UG Cond&Dev	-$408,830			-$408,830	-$193,385	-$5,991	$0	-$199,376	-$209,454
47	1995	Contributions & Grants - OHLine Trans	-$4,186			-$4,186	-$2,508	-$87	$0	-$2,595	-$1,591
47	1995	Contributions & Grants - UGLine Trans	-$331,205			-$331,205	-$236,651	-$9,657	$0	-$246,308	-$84,897
47	1995	Contributions & Grants - OHServices	-$7,927			-$7,927	-$2,624	-$119	$0	-$2,743	-$5,184
47	1995	Contributions & Grants - UGServices	-$368,587			-$368,587	-$184,561	-$5,225	$0	-$189,786	-$178,800
47	1995	Contributions & Grants - Meters	-$36,762			-$36,762	-$34,757	-$804	$0	-$35,561	-$1,201
47	1995	Contributions & Grants - Meters PTs CTs	-$2,632			-$2,632	-$678	-$52	$0	-$730	-$1,903
14.1	1609	Capital Contribution Pd Contracts	$38,995			$38,995	$6,043	$867	$0	$6,910	$32,086
	2440	Deferred Revenue	-$1,279,585			-$1,279,585	$106,870	$25,500	$0	$132,370	-$1,147,215
			$0	$0	$0	$0	$0		$0	$0	$0
	etc.		$0	$0	$0	$0		$0	$0	$0	$0
	etc.		$0	$0	$0	$0		$0	$0	$0	$0
	etc.		$0	$0	$0	$0		$0	$0	$0	$0
	etc.		$0	$0	$0	$0		$0	$0	$0	$0
	etc.		$0	$0	$0	$0		$0	$0	$0	$0
	etc.		$0	$0	$0	$0		$0	$0	$0	$0
	etc.		$0	$0	$0	$0		$0	$0	$0	$0
	etc.		$0	$0	$0	$0		$0	$0	$0	$0
			$0	$0	$0	$0		$0	$0	$0	$0
		Sub-Total	**$33,427,827**	**$1,318,200**	**-$114,079**	**$34,631,947**	**$14,829,487**	**$898,279**	**-$99,879**	**$15,627,886**	**$19,268,800**
		Less Socialized Renewable Energy Generation Investments (input as negative)Less Socialized Renewable Energy Generation Investments (input as negative)	$0			$0				$0	$0
		Less Other Non Rate-Regulated Utility Assets (input as negative)Less Other Non Rate-Regulated Utility Assets (input as negative)	$0			$0				$0	$0
		Total PP&E for Rate Base Purposes	**$ 33,427,827**	**$ 1,318,200**	**-$ 114,079**	**$ 34,631,947**	**$ 14,829,487**	**$ 898,279**	**-$ 99,879**	**$ 15,627,886**	**$ 19,268,800**
		Construction Work In Progress				$ -					$ -
		Total PP&E	**$33,427,827**	**$1,318,200**	**-$114,079**	**$34,631,947**	**$14,829,487**	**$898,279**	**-$99,879**	**$15,627,886**	**$19,268,800**
		Depreciation Expense adj. from gain or loss on the retirement of assets (pool of like assets)									
		Total						**$898,279**			

10		Transportation
8		Stores Equipment
8		Tools, Shop
8		Meas/Testing
		Deferred Revenue

Less: *Fully Allocated Depreciation*	
Transportation	-$ 149,577
Stores Equipment	-$ 1,174
Tools, Shop	
Meas/Testing	
Deferred Revenue	-$ 25,500
Net Depreciation	$722,029

2.3.2 GROSS ASSETS – PP&E AND ACCUMULATED DEPRECIATION

CWH above in section 2.1.3 showed the calculation using the average net balances of capital and accumulated depreciation. Below is a table that comprises the gross opening and closing balances for the assets and accumulated depreciation. The opening and closing balances correspond to the fixed asset continuity statements, therefore no reconciliation is required.

Table 19: Gross Assets and Accumulated Depreciation

Particulars	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Gross Capital Assets in Service:								
Opening Balance	$26,603,200	$27,391,066	$28,811,455	$29,293,068	$29,819,957	$30,338,650	$31,118,897	$33,427,827
Ending Balance	$27,391,066	$28,811,455	$29,293,068	$29,819,957	$30,484,032	$31,118,897	$33,427,827	$34,631,947
Accumulated Depreciation								
Opening Balance	$11,424,362	$11,747,958	$12,206,475	$12,814,502	$13,461,646	$14,092,025	$14,539,189	$14,829,487
Ending Balance	$11,747,958	$12,206,475	$12,814,502	$13,461,646	$14,092,025	$14,539,189	$14,829,487	$15,627,886
Net Book Value Balance	**$15,680,574**	**$16,683,794**	**$16,581,895**	**$16,517,509**	**$16,461,502**	**$16,844,391**	**$18,812,080**	**$19,268,800**
Average Gross	**$26,985,276**	**$28,101,261**	**$29,043,219**	**$29,543,652**	**$30,075,486**	**$30,728,773**	**$32,273,362**	**$34,029,887**
Average Acc Depr	**$11,586,160**	**$11,977,217**	**$12,510,489**	**$13,138,074**	**$13,776,836**	**$14,315,607**	**$14,684,338**	**$15,228,686**

CWH has explained variances under the following functions; Distribution Equipment, Land and Buildings, Vehicles, Computer Assets, Other Assets and Contributed Capital. CWH also included the annual WIP balance, however CWH does not calculate depreciation on this balance, incomplete works remains in the WIP, account 2055, until the project is complete.

Explanations are provided for the fixed asset variances year over year that were over the materiality threshold of $50,000, when analysis of the variance was calculated by the above-mentioned functions.

Distribution Equipment function includes modifications, additions and/or replacing system assets to ensure the distribution system continues to meet distributor operational objectives while addressing anticipated future customer electricity service requirements.

Land and Buildings function includes the main office and land for transformer stations.

Vehicle function includes all fleet – pickup trucks, line trucks, trailers and vehicles available to staff.

Computer asset function includes investments in software and computer hardware.

Other Asset functions include furniture, small tools, power operated equipment, stores equipment and miscellaneous equipment.

Contributed Capital function includes amounts received by CWH in aid of construction or for acquisition of fixed assets.

A summary breakdown of CWH's gross assets by function is in Table 20. In the next section year or year material variances will be discussed.

Table 20: Breakdown by Traditional Functions

Gross Assets	2018 Board Approved	2018	2019	2020	2021	2022	2023	2024 Bridge Year	2025 Test Year
Distribution Equipment	$869,100	$1,342,912	$1,692,497	$624,241	$729,788	$522,863	$964,930	$2,077,300	$1,175,400
Land and Buildings		$40,965	$7,504				$117,560	$45,000	$72,300
Vehicles	$130,000		$168,738				$77,079	$640,000	
Computer Assets	$69,000	$22,533	$69,008	$53,552	$28,801	$153,866	$17,209	$311,600	$57,400
Other Assets	$51,300	$24,895	$10,362	$15,804	$10,353	$40,078	$14,249	$6,600	$13,100
Contributed Capital		-$258,315	-$25,811	-$40,311	-$90,619	-$32,727	-$50,556	-$79,100	
Total In Service Assets	$1,119,400	$1,172,990	$1,922,298	$653,286	$678,323	$684,080	$1,140,471	$3,001,400	$1,318,200
WIP				$18,086	$7,635	$145,382	$207,902		
Total with WIP	$1,119,400	$1,172,990	$1,922,298	$671,372	$685,958	$829,462	$1,348,373	$3,001,400	$1,318,200

2.3.3 VARIANCE ANALYSIS

Table 21: 2018 Actual vs 2018 Board Approved

Gross Assets	2018 Board Approved	2018	Variance $	Variance %
Distribution Equipment	$869,100	$1,342,912	$473,812	55%
Land and Buildings	$0	$40,965	$40,965	
Vehicles	$130,000	$0	-$130,000	-100%
Computer Assets	$69,000	$22,533	-$ 46,467	-67%
Other Assets	$51,300	$24,895	-$26,405	-51%
Contributed Capital	$0	-$ 258,315	-$258,315	
Total In Service Assets	$1,119,400	$ 1,172,990	$53,590	5%
WIP				
Total with WIP	$1,119,400	$1,172,990	$53,590	5%

The total difference between the Board Approved and actual gross capital additions is $54K, this represents a 5% increase.

Distribution Equipment – increase $474K

- There were 4 jobs within the Distribution Equipment category that were not in the Board Approved Budget that amounted to $160K.
  - Three jobs costing $68K, were for connecting services for newly developed residential areas. These developments were not included in the Board Approved budget as it was anticipated that the developments would have been completed in 2017.
  - One job was to replace UG conductor as a result of a municipal road expansion. Work was completed in conjunction with the Township while replacing other underground structures, costs were $92K.
- A job was included in the 2018 Board Approved amounts; however the net amount was recorded at $244K. The actual gross cost in 2018 was $433K and there was $258K in contributed capital, which in the original 2018 Board Approved was netted together, this accounts for $258K of the variance. This job was divided into 2 phases and costs were also incurred in 2019.
- In 2018, CWH spent $72K more than what was in the 2018 Board Approved values on transformers. With the developments mentioned above CWH needed transformers.

Vehicles – decrease $130K

- CWH delayed the purchase of 3 vehicles until 2019, the purchases were made in 2019.

Contributed Capital – increase $258K

- In 2018 Board Approved the job was recorded at the net amount, rather than the gross amount and contributed capital separately, this accounts for $156K.

- As mentioned above, there were 3 additional jobs for connecting services, these jobs had contributed capital of $87K. The contributed capital is greater than the actual spent in 2018 as a correcting entry for 2017 was completed in 2018.
- The remaining contributed capital is $15K and was for a few smaller new services and a co-share job with the Township of Centre Wellington.

Table 22: 2019 Actual vs 2018 Actual

Gross Assets	2018	2019	Variance $	Variance %
Distribution Equipment	$1,342,912	$1,692,497	$349,585	26%
Land and Buildings	$40,965	$7,504	-$33,461	-82%
Vehicles	$0	$168,738	$168,738	
Computer Assets	$22,533	$69,008	$46,475	206%
Other Assets	$24,895	$10,362	-$14,533	-58%
Contributed Capital	-$258,315	-$25,811	$232,504	-90%
Total In Service Assets	$1,172,990	$1,922,298	$749,308	64%
WIP	$0	$0	$0	
Total with WIP	$1,172,990	$1,922,298	$749,308	64%

The total difference between the 2019 and 2018 in service assets is $749K, this represents a 64% increase.

Distribution Equipment – increase $350K

- In 2019 CWH had a transformer in one of their stations fail and require replacement. This project was in the DSP for 2022, however it was required in 2019 at a cost of $774K.
- In 2019 CWH did not have as many capital dollars spent on new services, as the developments previously mentioned did not have as many connections in 2019 as there was in 2018. This accounts for an approximately $42K decrease in spending.
- One large job from 2018 had a capital cost of $433K, the second phase of this job in 2019 had a cost of $255K, this results in a $178K reduction from 2018.
- The remaining difference of $200K was offset with lower cost capital jobs in 2019 compared to 2018. With the large cost for the station transformer in 2019, some capital jobs that were less of a risk were deferred in order to manage overall spending

Vehicles – increase $169K

In the Vehicle function CWH purchased 3 trucks – 2 pickup trucks and 1 dump truck. These were within the DSP plan, although they were allocated for purchase in 2018 and 2019.

Contributed Capital – decrease $233K

In 2018 there were a couple large projects that had contributed capital, this was not the case in 2019, therefore the Contributed Capital decreased.

Table 23: 2020 Actual vs 2019 Actual

Gross Assets	2019	2020	Variance $	Variance %
Distribution Equipment	$1,692,497	$624,241	-$1,068,256	-63%
Land and Buildings	$7,504	$0	-$7,504	-100%
Vehicles	$168,738	$0	-$168,738	-100%
Computer Assets	$69,008	$53,552	-$15,456	-22%
Other Assets	$10,362	$15,804	$5,442	53%
Contributed Capital	-$25,811	-$40,311	-$14,500	56%
Total In Service Assets	$1,922,298	$653,286	-$1,269,012	-66%
WIP	$0	$18,086	$18,086	
Total with WIP	$1,922,298	$671,372	-$1,250,926	-65%

The total difference between the 2020 and 2019 actual in service assets is $1.3M, this represents a 65% decrease.

Distribution Equipment – decrease $1.068M

- The main driver for 2019 was the station transformer replacement for $774K. There was not a similar project of this cost in 2020.
- In 2020 CWH had a decrease in spending on transformers ($40K).
- Decrease in new service connections ($9K) when compared to the previous year.
- During the start of the COVID pandemic, the operation crews were divided into smaller crews for a short period of time to attempt to reduce exposure and limit contact to ensure CWH had a crew available in the event of an emergency. The pandemic seemed to commence during CWH's typical start to capital jobs and therefore fewer labour hours in 2020 were spent on capital.

Vehicles – decrease $169K

CWH did not purchase any vehicles in 2020 therefore there is a decrease to $0 spent in 2020.

Table 24: 2021 Actual vs 2020 Actual

Gross Assets	2020	2021	Variance $	Variance %
Distribution Equipment	$624,241	$729,788	$105,547	17%
Land and Buildings	$0	$0	$0	
Vehicles	$0	$0	$0	
Computer Assets	$53,552	$28,801	-$24,751	-46%
Other Assets	$15,804	$10,353	-$5,451	-34%
Contributed Capital	-$40,311	-$90,619	-$50,308	125%
Total In Service Assets	$653,286	$678,323	$25,037	4%
WIP	$18,086	$7,635	-$10,451	-58%
Total with WIP	$671,372	$685,958	$14,586	2%

The total difference between the 2021 and 2020 actual in service assets $25K, this represents a 4% increase.

Distribution Equipment – increase $106K

- Increases in new services or upgrading service, $24K, these are requested by the customer or developer.
- In 2021 CWH had more hours attributed to capital than operations accounts, as with the onset of the pandemic in 2020 CWH had smaller operation crews that alternated time at home for a short period of time. This was to assist with less contact among the operations crew to ensure in the event of an emergency, we would have staff available. More labour hours in capital meant more capital jobs completed. The annual pole replacement program had increase spending of $75K.

Contributed Capital – increase $50K

- In conjunction with the increase in new services, CWH had an increase in contributed capital. One particular job had $41K of contributed capital this was for a new customer.
- The next highest capital contribution was $13K for job that was driven by new traffic lights.

Table 25: 2022 Actual vs 2021 Actual

Gross Assets	2021	2022	Variance $	Variance %
Distribution Equipment	$729,788	$522,863	-$206,925	-28%
Land and Buildings	$0	$0	$0	
Vehicles	$0	$0	$0	
Computer Assets	$28,801	$153,866	$125,065	434%
Other Assets	$10,353	$40,078	$29,725	287%
Contributed Capital	-$90,619	-$32,727	$57,892	-64%
Total In Service Assets	$678,323	$684,080	$5,757	1%
WIP	$7,635	$145,382	$137,747	1804%
Total with WIP	$685,958	$829,462	$143,504	21%

The total difference between the 2022 and 2021 actual in-service asset additions is $6K, this represents a 1% increase.

Distribution Equipment – decrease $206K

- In 2022 one capital project that would be classified as Distribution Equipment was mostly completed, however a portion needed to be completed by Hydro One and wasn't done prior to yearend such that the project was not energized in 2022 and therefore was recorded in WIP. At Dec 31/22 this job had a value of $129K.
- There was a decrease of $53K in new services/upgrades, these are done by request of the customer/developer.
- Poleline rebuild jobs in 2022 were completed on a smaller scale, therefore costs in 2022 were lower than in 2021.

Computer Assets – increase $125K

- CWH completed a financial system upgrade at a cost of$110K; the last upgrade was completed in 2015.
- CWH purchased a meter tester for $17K, this type of equipment was not purchased in the previous year.

Contributed Capital – decrease $58K

- CWH did not have as many capital projects receiving contributions.

Table 26: 2023 Actual vs 2022 Actual

Gross Assets	2022	2023	Variance $	Variance %
Distribution Equipment	$522,863	$964,930	$442,067	85%
Land and Buildings	$0	$117,560	$117,560	
Vehicles	$0	$77,079	$77,079	
Computer Assets	$153,866	$17,209	-$136,657	-89%
Other Assets	$40,078	$14,249	-$25,829	-64%
Contributed Capital	-$32,727	-$50,556	-$17,829	54%
Total In Service Assets	$684,080	$1,140,471	$456,391	67%
WIP	$145,382	$207,902	$62,520	43%
Total with WIP	$829,462	$1,348,373	$518,911	63%

The total difference between the 2023 and 2022 actual in-service asset additions is $456K, this represents a 67% increase.

Distribution Equipment – increase $442K

- 2023 had larger capital projects than compared to 2022,
  - one project had a cost of $137K, was from WIP from 2022 and didn't require many labour hours in 2023 to be completed.
  - Poleline rebuild of $274K for one job replaced 37 poles along a residential street, there was not a similar job to this in 2022.
- In 2021 and 2022 it was a challenge to order and receive transformers, in 2023 transformer spending increased by $54K.

Land and Buildings – increased $118K

- CWH that had solar panels installed on its office and distribution building, $101K. This is a net metering project that will not generate revenue, but rather will reduce operations and administration costs.
- $17K was spent on bay door replacements and carpet for 2 office spaces in the office.

Vehicles – increased $77K

- CWH purchased one EV pickup truck in 2023. No vehicle purchases occurred in 2022.

Computer Assets – decrease $137K

- no major software upgrade to the financial system, or similar spending on software.

WIP – increase $63K

- CWH had 5 different capital jobs have some amount allocated to WIP at the end of 2023. All of these jobs are within the distribution function. Various reasons for not completing them include requiring materials and requiring other parties to complete their portion before energization can occur.

Table 27: 2024 Bridge Year vs 2023 Actual

Gross Assets	2023	2024 Bridge Year	Variance $	Variance %
Distribution Equipment	$964,930	$2,077,300	$ 1,112,370	115%
Land and Buildings	$117,560	$45,000	-$72,560	-62%
Vehicles	$77,079	$640,000	$562,921	730%
Computer Assets	$17,209	$311,600	$294,391	1711%
Other Assets	$14,249	$6,600	-$7,649	-54%
Contributed Capital	-$50,556	-$79,100	-$28,544	56%
Total In Service Assets	$1,140,471	$3,001,400	$1,860,929	163%
WIP	$207,902	$0	-$207,902	-100%
Total with WIP	$1,348,373	$3,001,400	$1,653,027	123%

The total difference between the 2024 Bridge Year and 2023 actual in-service asset additions is $1.86M, this represents a 163% increase.

Distribution Equipment – increase $1.112M

- The main driver is the transformer replacement at station EMS2 – the cost of this is $994K.
- Another project that is scheduled for 2024 is a redevelopment driven by the Township for moving OH lines to UG, with a projected cost of $129K. There are economies of scale of completing the project to replace aging infrastructure while the area will already be under construction, this project drives the contributed capital of $79K.

Land and Buildings – decrease $73K

- CWH had the air conditioning unit that is for the climate-controlled server room replaced in Q1 of 2024, $24K.
- In 2023 CWH had the $101K cost for installing the net metering solar project, a similar project is not planned for 2024, therefore a decrease.

Vehicles – increase $563K

- CWH is anticipating the delivery of the digger/RBD truck in 2024. This truck has a cost of $640K. The truck began the design/quote stage in 2021, the order was placed in 2022 and CWH has been given notice that at the time of filing this application, the truck is in progress of being assembled. This is the only vehicle purchase in 2024.

Computer Assets – increase $294K

- In 2024 CWH will replace 10 gatekeepers and the software to go along with that, this has a cost of $65K.
- In 2024 CWH is obtaining an ESRI Enterprise license due to its current ESRI system becoming obsolete and no longer supported, this has a cost of $183K.
- CWH is changing platforms for its customer portal, it is moving away from Customer Connect and implementing Silverblaze, at a cost of $50K.

In 2024, CWH is not anticipating any contributed capital from the current budgeted capital projects.

Table 28: 2025 Test Year vs 2024 Bridge Year

Gross Assets	2024 Bridge Year	2025 Test Year	Variance $	Variance %
Distribution Equipment	$2,077,300	$1,175,400	-$901,900	-43%
Land and Buildings	$45,000	$72,300	$27,300	61%
Vehicles	$640,000	$0	-$640,000	-100%
Computer Assets	$311,600	$57,400	-$254,200	-82%
Other Assets	$6,600	$13,100	$6,500	98%
Contributed Capital	-$79,100	$0	$79,100	-100%
Total In Service Assets	$3,001,400	$1,318,200	-$1,683,200	-56%
WIP	$0	$0	$0	
Total with WIP	$3,001,400	$1,318,200	-$1,683,200	-56%

The total difference between the 2025 Test Year and 2024 Bridge Year projections for in-service asset additions is $1.7M, this represents a 56% decrease.

Distribution Equipment – decrease $902K

- 2024 had a large expense with a transformer being replaced in a distribution station, $994, there is not a job in 2025 of this scale.

Vehicles – decrease $640K

- There is no plan to purchase a truck in 2025.

Computer Assets – decrease $254K

- Purchasing laptops, printer and one server to replace existing hardware that are at the end of life at a cost of $57K, creating a net decrease in spending relative to 2024.

Contributed Capital – decrease $79K

- No Contributed Capital is anticipated in 2025, CWH has not planned nor are they aware of any developments or new services that will trigger capital contributions.

2.4 DEPRECIATION, AMORTIZATION AND DEPLETION

2.4.1 Accumulated Depreciation

CWH adopted depreciation rates based on the Kinectrics Asset Depreciation Study and has not changed its asset lives since CWH's last rebasing application.

The rates used are presented below and the Continuity Schedules of the Accumulated Depreciation are presented on the next pages. CWH's Accumulated Depreciation is presented in continuity schedules in section 2.2.1 above. CWH's depreciation expense policy and methodology are provided as Appendix A and have not changed since CWH's last rebasing. CWH continues to use MIFRS, including separating significant components appropriately and using the half year rule for new additions with respect to depreciation. The depreciation expenses continuity schedules are presented at 2.3.2 Depreciation Expense Schedules.

Table 29 below provides CWH's depreciable lives by asset class compared to the minimum and maximum useful lives from the Kinectrics Study.

Table 29: Comparison of Depreciation Rates

Account #	Description	CWH Useful Life	Kinectrics Min Useful Life	Kinectrics Max Useful Life
1806	Land Rights	50		
1820	Distribution Stations	45	30	55
1830	Poles - Concrete/Steel	60	50	80
1830	Poles - Wood	45	35	75
1835	OH Conductors	60	50	75
1840	UG Conduits	70	30	85
1845	UG Conductors	55	35	55
1850	Transformers -UG	30	25	45
1850	Transformers -OH	40	30	60
1855	OH Secondary Services	60	50	75
1855	UG Secondary Services	55	35	60
1860	Meters	15	5	15
1860	CT's & PT's (meters)	50	35	50
1908	Building & Fixtures	25-50	50	75
1915	Office Furniture & Equipment	10	5	15
1920	Computer Hardware	3	3	5
1925	Computer Software	5	2	5
1930	Transportation	7-12	5	20
1935	Stores Equipment	10	5	10
1940	Tools, Shop & Garage Equipment	10	5	10
1945	Measurement & Testing Equipment	10	5	10
1950	Power Operated Equipment	8	5	10
1955	Communication	10	2	10
1980	System Supervisory Equipment	15	15	30

Table 30: Depreciation Expense Schedule 2018

Year 2018

Account	Description	Opening Regulatory Gross PP&E as at Jan 1, 2018	Less Fully Depreciated	Net for Depreciation	Additions	Total for Depreciation	Years	Depreciation Rate	2018 Depreciation Expense	2018 Depreciation Expense per Appendix 2-B Fixed Assets, Column K (l)	Variance [2]
		(a)	(b)	(c)	(d)	(e) = (c) + ½ x (d) [1]	(f)	(g) = 1 / (f)	(h) = (e) / (f)		(m) = (h) - (l)
1611	Computer Software (Formally known as Account 1925)	$ 364,933.91	$ 296,913.83	$ 68,020.08	$ 6,900.00	$ 71,470.08	3.00	33.33%	$ 23,823.36	$ 12,486.03	$ 11,337.33
1612	Land Rights (Formally known as Account 1906 and 1806)	$ 37,132.16	$ -	$ 37,132.16	$ -	$ 37,132.16	50.00	2.00%	$ 742.64	$ 743.40	-$ 0.76
1805	Land	$ 46,065.54	$ -	$ 46,065.54	$ -	$ 46,065.54			$ -	$ -	$ -
1808	Buildings	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1810	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1815	Transformer Station Equipment >50 kV	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1820	Distribution Station Equipment <50 kV	$ 6,887,892.38	$ 90,316.00	$ 6,797,576.38	$ 40,751.67	$ 6,817,952.22	45.00	2.22%	$ 151,510.05	$ 160,023.04	-$ 8,512.99
1825	Storage Battery Equipment	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1830	Poles, Towers & Fixtures (wood)	$ 2,172,168.86	$ 61,155.00	$ 2,111,013.86	$ 194,152.57	$ 2,208,090.15	48.81	2.05%	$ 45,234.37	$ 42,170.31	$ 3,064.06
1830	Poles, Towers & Fixtures (steel/concrete)	$ 687,269.75	$ -	$ 687,269.75	$ -	$ 687,269.75	80.17	1.25%	$ 8,572.69	$ 7,936.29	$ 636.40
1835	Overhead Conductors & Devices	$ 2,001,751.62	$ -	$ 2,001,751.62	$ 172,156.76	$ 2,087,830.00	79.79	1.25%	$ 26,165.75	$ 26,165.75	$ 0.00
1840	Underground Conduit	$ 1,996,294.79	$ -	$ 1,996,294.79	$ 204,859.07	$ 2,098,724.33	94.53	1.06%	$ 22,201.29	$ 22,201.29	$ 0.00
1845	Underground Conductors & Devices	$ 2,179,115.70	$ -	$ 2,179,115.70	$ 333,063.59	$ 2,345,647.50	80.86	1.24%	$ 29,008.87	$ 29,008.87	$ 0.00
1850	Line Transformers - Overhead	$ 791,632.90	$ 127,271.60	$ 664,361.30	$ 16,445.29	$ 672,583.95	55.94	1.79%	$ 12,022.99	$ 12,022.99	$ 0.00
1850	Line Transformers - Underground	$ 2,759,610.05	$ 204,125.94	$ 2,555,484.11	$ 152,280.74	$ 2,631,624.48	38.32	2.61%	$ 68,670.07	$ 68,670.07	$ 0.00
1855	Services (Overhead)	$ 535,628.54	$ -	$ 535,628.54	$ 112,009.83	$ 591,633.46	83.75	1.19%	$ 7,063.96	$ 7,063.96	$ 0.00
1855	Services (Underground)	$ 3,177,472.52	$ 4,536.00	$ 3,172,936.52	$ 70,970.56	$ 3,208,421.80	110.99	0.90%	$ 28,907.81	$ 28,907.81	$ 0.00
1860	Meters	$ 1,308,386.20		$ 1,308,386.20	$ 22,649.11	$ 1,319,710.76	14.49	6.90%	$ 91,050.51	$ 91,050.51	$ 0.00
1860	Meters CTs PTs	$ 101,376.69		$ 101,376.69	$ 11,279.12	$ 107,016.25	50.00	2.00%	$ 2,140.33	$ 2,164.99	-$ 24.67
1860	Meters (Smart Meters)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1905	Land	$ 8,639.65		$ 8,639.65	$ -	$ 8,639.65			$ -	$ -	$ -
1908	Buildings & Fixtures (25 years)	$ 201,324.17		$ 201,324.17	$ 40,965.18	$ 221,806.76	25.00	4.00%	$ 8,872.27	$ 8,871.99	$ 0.28
1908	Buildings & Fixtures (50 years)	$ 1,055,104.29		$ 1,055,104.29	$ -	$ 1,055,104.29	50.00	2.00%	$ 21,102.09	$ 21,780.94	-$ 678.85
1910	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1915	Office Furniture & Equipment (10 years)	$ 113,893.11	$ 61,143.53	$ 52,749.58	$ 15,625.05	$ 60,562.11	10.00	10.00%	$ 6,056.21	$ 5,292.41	$ 763.80
1915	Office Furniture & Equipment (5 years)	$ -	$ -	$ -	$ -	$ -	5.00	20.00%	$ -	$ -	$ -
1920	Computer Equipment - Hardware -3 years	$ 101,043.20	$ 41,009.72	$ 60,033.48	$ 8,648.89	$ 64,357.93	3.00	33.33%	$ 21,452.64	$ 23,329.74	-$ 1,877.10
1920	Computer Equipment - Hardware - 4 years	$ 89,845.34	$ 66,359.37	$ 23,485.97	$ 6,984.39	$ 26,978.17	4.00	25.00%	$ 6,744.54	$ 5,952.29	$ 792.25
1920	Computer Equipment - Hardware - 5 years	$ 17,462.84	$ 17,462.84	$ -	$ -	$ -	5.00	20.00%	$ -	$ -	$ -
1920	Computer Equipment - Hardware - 6 years	$ 61,132.40		$ 61,132.40	$ -	$ 61,132.40	6.00	16.67%	$ 10,188.73	$ 10,188.73	$ 0.00
1920	Computer Equipment - Hardware - 10 years	$ 16,666.54		$ 16,666.54	$ -	$ 16,666.54	10.00	10.00%	$ 1,666.65	$ 1,666.65	$ 0.00
1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1930	Transportation Equipment <3 Tonnes	$ 185,710.26	$ 114,737.89	$ 70,972.37	$ -	$ 70,972.37	7.00	14.29%	$ 10,138.91	$ 10,138.92	-$ 0.01
1930	Transportation Equipment >3 Tonnes	$ 1,254,441.88	$ 225,878.46	$ 1,028,563.42	$ -	$ 1,028,563.42	12.00	8.33%	$ 85,713.62	$ 66,271.35	$ 19,442.27
1930	Transportation Equipment Trailer	$ 111,357.25		$ 111,357.25	$ -	$ 111,357.25	8.00	12.50%	$ 13,919.66	$ 13,919.66	-$ 0.00
1935	Stores Equipment	$ 14,318.24	$ 14,318.24	$ -	$ -	$ -	10.00	10.00%	$ -	$ -	$ -
1940	Tools, Shop & Garage Equipment	$ 102,233.30	$ 46,196.68	$ 56,036.62	$ 6,399.85	$ 59,236.55	10.00	10.00%	$ 5,923.65	$ 5,205.23	$ 718.42
1945	Measurement & Testing Equipment	$ 43,116.67	$ 28,597.84	$ 14,518.83	$ 974.85	$ 15,006.26	10.00	10.00%	$ 1,500.63	$ 1,472.94	$ 27.69
1950	Power Operated Equipment	$ 74,455.19	$ 66,172.85	$ 8,282.34	$ -	$ 8,282.34	8.00	12.50%	$ 1,035.29	$ 1,035.55	-$ 0.26
1955	Communications Equipment	$ 18,411.75	$ 496.78	$ 17,914.97	$ -	$ 17,914.97	10.00	10.00%	$ 1,791.50	$ 1,791.50	-$ 0.00
1955	Communication Equipment (Smart Meters)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1960	Miscellaneous Equipment	$ 17,091.63	$ 12,430.41	$ 4,661.22	$ 1,895.00	$ 5,608.72	5.00	20.00%	$ 1,121.74	$ 1,121.75	-$ 0.01
1970	Load Management Controls Customer Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1975	Load Management Controls Utility Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1980	System Supervisor Equipment	$ 258,806.31	$ 128,921.75	$ 129,884.56	$ -	$ 129,884.56	15.00	6.67%	$ 8,658.97	$ 6,958.12	$ 1,700.85
1985	Sentinel Lights	$ 2,516.21	$ 2,516.21	$ -	$ -	$ -	10.00	10.00%	$ -	$ -	$ -
1990	Other Tangible Property	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1995	Contributions & Grants - PolesTwrsFix	-$ 157,251.51		-$ 157,251.51	$ -	-$ 157,251.51	47.96	2.09%	-$ 3,279.00	-$ 3,278.53	-$ 0.47
1995	Contributions & Grants - O/H Conductor	-$ 70,035.29		-$ 70,035.29	$ -	-$ 70,035.29	67.41	1.48%	-$ 1,039.00	-$ 1,039.37	$ 0.37
1995	Contributions & Grants - UG Conduit	-$ 350,698.25		-$ 350,698.25	$ -	-$ 350,698.25	91.49	1.09%	-$ 3,833.00	-$ 3,833.43	$ 0.43
1995	Contributions & Grants - UG Cond&Dev	-$ 408,830.11		-$ 408,830.11	$ -	-$ 408,830.11	68.24	1.47%	-$ 5,991.00	-$ 5,991.22	$ 0.22
1995	Contributions & Grants - OHLine Trans	-$ 4,185.76		-$ 4,185.76	$ -	-$ 4,185.76	48.11	2.08%	-$ 87.00	-$ 86.82	-$ 0.18
1995	Contributions & Grants - UGLine Trans	-$ 331,205.07		-$ 331,205.07	$ -	-$ 331,205.07	34.30	2.92%	-$ 9,657.00	-$ 9,656.78	-$ 0.22
1995	Contributions & Grants - OHServices	-$ 7,926.93		-$ 7,926.93	$ -	-$ 7,926.93	66.61	1.50%	-$ 119.00	-$ 119.49	$ 0.49
1995	Contributions & Grants - UGServices	-$ 368,586.76		-$ 368,586.76	$ -	-$ 368,586.76	70.54	1.42%	-$ 5,225.00	-$ 5,224.75	-$ 0.25
1995	Contributions & Grants - Meters	-$ 36,761.86		-$ 36,761.86	$ -	-$ 36,761.86	16.24	6.16%	-$ 2,263.12	-$ 2,263.12	-$ 0.00
1995	Contributions & Grants - Meters PTs CTs	-$ 2,632.26		-$ 2,632.26	$ -	-$ 2,632.26	50.00	2.00%	-$ 52.65	-$ 52.11	-$ 0.54
1609	Capital Contribution Pd Contracts	$ 4,602.50		$ 4,602.50	$ 34,392.70	$ 21,798.85	45.00	2.22%	$ 484.42	$ 484.42	-$ 0.00
2440	Deferred Revenue	-$ 481,304.31		-$ 481,304.31	-$ 258,316.02	-$ 610,462.32			$ -	$ 11,095.57	-$ 11,095.57
	Total	$ 26,579,486.23	$ 1,610,560.94	$ 24,968,925.29	$ 1,195,088.20	$ 25,566,469.39		$ 3.49	$ 691,940.45	$ 675,647.45	$ 16,293.00

Table 31: Depreciation Expense Schedule 2019

Year 2019

Account	Description	Opening Regulatory Gross PP&E as at Jan 1, 2019	Less Fully Depreciated	Net for Depreciation	Additions	Total for Depreciation	Years	Depreciation Rate	2019 Depreciation Expense	2019 Depreciation Expense per Appendix 2-B Fixed Assets, Column K	Variance [2]
		(a)	(b)	(c)	(d)	(e) = (c) + ½ x (d) [1]	(f)	(g) = 1 / (f)	(h) = (e) / (f)	(l)	(m) = (h) - (l)
1611	Computer Software (Formally known as Account 1925)	$ 371,833.91	$ 364,933.91	$ 6,900.00	$ 52,827.00	$ 33,313.50	3.00	33.33%	$ 11,104.50	$ 7,179.92	$ 3,924.58
1612	Land Rights (Formally known as Account 1906 and 1806)	$ 37,132.16	$ -	$ 37,132.16	$ -	$ 37,132.16	50.00	2.00%	$ 742.64	$ 743.40	-$ 0.76
1805	Land	$ 46,065.54		$ 46,065.54	$ -	$ 46,065.54			$ -	$ -	$ -
1808	Buildings	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1810	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1815	Transformer Station Equipment >50 kV	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1820	Distribution Station Equipment <50 kV	$ 6,928,644.05	$ 90,316.00	$ 6,838,328.05	$ 805,688.72	$ 7,241,172.41	45.00	2.22%	$ 160,914.94	$ 168,905.57	-$ 7,990.63
1825	Storage Battery Equipment	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1830	Poles, Towers & Fixtures (wood)	$ 2,344,277.18	$ 61,159.60	$ 2,283,117.58	$ 159,940.94	$ 2,363,088.05	51.63	1.94%	$ 45,770.61	$ 45,770.61	$ 0.00
1830	Poles, Towers & Fixtures (steel/concrete)	$ 687,269.75		$ 687,269.75	$ -	$ 687,269.75	86.63	1.15%	$ 7,933.63	$ 7,933.63	$ 0.00
1835	Overhead Conductors & Devices	$ 2,162,595.77		$ 2,162,595.77	$ 36,858.24	$ 2,181,024.89	79.15	1.26%	$ 27,556.00	$ 27,556.00	-$ 0.00
1840	Underground Conduit	$ 2,201,153.86		$ 2,201,153.86	$ 30,922.34	$ 2,216,615.03	92.53	1.08%	$ 23,956.67	$ 23,956.67	-$ 0.00
1845	Underground Conductors & Devices	$ 2,512,179.29	$ 684.00	$ 2,511,495.29	$ 306,856.09	$ 2,664,923.34	76.40	1.31%	$ 34,882.40	$ 34,882.40	$ 0.00
1850	Line Transformers - Overhead	$ 769,349.74	$ 128,909.20	$ 640,440.54	$ 18,578.09	$ 649,729.59	52.99	1.89%	$ 12,260.83	$ 12,260.83	$ 0.00
1850	Line Transformers - Underground	$ 2,907,140.47	$ 205,700.05	$ 2,701,440.42	$ 108,990.11	$ 2,755,935.48	37.83	2.64%	$ 72,845.80	$ 72,845.80	-$ 0.00
1855	Services (Overhead)	$ 631,084.74		$ 631,084.74	$ 43,719.82	$ 652,944.65	80.70	1.24%	$ 8,091.03	$ 8,091.03	-$ 0.00
1855	Services (Underground)	$ 3,247,736.48	$ 29,664.00	$ 3,218,072.48	$ 79,631.97	$ 3,257,888.47	110.23	0.91%	$ 29,556.52	$ 29,556.52	$ 0.00
1860	Meters	$ 1,298,857.05		$ 1,298,857.05	$ 101,310.96	$ 1,349,512.53	14.41	6.94%	$ 93,655.98	$ 93,655.98	$ 0.00
1860	Meters CTs PTs	$ 112,655.81		$ 112,655.81	$ -	$ 112,655.81	50.00	2.00%	$ 2,253.12	$ 2,272.67	-$ 19.55
1860	Meters (Smart Meters)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1905	Land	$ 8,639.65		$ 8,639.65	$ -	$ 8,639.65			$ -	$ -	$ -
1908	Buildings & Fixtures (25 years)	$ 242,289.35		$ 242,289.35	$ 7,503.87	$ 246,041.29	25.00	4.00%	$ 9,841.65	$ 9,841.38	$ 0.27
1908	Buildings & Fixtures (50 years)	$ 1,055,104.29		$ 1,055,104.29	$ -	$ 1,055,104.29	50.00	2.00%	$ 21,102.09	$ 21,780.94	-$ 678.85
1910	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1915	Office Furniture & Equipment (10 years)	$ 129,518.16	$ 76,367.78	$ 53,150.38	$ -	$ 53,150.38	10.00	10.00%	$ 5,315.04	$ 5,315.04	-$ 0.00
1915	Office Furniture & Equipment (5 years)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equipment - Hardware -3 years	$ 109,692.09	$ 60,259.62	$ 49,432.47	$ 5,825.16	$ 52,345.05	3.00	33.33%	$ 17,448.35	$ 12,059.35	$ 5,389.00
1920	Computer Equipment - Hardware - 4 years	$ 93,982.73	$ 68,903.82	$ 25,078.91	$ 2,950.49	$ 26,554.16	4.00	25.00%	$ 6,638.54	$ 6,285.56	$ 352.98
1920	Computer Equipment - Hardware - 5 years	$ 17,462.84	$ 17,462.84	$ -	$ 7,405.00	$ 3,702.50	5.00	20.00%	$ 740.50	$ 740.50	$ -
1920	Computer Equipment - Hardware - 6 years	$ 61,132.40		$ 61,132.40	$ -	$ 61,132.40	6.00	16.67%	$ 10,188.73	$ 10,188.73	$ 0.00
1920	Computer Equipment - Hardware - 10 years	$ 16,666.54		$ 16,666.54	$ -	$ 16,666.54	10.00	10.00%	$ 1,666.65	$ 1,666.65	$ 0.00
1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1930	Transportation Equipment <3 Tonnes	$ 185,710.26	$ 114,737.89	$ 70,972.37	$ 168,737.85	$ 155,341.30	7.00	14.29%	$ 22,191.61	$ 22,191.62	-$ 0.01
1930	Transportation Equipment >3 Tonnes	$ 1,028,563.42	$ 291,460.16	$ 737,103.26	$ -	$ 737,103.26	12.00	8.33%	$ 61,425.27	$ 61,214.99	$ 210.28
1930	Transportation Equipment Trailer	$ 111,357.25		$ 111,357.25	$ -	$ 111,357.25	8.00	12.50%	$ 13,919.66	$ 11,720.30	$ 2,199.36
1935	Stores Equipment	$ 14,318.24	$ 14,318.24	$ -	$ 2,735.23	$ 1,367.62	10.00	10.00%	$ 136.76	$ 136.76	$ 0.00
1940	Tools, Shop & Garage Equipment	$ 107,293.97	$ 60,338.00	$ 46,955.97	$ 2,599.93	$ 48,255.94	10.00	10.00%	$ 4,825.59	$ 4,950.05	-$ 124.46
1945	Measurement & Testing Equipment	$ 43,497.52	$ 28,597.84	$ 14,899.68	$ 5,026.65	$ 17,413.01	10.00	10.00%	$ 1,741.30	$ 1,713.31	$ 27.99
1950	Power Operated Equipment	$ 59,971.27	$ 51,688.93	$ 8,282.34	$ -	$ 8,282.34	8.00	12.50%	$ 1,035.29	$ 1,035.55	-$ 0.26
1955	Communications Equipment	$ 18,411.75	$ 496.78	$ 17,914.97	$ -	$ 17,914.97	10.00	10.00%	$ 1,791.50	$ 1,791.50	-$ 0.00
1955	Communication Equipment (Smart Meters)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1960	Miscellaneous Equipment	$ 18,986.63	$ 12,430.41	$ 6,556.22	$ -	$ 6,556.22	5.00	20.00%	$ 1,311.24	$ 1,311.24	$ 0.00
1970	Load Management Controls Customer Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1975	Load Management Controls Utility Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1980	System Supervisor Equipment	$ 246,714.55	$ 116,830.19	$ 129,884.36	$ -	$ 129,884.36	15.00	6.67%	$ 8,658.96	$ 6,958.12	$ 1,700.84
1985	Sentinel Lights	$ 2,516.21	$ 2,516.21	$ -	$ -	$ -	10.00	10.00%	$ -	$ -	$ -
1990	Other Tangible Property	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1995	Contributions & Grants - PolesTwrsFix	-$ 157,251.51		-$ 157,251.51	$ -	-$ 157,251.51	47.96	2.09%	-$ 3,279.00	-$ 3,278.53	-$ 0.47
1995	Contributions & Grants - O/H Conductor	-$ 70,035.29		-$ 70,035.29	$ -	-$ 70,035.29	67.41	1.48%	-$ 1,039.00	-$ 1,039.37	$ 0.37
1995	Contributions & Grants - UG Conduit	-$ 350,698.25		-$ 350,698.25	$ -	-$ 350,698.25	91.49	1.09%	-$ 3,833.00	-$ 3,833.43	$ 0.43
1995	Contributions & Grants - UG Cond&Dev	-$ 408,830.11		-$ 408,830.11	$ -	-$ 408,830.11	68.24	1.47%	-$ 5,991.00	-$ 5,991.22	$ 0.22
1995	Contributions & Grants - OHLine Trans	-$ 4,185.76		-$ 4,185.76	$ -	-$ 4,185.76	48.11	2.08%	-$ 87.00	-$ 86.82	-$ 0.18
1995	Contributions & Grants - UGLine Trans	-$ 331,205.07		-$ 331,205.07	$ -	-$ 331,205.07	34.30	2.92%	-$ 9,657.00	-$ 9,656.78	-$ 0.22
1995	Contributions & Grants - OHServices	-$ 7,926.93		-$ 7,926.93	$ -	-$ 7,926.93	66.61	1.50%	-$ 119.00	-$ 119.49	$ 0.49
1995	Contributions & Grants - UGServices	-$ 368,586.76		-$ 368,586.76	$ -	-$ 368,586.76	70.54	1.42%	-$ 5,225.00	-$ 5,224.75	-$ 0.25
1995	Contributions & Grants - Meters	-$ 36,761.86		-$ 36,761.86	$ -	-$ 36,761.86	45.72	2.19%	-$ 804.00	-$ 1,080.04	$ 276.04
1995	Contributions & Grants - Meters PTs CTs	-$ 2,632.26		-$ 2,632.26	$ -	-$ 2,632.26	50.00	2.00%	-$ 52.65	-$ 52.11	-$ 0.54
1609	Capital Contribution Pd Contracts	$ 38,995.20		$ 38,995.20	$ -	$ 38,995.20	45.00	2.22%	$ 866.56	$ 866.56	$ -
2440	Deferred Revenue	-$ 739,620.33		-$ 739,620.33	-$ 245,249.06	-$ 862,244.86			$ -	$ 20,674.05	-$ 20,674.05
	Total	$ 27,391,065.99	$ 1,797,775.47	$ 25,593,290.52	$ 1,702,859.40	$ 26,444,720.22			$ 692,283.32	$ 707,690.69	-$ 15,407.37

Table 32: Depreciation Expense Schedule 2020

Year 2020

Account	Description	Opening Regulatory Gross PP&E as at Jan 1, 2020	Less Fully Depreciated	Net for Depreciation	Additions	Total for Depreciation	Years	Depreciation Rate	2020 Depreciation Expense	2020 Depreciation Expense per Appendix 2-B Fixed Assets, Column K	Variance [2]
		(a)	(b)	(c)	(d)	(e) = (c) + ½ x (d) [1]	(f)	(g) = 1 / (f)	(h) = (e) / (f)	(l)	(m) = (h) - (l)
1611	Computer Software (Formally known as Account 1925)	$ 422,474.89	$ 362,747.89	$ 59,727.00	$ 26,060.00	$ 72,757.00	3.51	28.51%	$ 20,746.50	$ 16,403.17	$ 4,343.33
1612	Land Rights (Formally known as Account 1906 and 1806)	$ 37,132.16		$ 37,132.16	$ -	$ 37,132.16	50.00	2.00%	$ 742.64	$ 743.40	-$ 0.76
1805	Land	$ 46,065.54		$ 46,065.54	$ -	$ 46,065.54			$ -	$ -	$ -
1808	Buildings	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1810	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1815	Transformer Station Equipment >50 kV	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1820	Distribution Station Equipment <50 kV	$ 7,723,477.77	$ 90,316.00	$ 7,633,161.77	$ -	$ 7,633,161.77	42.96	2.33%	$ 177,693.84	$ 177,693.84	$ 0.00
1825	Storage Battery Equipment	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1830	Poles, Towers & Fixtures (wood)	$ 2,475,843.65	$ 211,943.89	$ 2,263,899.76	$ 191,685.37	$ 2,359,742.45	48.09	2.08%	$ 49,069.07	$ 49,069.07	$ 0.00
1830	Poles, Towers & Fixtures (steel/concrete)	$ 683,706.73		$ 683,706.73	$ 5,183.16	$ 686,298.31	91.75	1.09%	$ 7,480.24	$ 7,480.24	$ 0.00
1835	Overhead Conductors & Devices	$ 2,196,326.84		$ 2,196,326.84	$ 155,258.13	$ 2,273,955.91	77.92	1.28%	$ 29,182.47	$ 29,182.47	-$ 0.00
1840	Underground Conduit	$ 2,232,076.20		$ 2,232,076.20	$ -	$ 2,232,076.20	95.10	1.05%	$ 23,470.33	$ 23,470.33	$ 0.00
1845	Underground Conductors & Devices	$ 2,819,035.38	$ 684.00	$ 2,818,351.38	$ 38,822.44	$ 2,837,762.60	73.51	1.36%	$ 38,606.36	$ 38,606.36	$ 0.00
1850	Line Transformers - Overhead	$ 778,851.06	$ 171,409.58	$ 607,441.48	$ 724.29	$ 607,803.63	51.84	1.93%	$ 11,724.88	$ 11,724.88	-$ 0.00
1850	Line Transformers - Underground	$ 3,002,704.20	$ 494,446.58	$ 2,508,257.62	$ 88,233.71	$ 2,552,374.48	34.07	2.94%	$ 74,921.55	$ 74,921.55	$ 0.00
1855	Services (Overhead)	$ 667,467.82		$ 667,467.82	$ 6,923.25	$ 670,929.45	81.10	1.23%	$ 8,272.61	$ 8,272.61	-$ 0.00
1855	Services (Underground)	$ 3,324,418.02	$ 29,664.00	$ 3,294,754.02	$ 77,625.38	$ 3,333,566.71	106.15	0.94%	$ 31,403.75	$ 31,403.75	$ 0.00
1860	Meters	$ 1,376,338.94		$ 1,376,338.94	$ 35,950.73	$ 1,394,314.31	14.41	6.94%	$ 96,765.22	$ 97,080.90	-$ 315.68
1860	Meters CTs PTs	$ 112,655.81		$ 112,655.81	$ 1,734.93	$ 113,523.28	50.00	2.00%	$ 2,270.47	$ 2,290.02	-$ 19.55
1860	Meters (Smart Meters)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1905	Land	$ 8,639.65		$ 8,639.65	$ -	$ 8,639.65			$ -	$ -	$ -
1908	Buildings & Fixtures (25 years)	$ 249,793.22		$ 249,793.22	$ -	$ 249,793.22	25.00	4.00%	$ 9,991.73	$ 9,991.46	$ 0.27
1908	Buildings & Fixtures (50 years)	$ 1,055,104.29		$ 1,055,104.29	$ -	$ 1,055,104.29	50.00	2.00%	$ 21,102.09	$ 21,780.94	-$ 678.85
1910	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1915	Office Furniture & Equipment (10 years)	$ 89,710.57	$ 36,560.19	$ 53,150.38	$ -	$ 53,150.38	10.00	10.00%	$ 5,315.04	$ 5,315.04	-$ 0.00
1915	Office Furniture & Equipment (5 years)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equipment - Hardware -3 years	$ 54,020.97	$ 17,808.92	$ 36,212.05	$ 7,718.47	$ 40,071.29	3.00	33.33%	$ 13,357.10	$ 6,977.25	$ 6,379.85
1920	Computer Equipment - Hardware - 4 years	$ 82,297.49	$ 54,736.59	$ 27,560.90	$ 15,488.62	$ 35,305.21	4.00	25.00%	$ 8,826.30	$ 9,043.40	-$ 217.10
1920	Computer Equipment - Hardware - 5 years	$ 24,867.84	$ 17,462.84	$ 7,405.00	$ -	$ 7,405.00	5.00	20.00%	$ 1,481.00	$ 1,481.00	$ -
1920	Computer Equipment - Hardware - 6 years	$ 61,132.40		$ 61,132.40	$ 4,284.82	$ 63,274.81	6.00	16.67%	$ 10,545.80	$ 10,545.80	$ 0.00
1920	Computer Equipment - Hardware - 10 years	$ 16,666.54		$ 16,666.54	$ -	$ 16,666.54	10.00	10.00%	$ 1,666.65	$ 1,666.65	$ 0.00
1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1930	Transportation Equipment <3 Tonnes	$ 296,611.75	$ 56,901.53	$ 239,710.22	$ -	$ 239,710.22	7.00	14.29%	$ 34,244.32	$ 34,244.32	-$ 0.00
1930	Transportation Equipment >3 Tonnes	$ 1,028,563.42	$ 295,138.18	$ 733,425.24	$ -	$ 733,425.24	12.00	8.33%	$ 61,118.77	$ 61,126.60	-$ 7.83
1930	Transportation Equipment Trailer	$ 111,357.25	$ 35,190.00	$ 76,167.25	$ -	$ 76,167.25	8.00	12.50%	$ 9,520.91	$ 9,520.91	-$ 0.00
1935	Stores Equipment	$ 17,053.47	$ 14,318.24	$ 2,735.23	$ -	$ 2,735.23	10.00	10.00%	$ 273.52	$ 273.52	$ 0.00
1940	Tools, Shop & Garage Equipment	$ 108,792.41	$ 60,338.31	$ 48,454.10	$ 2,584.28	$ 49,746.24	10.00	10.00%	$ 4,974.62	$ 5,006.29	-$ 31.67
1945	Measurement & Testing Equipment	$ 45,656.50	$ 26,324.17	$ 19,332.33	$ 2,392.70	$ 20,528.68	10.00	10.00%	$ 2,052.87	$ 1,890.39	$ 162.48
1950	Power Operated Equipment	$ 59,971.27	$ 51,688.93	$ 8,282.34	$ -	$ 8,282.34	8.00	12.50%	$ 1,035.29	$ 1,035.55	-$ 0.26
1955	Communications Equipment	$ 18,411.75	$ 496.78	$ 17,914.97	$ 8,216.30	$ 22,023.12	10.00	10.00%	$ 2,202.31	$ 2,202.32	-$ 0.01
1955	Communication Equipment (Smart Meters)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1960	Miscellaneous Equipment	$ 18,986.63	$ 12,430.41	$ 6,556.22	$ 2,610.51	$ 7,861.48	5.00	20.00%	$ 1,572.30	$ 1,572.30	-$ 0.00
1970	Load Management Controls Customer Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1975	Load Management Controls Utility Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1980	System Supervisor Equipment	$ 246,714.55	$ 116,829.99	$ 129,884.56	$ -	$ 129,884.56	18.67	5.36%	$ 6,958.12	$ 6,958.12	$ 0.00
1985	Sentinel Lights	$ 2,516.21	$ 2,516.21	$ -	$ -	$ -	10.00	10.00%	$ -	$ -	$ -
1990	Other Tangible Property	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1995	Contributions & Grants - PolesTwrsFix	-$ 157,251.51		-$ 157,251.51	$ -	-$ 157,251.51	47.96	2.09%	-$ 3,279.00	-$ 3,278.53	-$ 0.47
1995	Contributions & Grants - O/H Conductor	-$ 70,035.29		-$ 70,035.29	$ -	-$ 70,035.29	67.41	1.48%	-$ 1,039.00	-$ 1,039.37	$ 0.37
1995	Contributions & Grants - UG Conduit	-$ 350,698.25		-$ 350,698.25	$ -	-$ 350,698.25	91.49	1.09%	-$ 3,833.00	-$ 3,833.43	$ 0.43
1995	Contributions & Grants - UG Cond&Dev	-$ 408,830.11		-$ 408,830.11	$ -	-$ 408,830.11	68.24	1.47%	-$ 5,991.00	-$ 5,991.22	$ 0.22
1995	Contributions & Grants - OHLine Trans	-$ 4,185.76		-$ 4,185.76	$ -	-$ 4,185.76	48.11	2.08%	-$ 87.00	-$ 86.82	-$ 0.18
1995	Contributions & Grants - UGLine Trans	-$ 331,205.07		-$ 331,205.07	$ -	-$ 331,205.07	34.30	2.92%	-$ 9,657.00	-$ 9,656.78	-$ 0.22
1995	Contributions & Grants - OHServices	-$ 7,926.93		-$ 7,926.93	$ -	-$ 7,926.93	66.61	1.50%	-$ 119.00	-$ 119.49	$ 0.49
1995	Contributions & Grants - UGServices	-$ 368,586.76		-$ 368,586.76	$ -	-$ 368,586.76	70.54	1.42%	-$ 5,225.00	-$ 5,224.75	-$ 0.25
1995	Contributions & Grants - Meters	-$ 36,761.86		-$ 36,761.86	$ -	-$ 36,761.86	45.72	2.19%	-$ 804.00	-$ 1,157.16	$ 353.16
1995	Contributions & Grants - Meters PTs CTs	-$ 2,632.26		-$ 2,632.26	$ -	-$ 2,632.26	50.00	2.00%	-$ 52.65	-$ 52.11	-$ 0.54
1609	Capital Contribution Pd Contracts	$ 38,995.20		$ 38,995.20	$ -	$ 38,995.20	45.00	2.22%	$ 866.56	$ 866.56	$ -
2440	Deferred Revenue			$ -	-$ 40,311.27	-$ 20,155.64			$ -	$ 21,300.83	-$ 21,300.83
	Total	$ 29,796,324.59	$ 2,159,953.23	$ 27,636,371.36	$ 631,185.82	$ 27,951,964.27			$ 739,368.57	$ 750,702.18	-$ 11,333.61

Table 33: Depreciation Expense Schedule 2021

Year 2021

Account	Description	Opening Regulatory Gross PP&E as at Jan 1, 2021	Less Fully Depreciated	Net for Depreciation	Additions	Total for Depreciation	Years	Depreciation Rate	2021 Depreciation Expense	2021 Depreciation Expense per Appendix 2-B Fixed Assets, Column K	Variance [2]
		(a)	(b)	(c)	(d)	(e) = (c) + ½ x (d) [1]	(f)	(g) = 1 / (f)	(h) = (e) / (f)	(l)	(m) = (h) - (l)
1611	Computer Software (Formally known as Account 1925)	$ 446,693.56	$ 360,906.56	$ 85,787.00	$ 20,815.00	$ 96,194.50	3.97	25.17%	$ 24,215.67	$ 23,065.67	$ 1,150.00
1612	Land Rights (Formally known as Account 1906 and 1806)	$ 37,132.16	$ -	$ 37,132.16	$ -	$ 37,132.16	50.00	2.00%	$ 742.64	$ 743.40	-$ 0.76
1805	Land	$ 46,065.54		$ 46,065.54	$ -	$ 46,065.54			$ -	$ -	$ -
1808	Buildings	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1810	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1815	Transformer Station Equipment >50 kV	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1820	Distribution Station Equipment <50 kV	$ 7,723,477.77	$ 112,211.02	$ 7,611,266.75	$ -	$ 7,611,266.75	41.24	2.42%	$ 184,543.46	$ 184,543.46	$ 0.00
1825	Storage Battery Equipment	$ -	$ 2,154.99	-$ 2,154.99	$ -	-$ 2,154.99			$ -	$ -	$ -
1830	Poles, Towers & Fixtures (wood)	$ 2,650,304.55	$ 214,275.28	$ 2,436,029.27	$ 262,396.01	$ 2,567,227.28	47.85	2.09%	$ 53,650.27	$ 53,650.27	$ 0.00
1830	Poles, Towers & Fixtures (steel/concrete)	$ 688,889.89		$ 688,889.89	$ 6,341.80	$ 692,060.79	86.98	1.15%	$ 7,956.80	$ 7,956.80	-$ 0.00
1835	Overhead Conductors & Devices	$ 2,350,721.14	$ 1,324.00	$ 2,349,397.14	$ 177,190.02	$ 2,437,992.15	78.55	1.27%	$ 31,036.01	$ 31,036.01	$ 0.00
1840	Underground Conduit	$ 2,232,076.20	$ -	$ 2,232,076.20	$ 217.38	$ 2,232,184.89	93.33	1.07%	$ 23,916.84	$ 23,916.84	$ 0.00
1845	Underground Conductors & Devices	$ 2,857,323.62	$ 684.00	$ 2,856,639.62	$ 112,465.95	$ 2,912,872.60	74.27	1.35%	$ 39,222.17	$ 39,222.17	-$ 0.00
1850	Line Transformers - Overhead	$ 757,542.61	$ 178,805.22	$ 578,737.39	$ 13,248.05	$ 585,361.42	53.70	1.86%	$ 10,899.69	$ 10,899.69	$ 0.00
1850	Line Transformers - Underground	$ 3,062,292.47	$ 521,657.80	$ 2,540,634.67	$ 600.61	$ 2,540,934.98	33.85	2.95%	$ 75,056.98	$ 75,056.98	$ 0.00
1855	Services (Overhead)	$ 671,768.30	$ 3,770.00	$ 667,998.30	$ 63,893.93	$ 699,945.27	81.41	1.23%	$ 8,598.00	$ 8,598.00	$ 0.00
1855	Services (Underground)	$ 3,401,182.94	$ 29,111.00	$ 3,372,071.94	$ 67,610.46	$ 3,405,877.17	105.32	0.95%	$ 32,337.63	$ 32,337.63	$ 0.00
1860	Meters	$ 1,392,455.13		$ 1,392,455.13	$ 22,066.77	$ 1,403,488.52	16.37	6.11%	$ 85,744.56	$ 85,744.56	$ 0.00
1860	Meters CTs PTs	$ 114,390.74		$ 114,390.74	$ 3,758.33	$ 116,269.91	50.00	2.00%	$ 2,325.40	$ 2,296.67	$ 28.73
1860	Meters (Smart Meters)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1905	Land	$ 8,639.65	$ -	$ 8,639.65	$ -	$ 8,639.65			$ -	$ -	$ -
1908	Buildings & Fixtures (25 years)	$ 249,793.22	$ -	$ 249,793.22	$ -	$ 249,793.22	25.00	4.00%	$ 9,991.73	$ 9,991.45	$ 0.28
1908	Buildings & Fixtures (50 years)	$ 1,055,104.29		$ 1,055,104.29	$ -	$ 1,055,104.29	50.00	2.00%	$ 21,102.09	$ 21,780.94	-$ 678.85
1910	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1915	Office Furniture & Equipment (10 years)	$ 89,710.57	$ 36,560.19	$ 53,150.38	$ -	$ 53,150.38	10.00	10.00%	$ 5,315.04	$ 5,004.08	$ 310.96
1915	Office Furniture & Equipment (5 years)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equipment - Hardware -3 years	$ 61,739.44	$ 46,249.44	$ 15,490.00	$ 7,985.68	$ 19,482.84	3.00	33.33%	$ 6,494.28	$ 5,313.07	$ 1,181.21
1920	Computer Equipment - Hardware - 4 years	$ 93,390.07	$ 61,398.07	$ 31,992.00	$ -	$ 31,992.00	4.00	25.00%	$ 7,998.00	$ 7,628.90	$ 369.10
1920	Computer Equipment - Hardware - 5 years	$ 24,867.84	$ 17,462.84	$ 7,405.00	$ -	$ 7,405.00	5.00	20.00%	$ 1,481.00	$ 1,481.00	$ -
1920	Computer Equipment - Hardware - 6 years	$ 65,417.22	$ -	$ 65,417.22	$ -	$ 65,417.22	6.00	16.67%	$ 10,902.87	$ 5,808.52	$ 5,094.35
1920	Computer Equipment - Hardware - 10 years	$ 16,666.54		$ 16,666.54	$ -	$ 16,666.54	10.00	10.00%	$ 1,666.65	$ 1,666.65	$ 0.00
1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1930	Transportation Equipment <3 Tonnes	$ 239,710.22		$ 239,710.22	$ -	$ 239,710.22	7.00	14.29%	$ 34,244.32	$ 31,556.73	$ 2,687.59
1930	Transportation Equipment >3 Tonnes	$ 1,028,563.42	$ 295,138.18	$ 733,425.24	$ -	$ 733,425.24	12.00	8.33%	$ 61,118.77	$ 61,126.60	-$ 7.83
1930	Transportation Equipment Trailer	$ 111,357.25	$ 35,190.00	$ 76,167.25	$ -	$ 76,167.25	8.00	12.50%	$ 9,520.91	$ 8,574.03	$ 946.88
1935	Stores Equipment	$ 17,053.47	$ 14,318.24	$ 2,735.23	$ -	$ 2,735.23	10.00	10.00%	$ 273.52	$ 273.52	$ 0.00
1940	Tools, Shop & Garage Equipment	$ 111,071.84	$ 60,033.46	$ 51,038.38	$ 5,858.98	$ 53,967.87	10.00	10.00%	$ 5,396.79	$ 5,073.70	$ 323.09
1945	Measurement & Testing Equipment	$ 36,452.48	$ 17,991.21	$ 18,461.27	$ -	$ 18,461.27	10.00	10.00%	$ 1,846.13	$ 1,678.23	$ 167.90
1950	Power Operated Equipment	$ 59,971.27	$ 51,688.93	$ 8,282.34	$ 1,894.28	$ 9,229.48	8.00	12.50%	$ 1,153.69	$ 1,153.94	-$ 0.25
1955	Communications Equipment	$ 26,628.05	$ 496.78	$ 26,131.27	$ -	$ 26,131.27	10.00	10.00%	$ 2,613.13	$ 2,613.13	-$ 0.00
1955	Communication Equipment (Smart Meters)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1960	Miscellaneous Equipment	$ 21,597.14	$ 12,430.41	$ 9,166.73	$ 2,599.98	$ 10,466.72	5.00	20.00%	$ 2,093.34	$ 2,093.34	$ 0.00
1970	Load Management Controls Customer Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1975	Load Management Controls Utility Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1980	System Supervisor Equipment	$ 246,714.55	$ 116,829.99	$ 129,884.56	$ -	$ 129,884.56	10.00	10.00%	$ 12,988.46	$ 6,958.12	$ 6,030.34
1985	Sentinel Lights	$ 2,516.21	$ 2,516.21	$ -	$ -	$ -			$ -	$ -	$ -
1990	Other Tangible Property	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1995	Contributions & Grants - PolesTwrsFix	-$ 157,251.51		-$ 157,251.51	$ -	-$ 157,251.51	47.96	2.09%	-$ 3,279.00	-$ 3,278.53	-$ 0.47
1995	Contributions & Grants - O/H Conductor	-$ 70,035.29		-$ 70,035.29	$ -	-$ 70,035.29	67.41	1.48%	-$ 1,039.00	-$ 1,039.37	$ 0.37
1995	Contributions & Grants - UG Conduit	-$ 350,698.25		-$ 350,698.25	$ -	-$ 350,698.25	91.49	1.09%	-$ 3,833.00	-$ 3,833.43	$ 0.43
1995	Contributions & Grants - UG Cond&Dev	-$ 408,830.11		-$ 408,830.11	$ -	-$ 408,830.11	68.24	1.47%	-$ 5,991.00	-$ 5,991.22	$ 0.22
1995	Contributions & Grants - OHLine Trans	-$ 4,185.76		-$ 4,185.76	$ -	-$ 4,185.76	48.11	2.08%	-$ 87.00	-$ 86.82	-$ 0.18
1995	Contributions & Grants - UGLine Trans	-$ 331,205.07		-$ 331,205.07	$ -	-$ 331,205.07	34.30	2.92%	-$ 9,657.00	-$ 9,656.78	-$ 0.22
1995	Contributions & Grants - OHServices	-$ 7,926.93		-$ 7,926.93	$ -	-$ 7,926.93	66.61	1.50%	-$ 119.00	-$ 119.49	$ 0.49
1995	Contributions & Grants - UGServices	-$ 368,586.76		-$ 368,586.76	$ -	-$ 368,586.76	70.54	1.42%	-$ 5,225.00	-$ 5,224.75	-$ 0.25
1995	Contributions & Grants - Meters	-$ 36,761.86		-$ 36,761.86	$ -	-$ 36,761.86	45.72	2.19%	-$ 804.00	-$ 980.39	$ 176.39
1995	Contributions & Grants - Meters PTs CTs	-$ 2,632.26		-$ 2,632.26	$ -	-$ 2,632.26	50.00	2.00%	-$ 52.65	-$ 52.11	-$ 0.54
1609	Capital Contribution Pd Contracts	$ 38,995.20		$ 38,995.20	$ -	$ 38,995.20	45.00	2.22%	$ 866.56	$ 866.56	$ -
2440	Deferred Revenue			$ -	-$ 90,619.81	-$ 45,309.91			$ -	$ 22,708.92	-$ 22,708.92
				$ -		$ -			$ -		$ -
	Total	$ 30,300,162.76	$ 2,193,203.82	$ 28,106,958.94	$ 678,323.42	$ 28,446,120.65			$ 747,226.73	$ 752,156.69	-$ 4,929.96

Table 34: Depreciation Expense Schedule 2022

Year 2022

Account	Description	Opening Regulatory Gross PP&E as at Jan 1, 2022	Less Fully Depreciated	Net for Depreciation	Additions	Total for Depreciation	Years	Depreciation Rate	2022 Depreciation Expense	2022 Depreciation Expense per Appendix 2-B Fixed Assets, Column K	Variance [2]
		(a)	(b)	(c)	(d)	(e) = (c) + ½ x (d) [1]	(f)	(g) = 1 / (f)	(h) = (e) / (f)	(l)	(m) = (h) - (l)
1611	Computer Software (Formally known as Account 1925)	$ 458,943.96	$ 359,241.96	$ 99,702.00	$ 124,708.12	$ 162,056.06	3.51	28.49%	$ 46,169.52	$ 45,214.19	$ 955.33
1612	Land Rights (Formally known as Account 1906 and 1806)	$ 37,132.16	$ -	$ 37,132.16	$ -	$ 37,132.16	50.00	2.00%	$ 742.64	$ 743.40	-$ 0.76
1805	Land	$ 46,065.54	$ -	$ 46,065.54	$ -	$ 46,065.54			$ -	$ -	$ -
1808	Buildings	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1810	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1815	Transformer Station Equipment >50 kV	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1820	Distribution Station Equipment <50 kV	$ 7,723,477.77	$ 324,514.42	$ 7,398,963.35		$ 7,398,963.35	45.00	2.22%	$ 164,421.41	$ 175,479.51	-$ 11,058.10
1825	Storage Battery Equipment	$ -	$ 2,154.99	-$ 2,154.99	$ -	-$ 2,154.99			$ -	$ -	$ -
1830	Poles, Towers & Fixtures (wood)	$ 2,893,789.70	$ 463,436.75	$ 2,430,352.95	$ 178,898.08	$ 2,519,801.99	45.00	2.22%	$ 55,995.60	$ 58,326.02	-$ 2,330.42
1830	Poles, Towers & Fixtures (steel/concrete)	$ 695,231.69	$ -	$ 695,231.69	$ -	$ 695,231.69	86.79	1.15%	$ 8,010.55	$ 8,010.55	$ 0.00
1835	Overhead Conductors & Devices	$ 2,503,516.53	$ 1,324.23	$ 2,502,192.30	$ 99,806.55	$ 2,552,095.58	77.20	1.30%	$ 33,058.17	$ 33,058.17	$ 0.00
1840	Underground Conduit	$ 2,232,293.58	$ -	$ 2,232,293.58	$ -	$ 2,232,293.58	93.33	1.07%	$ 23,918.40	$ 23,918.40	$ 0.00
1845	Underground Conductors & Devices	$ 2,954,454.27	$ 684.00	$ 2,953,770.27	$ 41,771.68	$ 2,974,656.11	73.20	1.37%	$ 40,635.61	$ 40,635.61	$ 0.00
1850	Line Transformers - Overhead	$ 767,198.41	$ 192,179.43	$ 575,018.98	$ 43,460.55	$ 596,749.26	50.84	1.97%	$ 11,737.40	$ 11,737.40	$ 0.00
1850	Line Transformers - Underground	$ 3,061,309.64	$ 528,751.59	$ 2,532,558.05	$ 1,146.33	$ 2,533,131.22	33.75	2.96%	$ 75,049.98	$ 75,049.98	$ 0.00
1855	Services (Overhead)	$ 729,109.04	$ 11,207.70	$ 717,901.34	$ 43,724.65	$ 739,763.67	79.66	1.26%	$ 9,286.47	$ 9,286.47	$ 0.00
1855	Services (Underground)	$ 3,456,606.29	$ 28,922.35	$ 3,427,683.94	$ 34,501.94	$ 3,444,934.91	103.54	0.97%	$ 33,271.50	$ 33,271.50	$ 0.00
1860	Meters	$ 1,391,947.43	$ 580.72	$ 1,391,366.71	$ 73,622.71	$ 1,428,178.07	16.35	6.12%	$ 87,366.60	$ 87,366.60	$ 0.00
1860	Meters CTs PTs	$ 118,149.07	$ -	$ 118,149.07	$ 5,931.21	$ 121,114.68	50.00	2.00%	$ 2,422.29	$ 2,394.33	$ 27.96
1860	Meters (Smart Meters)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1905	Land	$ 8,639.65	$ -	$ 8,639.65	$ -	$ 8,639.65			$ -	$ -	$ -
1908	Buildings & Fixtures (25 years)	$ 249,793.22	$ -	$ 249,793.22	$ -	$ 249,793.22	25.00	4.00%	$ 9,991.73	$ 9,991.45	$ 0.28
1908	Buildings & Fixtures (50 years)	$ 1,055,104.29	$ -	$ 1,055,104.29	$ -	$ 1,055,104.29	50.00	2.00%	$ 21,102.09	$ 21,780.95	-$ 678.86
1910	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1915	Office Furniture & Equipment (10 years)	$ 89,710.57	$ 42,778.00	$ 46,932.57	$ 14,253.18	$ 54,059.16	10.00	10.00%	$ 5,405.92	$ 5,247.64	$ 158.28
1915	Office Furniture & Equipment (5 years)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equipment - Hardware -3 years	$ 48,782.56	$ 25,306.56	$ 23,476.00	$ 29,157.90	$ 38,054.95	3.00	33.33%	$ 12,684.98	$ 10,807.55	$ 1,877.43
1920	Computer Equipment - Hardware - 4 years	$ 87,044.78	$ 67,108.78	$ 19,936.00	$ -	$ 19,936.00	4.00	25.00%	$ 4,984.00	$ 6,935.22	-$ 1,951.22
1920	Computer Equipment - Hardware - 5 years	$ 24,867.84	$ 17,462.84	$ 7,405.00	$ -	$ 7,405.00	5.00	20.00%	$ 1,481.00	$ 1,481.00	$ -
1920	Computer Equipment - Hardware - 6 years	$ 65,417.22	$ 61,132.40	$ 4,284.82	$ -	$ 4,284.82	6.00	16.67%	$ 714.14	$ 714.14	-$ 0.00
1920	Computer Equipment - Hardware - 10 years	$ 16,666.54	$ -	$ 16,666.54	$ -	$ 16,666.54	10.00	10.00%	$ 1,666.65	$ 1,666.65	$ 0.00
1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1930	Transportation Equipment <3 Tonnes	$ 239,710.22	$ 37,625.72	$ 202,084.50	$ -	$ 202,084.50	7.00	14.29%	$ 28,869.21	$ 28,869.21	$ 0.00
1930	Transportation Equipment >3 Tonnes	$ 1,028,563.42	$ 295,138.18	$ 733,425.24	$ -	$ 733,425.24	12.00	8.33%	$ 61,118.77	$ 61,126.60	-$ 7.83
1930	Transportation Equipment Trailer	$ 111,357.25	$ 50,340.00	$ 61,017.25	$ -	$ 61,017.25	8.00	12.50%	$ 7,627.16	$ 7,627.16	-$ 0.00
1935	Stores Equipment	$ 17,053.47	$ 14,318.24	$ 2,735.23	$ -	$ 2,735.23	10.00	10.00%	$ 273.52	$ 273.52	$ 0.00
1940	Tools, Shop & Garage Equipment	$ 116,930.82	$ 66,495.50	$ 50,435.32	$ 2,026.24	$ 51,448.44	10.00	10.00%	$ 5,144.84	$ 5,144.86	-$ 0.02
1945	Measurement & Testing Equipment	$ 36,452.48	$ 21,317.15	$ 15,135.33	$ 18,804.79	$ 24,537.73	10.00	10.00%	$ 2,453.77	$ 2,117.56	$ 336.21
1950	Power Operated Equipment	$ 61,865.55	$ 51,688.93	$ 10,176.62	$ -	$ 10,176.62	8.00	12.50%	$ 1,272.08	$ 1,272.34	-$ 0.26
1955	Communications Equipment	$ 26,628.05	$ 496.78	$ 26,131.27	$ 4,993.91	$ 28,628.23	10.00	10.00%	$ 2,862.82	$ 2,862.83	-$ 0.01
1955	Communication Equipment (Smart Meters)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1960	Miscellaneous Equipment	$ 24,197.12	$ 11,094.41	$ 13,102.71	$ -	$ 13,102.71	5.00	20.00%	$ 2,620.54	$ 1,887.22	$ 733.32
1970	Load Management Controls Customer Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1975	Load Management Controls Utility Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1980	System Supervisor Equipment	$ 246,714.55	$ 116,829.99	$ 129,884.56	$ -	$ 129,884.56	18.67	5.36%	$ 6,958.12	$ 6,958.12	$ 0.00
1985	Sentinel Lights	$ 2,516.21	$ 2,516.21	$ -	$ -	$ -	10.00	10.00%	$ -	$ -	$ -
1990	Other Tangible Property	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1995	Contributions & Grants - PolesTwrsFix	-$ 157,251.51		-$ 157,251.51	$ -	-$ 157,251.51	47.96	2.09%	-$ 3,279.00	-$ 3,278.53	-$ 0.47
1995	Contributions & Grants - O/H Conductor	-$ 70,035.29		-$ 70,035.29	$ -	-$ 70,035.29	67.41	1.48%	-$ 1,039.00	-$ 1,039.37	$ 0.37
1995	Contributions & Grants - UG Conduit	-$ 350,698.25		-$ 350,698.25	$ -	-$ 350,698.25	91.49	1.09%	-$ 3,833.00	-$ 3,833.43	$ 0.43
1995	Contributions & Grants - UG Cond&Dev	-$ 408,830.11		-$ 408,830.11	$ -	-$ 408,830.11	68.24	1.47%	-$ 5,991.00	-$ 5,991.22	$ 0.22
1995	Contributions & Grants - OHLine Trans	-$ 4,185.76		-$ 4,185.76	$ -	-$ 4,185.76	48.11	2.08%	-$ 87.00	-$ 86.82	-$ 0.18
1995	Contributions & Grants - UGLine Trans	-$ 331,205.07		-$ 331,205.07	$ -	-$ 331,205.07	34.30	2.92%	-$ 9,657.00	-$ 9,656.78	-$ 0.22
1995	Contributions & Grants - OHServices	-$ 7,926.93		-$ 7,926.93	$ -	-$ 7,926.93	66.61	1.50%	-$ 119.00	-$ 119.49	$ 0.49
1995	Contributions & Grants - UGServices	-$ 368,586.76		-$ 368,586.76	$ -	-$ 368,586.76	70.54	1.42%	-$ 5,225.00	-$ 5,224.75	-$ 0.25
1995	Contributions & Grants - Meters	-$ 36,761.86		-$ 36,761.86	$ -	-$ 36,761.86	45.72	2.19%	-$ 804.00	-$ 803.63	-$ 0.37
1995	Contributions & Grants - Meters PTs CTs	-$ 2,632.26		-$ 2,632.26	$ -	-$ 2,632.26	50.00	2.00%	-$ 52.65	-$ 52.11	-$ 0.54
1609	Capital Contribution Pd Contracts	$ 38,995.20	$ -	$ 38,995.20	$ -	$ 38,995.20	45.00	2.22%	$ 866.56	$ 866.56	$ -
2440	Deferred Revenue	-$ 1,115,800.47		-$ 1,115,800.47	-$ 32,727.23	-$ 1,132,164.09			$ -		$ -
				$ -		$ -			$ -		$ -
	Total	$ 29,812,321.82	$ 2,794,647.83	$ 27,017,673.99	$ 684,080.61	$ 27,359,714.30			$ 740,097.41	$ 752,036.58	-$ 11,939.17

Table 35: Depreciation Expense Schedule 2023

Year 2023

Account	Description	Opening Regulatory Gross PP&E as at Jan 1, 2023	Less Fully Depreciated	Net for Depreciation	Additions	Total for Depreciation	Years	Depreciation Rate	2023 Depreciation Expense	2023 Depreciation Expense per Appendix 2-B Fixed Assets, Column K	Variance [2]
		(a)	(b)	(c)	(d)	(e) = (c) + ½ x (d) [1]	(f)	(g) = 1 / (f)	(h) = (e) / (f)	(l)	(m) = (h) - (l)
1611	Computer Software (Formally known as Account 1925)	$ 514,592.68	$ 295,914.56	$ 218,678.12	$ 4,000.00	$ 220,678.12	3.36	29.78%	$ 65,710.20	$ 61,366.87	$ 4,343.33
1612	Land Rights (Formally known as Account 1906 and 1806)	$ 37,132.16	$ -	$ 37,132.16	$ -	$ 37,132.16	50.00	2.00%	$ 742.64	$ 743.40	-$ 0.76
1805	Land	$ 46,065.54	$ -	$ 46,065.54	$ -	$ 46,065.54			$ -	$ -	$ -
1808	Buildings	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1810	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1815	Transformer Station Equipment >50 kV	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1820	Distribution Station Equipment <50 kV	$ 7,471,727.37	$ 72,764.02	$ 7,398,963.35	$ 103,275.15	$ 7,450,600.93	45.00	2.22%	$ 165,568.91	$ 178,012.36	-$ 12,443.45
1825	Storage Battery Equipment	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1830	Poles, Towers & Fixtures (wood)	$ 3,294,287.16	$ 449,793.32	$ 2,844,493.84	$ 343,604.97	$ 3,016,296.33	47.20	2.12%	$ 63,903.26	$ 63,903.26	$ 0.00
1830	Poles, Towers & Fixtures (steel/concrete)	$ 695,231.69	$ -	$ 695,231.69	$ 108,330.00	$ 749,396.69	84.08	1.19%	$ 8,913.30	$ 8,913.30	$ 0.00
1835	Overhead Conductors & Devices	$ 2,600,546.12	$ 1,324.26	$ 2,599,221.86	$ 181,397.30	$ 2,689,920.51	76.93	1.30%	$ 34,965.55	$ 34,965.55	$ 0.00
1840	Underground Conduit	$ 2,232,293.58	$ -	$ 2,232,293.58	$ -	$ 2,232,293.58	93.33	1.07%	$ 23,918.41	$ 23,918.41	$ 0.00
1845	Underground Conductors & Devices	$ 2,994,918.19	$ 683.92	$ 2,994,234.27	$ 27,696.18	$ 3,008,082.36	73.22	1.37%	$ 41,084.54	$ 41,084.54	$ 0.00
1850	Line Transformers - Overhead	$ 805,229.45	$ 224,108.54	$ 581,120.91	$ 46,751.14	$ 604,496.48	51.23	1.95%	$ 11,798.55	$ 11,798.55	$ 0.00
1850	Line Transformers - Underground	$ 3,062,455.97	$ 563,967.19	$ 2,498,488.78	$ 42,520.85	$ 2,519,749.21	33.42	2.99%	$ 75,388.08	$ 75,388.08	$ 0.00
1855	Services (Overhead)	$ 770,671.73	$ 11,138.70	$ 759,533.03	$ 47,817.87	$ 783,441.97	79.21	1.26%	$ 9,890.61	$ 9,890.61	$ 0.00
1855	Services (Underground)	$ 3,489,475.25	$ 28,922.35	$ 3,460,552.90	$ 40,814.07	$ 3,480,959.94	106.43	0.94%	$ 32,707.87	$ 32,707.87	$ 0.00
1860	Meters	$ 1,446,130.29	$ 580.72	$ 1,445,549.57	$ 21,772.86	$ 1,456,436.00	25.34	3.95%	$ 57,483.88	$ 56,321.81	$ 1,162.07
1860	Meters CTs PTs	$ 124,080.28	$ -	$ 124,080.28	$ 948.00	$ 124,554.28	50.00	2.00%	$ 2,491.09	$ 2,454.85	$ 36.24
1860	Meters (Smart Meters)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1905	Land	$ 8,639.65	$ -	$ 8,639.65	$ -	$ 8,639.65			$ -	$ -	$ -
1908	Buildings & Fixtures (25 years)	$ 249,793.22	$ -	$ 249,793.22	$ 117,559.73	$ 308,573.09	29.87	3.35%	$ 10,330.54	$ 10,330.54	$ 0.00
1908	Buildings & Fixtures (50 years)	$ 1,055,104.29	$ -	$ 1,055,104.29	$ -	$ 1,055,104.29	50.00	2.00%	$ 21,102.09	$ 21,780.95	-$ 678.86
1910	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1915	Office Furniture & Equipment (10 years)	$ 87,558.51	$ 25,423.74	$ 62,134.77	$ 2,420.40	$ 63,344.97	10.00	10.00%	$ 6,334.50	$ 5,493.41	$ 841.09
1915	Office Furniture & Equipment (5 years)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equipment - Hardware -3 years	$ 71,766.88	$ 35,124.96	$ 36,641.92	$ 8,385.10	$ 40,834.47	3.00	33.33%	$ 13,611.49	$ 14,103.73	-$ 492.24
1920	Computer Equipment - Hardware - 4 years	$ 87,044.78	$ 64,633.59	$ 22,411.19	$ -	$ 22,411.19	4.00	25.00%	$ 5,602.80	$ 4,864.94	$ 737.86
1920	Computer Equipment - Hardware - 5 years	$ 24,867.84	$ 17,463.14	$ 7,404.70	$ 4,824.20	$ 9,816.80	5.00	20.00%	$ 1,963.36	$ 1,963.42	-$ 0.06
1920	Computer Equipment - Hardware - 6 years	$ 65,417.22	$ 61,132.40	$ 4,284.82	$ -	$ 4,284.82	6.00	16.67%	$ 714.14	$ 714.14	-$ 0.00
1920	Computer Equipment - Hardware - 10 years	$ 16,666.54		$ 16,666.54	$ -	$ 16,666.54	10.00	10.00%	$ 1,666.65	$ 1,666.65	$ 0.00
1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1930	Transportation Equipment <3 Tonnes	$ 239,710.22	$ -	$ 239,710.22	$ 77,079.00	$ 278,249.72	7.00	14.29%	$ 39,749.96	$ 34,374.86	$ 5,375.10
1930	Transportation Equipment >3 Tonnes	$ 1,028,563.42	$ 295,138.18	$ 733,425.24	$ -	$ 733,425.24	12.00	8.33%	$ 61,118.77	$ 61,126.60	-$ 7.83
1930	Transportation Equipment Trailer	$ 111,357.25	$ 50,340.00	$ 61,017.25	$ -	$ 61,017.25	10.33	9.68%	$ 5,907.21	$ 5,907.21	$ 0.00
1935	Stores Equipment	$ 17,053.47	$ 14,318.24	$ 2,735.23	$ 6,338.30	$ 5,904.38	10.00	10.00%	$ 590.44	$ 590.44	-$ 0.00
1940	Tools, Shop & Garage Equipment	$ 115,742.48	$ 62,136.11	$ 53,606.37	$ 3,136.45	$ 55,174.60	10.00	10.00%	$ 5,517.46	$ 5,058.39	$ 459.07
1945	Measurement & Testing Equipment	$ 55,257.27	$ 28,058.28	$ 27,198.99	$ -	$ 27,198.99	10.00	10.00%	$ 2,719.90	$ 2,720.24	-$ 0.34
1950	Power Operated Equipment	$ 61,865.55	$ 51,688.93	$ 10,176.62	$ -	$ 10,176.62	8.00	12.50%	$ 1,272.08	$ 879.82	$ 392.26
1955	Communications Equipment	$ 31,621.96	$ 496.78	$ 31,125.18	$ -	$ 31,125.18	10.00	10.00%	$ 3,112.52	$ 2,871.76	$ 240.76
1955	Communication Equipment (Smart Meters)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1960	Miscellaneous Equipment	$ 24,197.12	$ 15,755.63	$ 8,441.49	$ 2,354.97	$ 9,618.98	5.00	20.00%	$ 1,923.80	$ 1,467.10	$ 456.70
1970	Load Management Controls Customer Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1975	Load Management Controls Utility Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1980	System Supervisor Equipment	$ 246,714.55	$ 116,829.99	$ 129,884.56	$ -	$ 129,884.56	18.67	5.36%	$ 6,958.12	$ 6,958.12	$ 0.00
1985	Sentinel Lights	$ 2,516.21	$ 2,516.21	$ -	$ -	$ -	10.00	10.00%	$ -	$ -	$ -
1990	Other Tangible Property	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1995	Contributions & Grants - PolesTwrsFix	-$ 157,251.51		-$ 157,251.51	$ -	-$ 157,251.51	47.96	2.09%	-$ 3,279.00	-$ 3,279.00	-$ 0.00
1995	Contributions & Grants - O/H Conductor	-$ 70,035.29		-$ 70,035.29	$ -	-$ 70,035.29	67.41	1.48%	-$ 1,039.00	-$ 1,039.00	-$ 0.00
1995	Contributions & Grants - UG Conduit	-$ 350,698.25		-$ 350,698.25	$ -	-$ 350,698.25	91.49	1.09%	-$ 3,833.00	-$ 3,833.00	-$ 0.00
1995	Contributions & Grants - UG Cond&Dev	-$ 408,830.11		-$ 408,830.11	$ -	-$ 408,830.11	68.24	1.47%	-$ 5,991.00	-$ 5,991.00	-$ 0.00
1995	Contributions & Grants - OHLine Trans	-$ 4,185.76		-$ 4,185.76	$ -	-$ 4,185.76	48.11	2.08%	-$ 87.00	-$ 87.00	-$ 0.00
1995	Contributions & Grants - UGLine Trans	-$ 331,205.07		-$ 331,205.07	$ -	-$ 331,205.07	34.30	2.92%	-$ 9,657.00	-$ 9,657.00	-$ 0.00
1995	Contributions & Grants - OHServices	-$ 7,926.93		-$ 7,926.93	$ -	-$ 7,926.93	66.61	1.50%	-$ 119.00	-$ 119.00	-$ 0.00
1995	Contributions & Grants - UGServices	-$ 368,586.76		-$ 368,586.76	$ -	-$ 368,586.76	70.54	1.42%	-$ 5,225.00	-$ 5,225.00	-$ 0.00
1995	Contributions & Grants - Meters	-$ 36,761.86		-$ 36,761.86	$ -	-$ 36,761.86	45.72	2.19%	-$ 804.00	-$ 804.00	-$ 0.00
1995	Contributions & Grants - Meters PTs CTs	-$ 2,632.26		-$ 2,632.26	$ -	-$ 2,632.26	50.00	2.00%	-$ 52.65	-$ 52.00	-$ 0.65
1609	Capital Contribution Pd Contracts	$ 38,995.20	$ -	$ 38,995.20	$ -	$ 38,995.20	45.00	2.22%	$ 866.56	$ 867.00	-$ 0.44
2440	Deferred Revenue	-$ 1,148,527.70	$ -	-$ 1,148,527.70	-$ 51,957.03	-$ 1,174,506.22			$ -	$ 24,902.31	-$ 24,902.31
2075	Non Utility Assets - Net Solar project	$ -		$ -	$ -	$ -	25.00	4.00%	$ -	$ -	$ -
				$ -		$ -			$ -		$ -
	Total	$ 30,338,649.59	$ 2,490,253.76	$ 27,848,395.83	$ 1,139,069.51	$ 28,417,930.59			$ 755,542.61	$ 780,025.09	-$ 24,482.48

Table 36: Depreciation Expense Schedule 2024

Year 2024

Account	Description	Opening Regulatory Gross PP&E as at Jan 1, 2024	Less Fully Depreciated	Net for Depreciation	Additions	Total for Depreciation	Years	Depreciation Rate	2023 Depreciation Expense	2023 Depreciation Expense per Appendix 2-B Fixed Assets, Column K	Variance [2]
		(a)	(b)	(c)	(d)	(e) = (c) + ½ x (d) [1]	(f)	(g) = 1 / (f)	(h) = (e) / (f)	(l)	(m) = (h) - (l)
1611	Computer Software (Formally known as Account 1925)	$ 518,592.68	$ 394,789.56	$ 123,803.12	$ 246,400.00	$ 247,003.12	3.00	33.33%	$ 82,334.37	$ 78,861.00	$ 3,473.37
1612	Land Rights (Formally known as Account 1906 and 1806)	$ 37,132.16	$ -	$ 37,132.16	$ -	$ 37,132.16	50.00	2.00%	$ 742.64	$ 743.00	-$ 0.36
1805	Land	$ 46,065.54	$ -	$ 46,065.54	$ -	$ 46,065.54			$ -	$ -	$ -
1808	Buildings	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1810	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1815	Transformer Station Equipment >50 kV	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1820	Distribution Station Equipment <50 kV	$ 7,575,002.52	$ 277,137.06	$ 7,297,865.46	$ 931,700.00	$ 7,763,715.46	45.00	2.22%	$ 172,527.01	$ 172,798.00	-$ 270.99
1825	Storage Battery Equipment	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1830	Poles, Towers & Fixtures (wood)	$ 3,507,528.02	$ 198,043.32	$ 3,309,484.70	$ 286,500.00	$ 3,452,734.70	48.64	2.06%	$ 70,991.65	$ 70,991.65	$ 0.00
1830	Poles, Towers & Fixtures (steel/concrete)	$ 803,561.69	$ -	$ 803,561.69	$ -	$ 803,561.69	81.73	1.22%	$ 9,831.35	$ 9,831.35	$ 0.00
1835	Overhead Conductors & Devices	$ 2,775,998.87	$ 1,324.28	$ 2,774,674.59	$ 206,010.00	$ 2,877,679.59	76.26	1.31%	$ 37,737.00	$ 37,737.00	$ 0.00
1840	Underground Conduit	$ 2,232,293.58	$ -	$ 2,232,293.58	$ 16,319.00	$ 2,240,453.08	93.22	1.07%	$ 24,035.00	$ 24,035.00	$ 0.00
1845	Underground Conductors & Devices	$ 3,010,559.50	$ 683.92	$ 3,009,875.58	$ 170,594.00	$ 3,095,172.58	72.16	1.39%	$ 42,892.00	$ 42,892.00	$ 0.00
1850	Line Transformers - Overhead	$ 834,632.31	$ 241,924.16	$ 592,708.15	$ 114,300.00	$ 649,858.15	47.45	2.11%	$ 13,695.00	$ 13,695.00	$ 0.00
1850	Line Transformers - Underground	$ 3,059,625.65	$ 608,303.37	$ 2,451,322.28	$ 190,107.00	$ 2,546,375.78	32.19	3.11%	$ 79,110.00	$ 79,110.00	$ 0.00
1855	Services (Overhead)	$ 813,558.63	$ 11,138.70	$ 802,419.93	$ 46,400.00	$ 825,619.93	78.62	1.27%	$ 10,502.00	$ 10,502.00	$ 0.00
1855	Services (Underground)	$ 3,530,100.27	$ 28,922.35	$ 3,501,177.92	$ 62,966.00	$ 3,532,660.92	100.29	1.00%	$ 35,226.00	$ 35,226.00	$ 0.00
1860	Meters	$ 1,450,472.04	$ 14,217.00	$ 1,436,255.04	$ 52,500.00	$ 1,462,505.04	25.05	3.99%	$ 58,378.00	$ 57,942.98	$ 435.02
1860	Meters CTs PTs	$ 125,028.28	$ -	$ 125,028.28	$ -	$ 125,028.28	50.00	2.00%	$ 2,500.57	$ 2,474.02	$ 26.55
1860	Meters (Smart Meters)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1905	Land	$ 8,639.65	$ -	$ 8,639.65	$ -	$ 8,639.65			$ -	$ -	$ -
1908	Buildings & Fixtures (25 years)	$ 367,352.95	$ -	$ 367,352.95	$ 45,000.00	$ 389,852.95	25.00	4.00%	$ 15,594.12	$ 17,605.30	-$ 2,011.18
1908	Buildings & Fixtures (50 years)	$ 1,055,104.29	$ -	$ 1,055,104.29	$ -	$ 1,055,104.29	50.00	2.00%	$ 21,102.09	$ 15,529.70	$ 5,572.39
1910	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1915	Office Furniture & Equipment (10 years)	$ 81,567.96	$ 29,718.74	$ 51,849.22	$ -	$ 51,849.22	10.00	10.00%	$ 5,184.92	$ 5,553.00	-$ 368.08
1915	Office Furniture & Equipment (5 years)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equipment - Hardware -3 years	$ 59,322.04	$ 19,299.44	$ 40,022.60	$ 12,000.00	$ 46,022.60	3.00	33.33%	$ 15,340.87	$ 15,498.15	-$ 157.28
1920	Computer Equipment - Hardware - 4 years	$ 34,450.93	$ 26,306.31	$ 8,144.62	$ -	$ 8,144.62	4.00	25.00%	$ 2,036.16	$ 2,283.20	-$ 247.04
1920	Computer Equipment - Hardware - 5 years	$ 27,796.34	$ 17,462.84	$ 10,333.50	$ -	$ 10,333.50	5.00	20.00%	$ 2,066.70	$ 1,708.34	$ 358.36
1920	Computer Equipment - Hardware - 6 years	$ 65,417.22	$ 61,132.40	$ 4,284.82	$ 53,200.00	$ 30,884.82	6.00	16.67%	$ 5,147.47	$ 5,147.47	$ -
1920	Computer Equipment - Hardware - 10 years	$ 16,666.54		$ 16,666.54	$ -	$ 16,666.54	10.00	10.00%	$ 1,666.65	$ 1,666.65	$ 0.00
1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1930	Transportation Equipment <3 Tonnes	$ 279,163.50	$ -	$ 279,163.50	$ -	$ 279,163.50	7.00	14.29%	$ 39,880.50	$ 37,498.60	$ 2,381.90
1930	Transportation Equipment >3 Tonnes	$ 1,028,563.42		$ 1,028,563.42	$ 640,000.00	$ 1,348,563.42	12.00	8.33%	$ 112,380.29	$ 87,793.27	$ 24,587.02
1930	Transportation Equipment Trailer	$ 111,357.25	$ 77,858.94	$ 33,498.31	$ -	$ 33,498.31	8.00	12.50%	$ 4,187.29	$ 2,094.00	$ 2,093.29
1935	Stores Equipment	$ 23,391.77	$ 14,318.24	$ 9,073.53	$ -	$ 9,073.53	10.00	10.00%	$ 907.35	$ 1,174.00	-$ 266.65
1940	Tools, Shop & Garage Equipment	$ 118,878.93	$ 69,027.44	$ 49,851.49	$ 5,100.00	$ 52,401.49	10.00	10.00%	$ 5,240.15	$ 4,631.00	$ 609.15
1945	Measurement & Testing Equipment	$ 55,257.27	$ 28,058.28	$ 27,198.99	$ 1,500.00	$ 27,948.99	10.00	10.00%	$ 2,794.90	$ 2,795.00	-$ 0.10
1950	Power Operated Equipment	$ 61,865.55	$ 57,950.90	$ 3,914.65	$ -	$ 3,914.65	8.00	12.50%	$ 489.33	$ 363.00	$ 126.33
1955	Communications Equipment	$ 31,621.96	$ 5,311.75	$ 26,310.21	$ -	$ 26,310.21	10.00	10.00%	$ 2,631.02	$ 2,631.00	$ 0.02
1955	Communication Equipment (Smart Meters)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1960	Miscellaneous Equipment	$ 25,216.09	$ 17,650.63	$ 7,565.46	$ -	$ 7,565.46	5.00	20.00%	$ 1,513.09	$ 1,513.00	$ 0.09
1970	Load Management Controls Customer Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1975	Load Management Controls Utility Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1980	System Supervisor Equipment	$ 246,714.55	$ 116,829.99	$ 129,884.56	$ -	$ 129,884.56	18.67	5.36%	$ 6,958.00	$ 6,958.00	$ 0.00
1995	Sentinel Lights	$ -		$ -	$ -	$ -	10.00	10.00%	$ -	$ -	$ -
1990	Other Tangible Property	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1995	Contributions & Grants - PolesTwrsFix	-$ 157,251.51		-$ 157,251.51	$ -	-$ 157,251.51	47.96	2.09%	-$ 3,279.00	-$ 3,279.00	-$ 0.00
1995	Contributions & Grants - O/H Conductor	-$ 70,035.29		-$ 70,035.29	$ -	-$ 70,035.29	67.41	1.48%	-$ 1,039.00	-$ 1,039.00	-$ 0.00
1995	Contributions & Grants - UG Conduit	-$ 350,698.25		-$ 350,698.25	$ -	-$ 350,698.25	91.49	1.09%	-$ 3,833.00	-$ 3,833.00	-$ 0.00
1995	Contributions & Grants - UG Cond&Dev	-$ 408,830.11		-$ 408,830.11	$ -	-$ 408,830.11	68.24	1.47%	-$ 5,991.00	-$ 5,991.00	-$ 0.00
1995	Contributions & Grants - OHLine Trans	-$ 4,185.76		-$ 4,185.76	$ -	-$ 4,185.76	48.11	2.08%	-$ 87.00	-$ 87.00	-$ 0.00
1995	Contributions & Grants - UGLine Trans	-$ 331,205.07		-$ 331,205.07	$ -	-$ 331,205.07	34.30	2.92%	-$ 9,657.00	-$ 9,657.00	-$ 0.00
1995	Contributions & Grants - OHServices	-$ 7,926.93		-$ 7,926.93	$ -	-$ 7,926.93	66.61	1.50%	-$ 119.00	-$ 119.00	-$ 0.00
1995	Contributions & Grants - UGServices	-$ 368,586.76		-$ 368,586.76	$ -	-$ 368,586.76	70.54	1.42%	-$ 5,225.00	-$ 5,225.00	-$ 0.00
1995	Contributions & Grants - Meters	-$ 36,761.86		-$ 36,761.86	$ -	-$ 36,761.86	45.72	2.19%	-$ 804.00	-$ 804.00	-$ 0.00
1995	Contributions & Grants - Meters PTs CTs	-$ 2,632.26		-$ 2,632.26	$ -	-$ 2,632.26	50.00	2.00%	-$ 52.65	-$ 52.00	-$ 0.65
1609	Capital Contribution Pd Contracts	$ 38,995.20	$ -	$ 38,995.20	$ -	$ 38,995.20	45.00	2.22%	$ 866.56	$ 867.00	-$ 0.44
2440	Deferred Revenue	-$ 1,200,484.73	$ -	-$ 1,200,484.73	-$ 79,100.00	-$ 1,240,034.73			$ -	-$ 25,471.81	$ 25,471.81
2075	Non Utility Assets - Net Solar project	$ -		$ -	$ -	$ -			$ -	$ -	$ -
				$ -		$ -			$ -		$ -
	Total	$ 31,118,896.62	$ 2,317,409.62	$ 28,801,487.00	$ 3,001,496.00	$ 30,302,235.00			$ 856,403.40	$ 794,590.87	$ 61,812.53

Table 37: Depreciation Expense Schedule 2025

Year 2025

Account	Description	Opening Regulatory Gross PP&E as at Jan 1, 2025	Less Fully Depreciated	Net for Depreciation	Additions	Total for Depreciation	Years	Depreciation Rate	2023 Depreciation Expense	2023 Depreciation Expense per Appendix 2-B Fixed Assets, Column K	Variance [2]
		(a)	(b)	(c)	(d)	(e) = (c) + ½ x (d) [1]	(f)	(g) = 1 / (f)	(h) = (e) / (f)	(l)	(m) = (h) - (l)
1611	Computer Software (Formally known as Account 1925)	$ 749,992.68	$ 457,789.56	$ 292,203.12	$ -	$ 292,203.12	3.00	33.33%	$ 97,401.04	$ 75,333.00	$ 22,068.04
1612	Land Rights (Formally known as Account 1906 and 1806)	$ 37,132.16	$ -	$ 37,132.16	$ -	$ 37,132.16	50.00	2.00%	$ 742.64	$ 743.00	-$ 0.36
1805	Land	$ 46,065.54	$ -	$ 46,065.54	$ -	$ 46,065.54			$ -	$ -	$ -
1808	Buildings	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1810	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1815	Transformer Station Equipment >50 kV	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1820	Distribution Station Equipment <50 kV	$ 8,302,329.48	$ 72,764.02	$ 8,229,565.46	$ -	$ 8,229,565.46	45.00	2.22%	$ 182,879.23	$ 183,137.00	-$ 257.77
1825	Storage Battery Equipment	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1830	Poles, Towers & Fixtures (wood)	$ 3,779,028.02	$ 198,043.32	$ 3,580,984.70	$ 376,200.00	$ 3,769,084.70	48.06	2.08%	$ 78,426.65	$ 78,426.65	$ 0.00
1830	Poles, Towers & Fixtures (steel/concrete)	$ 803,561.69	$ 0.15	$ 803,561.54	$ -	$ 803,561.54	81.73	1.22%	$ 9,831.35	$ 9,831.35	$ 0.00
1835	Overhead Conductors & Devices	$ 2,972,008.87	$ 8,886.24	$ 2,963,122.63	$ 253,400.00	$ 3,089,822.63	80.01	1.25%	$ 38,620.00	$ 38,620.00	$ 0.00
1840	Underground Conduit	$ 2,248,612.58	$ -	$ 2,248,612.58	$ 32,600.00	$ 2,264,912.58	92.88	1.08%	$ 24,386.00	$ 24,386.00	$ 0.00
1845	Underground Conductors & Devices	$ 3,181,153.50	$ 683.92	$ 3,180,469.58	$ 82,400.00	$ 3,221,669.58	71.24	1.40%	$ 45,221.00	$ 45,221.00	$ 0.00
1850	Line Transformers - Overhead	$ 933,332.31	$ 256,064.82	$ 677,267.49	$ 62,100.00	$ 708,317.49	45.07	2.22%	$ 15,715.00	$ 15,715.00	$ 0.00
1850	Line Transformers - Underground	$ 3,240,132.65	$ 632,846.62	$ 2,607,286.03	$ 249,100.00	$ 2,731,836.03	31.55	3.17%	$ 86,586.00	$ 86,586.00	$ 0.00
1855	Services (Overhead)	$ 853,158.63	$ 11,138.70	$ 842,019.93	$ 54,400.00	$ 869,219.93	88.16	1.13%	$ 9,860.00	$ 9,860.00	$ 0.00
1855	Services (Underground)	$ 3,589,866.27	$ 28,922.35	$ 3,560,943.92	$ 40,300.00	$ 3,581,093.92	98.99	1.01%	$ 36,175.00	$ 36,175.00	$ 0.00
1860	Meters	$ 1,479,972.04	$ 14,217.00	$ 1,465,755.04	$ 24,900.00	$ 1,478,205.04	24.42	4.10%	$ 60,537.68	$ 59,310.98	$ 1,226.70
1860	Meters CTs PTs	$ 125,028.28	$ -	$ 125,028.28	$ -	$ 125,028.28	50.00	2.00%	$ 2,500.57	$ 2,474.02	$ 26.55
1860	Meters (Smart Meters)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1905	Land	$ 8,639.65	$ -	$ 8,639.65	$ -	$ 8,639.65			$ -	$ -	$ -
1908	Buildings & Fixtures (25 years)	$ 412,352.95	$ -	$ 412,352.95	$ 72,300.00	$ 448,502.95	31.21	3.20%	$ 14,369.86	$ 17,593.20	-$ 3,223.34
1908	Buildings & Fixtures (50 years)	$ 1,055,104.29	$ -	$ 1,055,104.29	$ -	$ 1,055,104.29	58.98	1.70%	$ 17,887.80	$ 17,887.80	$ 0.00
1910	Leasehold Improvements	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1915	Office Furniture & Equipment (10 years)	$ 81,567.96	$ 28,946.19	$ 52,621.77	$ -	$ 52,621.77	10.00	10.00%	$ 5,262.18	$ 5,327.00	-$ 64.82
1915	Office Furniture & Equipment (5 years)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equipment - Hardware -3 years	$ 65,206.51	$ 30,663.51	$ 34,543.00	$ 27,400.00	$ 48,243.00	3.00	33.33%	$ 16,081.00	$ 16,221.35	-$ 140.35
1920	Computer Equipment - Hardware - 4 years	$ 22,411.34	$ 20,328.58	$ 2,082.76	$ 30,000.00	$ 17,082.76	4.00	25.00%	$ 4,270.69	$ 3,750.00	$ 520.69
1920	Computer Equipment - Hardware - 5 years	$ 12,229.20	$ 7,947.86	$ 4,281.34	$ -	$ 4,281.34	5.00	20.00%	$ 856.27	$ 964.84	-$ 108.57
1920	Computer Equipment - Hardware - 6 years	$ 57,484.82		$ 57,484.82	$ -	$ 57,484.82	6.00	16.67%	$ 9,580.80	$ 9,580.80	$ 0.00
1920	Computer Equipment - Hardware - 10 years	$ 16,666.54		$ 16,666.54	$ -	$ 16,666.54	10.00	10.00%	$ 1,666.65	$ 1,666.65	$ 0.00
1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1930	Transportation Equipment <3 Tonnes	$ 279,163.50	$ 33,346.65	$ 245,816.85	$ -	$ 245,816.85	7.00	14.29%	$ 35,116.69	$ 35,116.69	$ 0.00
1930	Transportation Equipment >3 Tonnes	$ 1,373,425.24		$ 1,373,425.24	$ -	$ 1,373,425.24	12.00	8.33%	$ 114,452.10	$ 114,459.93	-$ 7.83
1930	Transportation Equipment Trailer	$ 111,357.25	$ 111,357.25	$ -	$ -	$ -	8.00	12.50%	$ -	$ -	$ -
1935	Stores Equipment	$ 23,391.77	$ 14,318.24	$ 9,073.53	$ -	$ 9,073.53	10.00	10.00%	$ 907.35	$ 1,174.00	-$ 266.65
1940	Tools, Shop & Garage Equipment	$ 123,978.93	$ 78,923.19	$ 45,055.74	$ 11,600.00	$ 50,855.74	10.00	10.00%	$ 5,085.57	$ 4,868.00	$ 217.57
1945	Measurement & Testing Equipment	$ 56,757.27	$ 28,058.28	$ 28,698.99	$ 1,500.00	$ 29,448.99	10.00	10.00%	$ 2,944.90	$ 2,945.00	-$ 0.10
1950	Power Operated Equipment	$ 61,865.55	$ 59,971.27	$ 1,894.28	$ -	$ 1,894.28	8.00	12.50%	$ 236.79	$ 237.00	-$ 0.22
1955	Communications Equipment	$ 31,621.96	$ 13,210.21	$ 18,411.75	$ -	$ 18,411.75	10.00	10.00%	$ 1,841.18	$ 1,976.00	-$ 134.83
1955	Communication Equipment (Smart Meters)	$ -	$ -	$ -	$ -	$ -			$ -	$ -	$ -
1960	Miscellaneous Equipment	$ 25,216.09	$ 17,650.63	$ 7,565.46	$ -	$ 7,565.46	5.00	20.00%	$ 1,513.09	$ 1,252.00	$ 261.09
1970	Load Management Controls Customer Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1975	Load Management Controls Utility Premises	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1980	System Supervisor Equipment	$ 246,714.55	$ 145,829.99	$ 100,884.56	$ -	$ 100,884.56	18.67	5.36%	$ 5,403.57	$ 1,159.00	$ 4,244.57
1995	Sentinel Lights	$ -		$ -	$ -	$ -	10.00	10.00%	$ -	$ -	$ -
1990	Other Tangible Property	$ -		$ -	$ -	$ -			$ -	$ -	$ -
1995	Contributions & Grants - PolesTwrsFix	-$ 157,251.51		-$ 157,251.51	$ -	-$ 157,251.51	47.96	2.09%	-$ 3,279.00	-$ 3,279.00	-$ 0.00
1995	Contributions & Grants - O/H Conductor	-$ 70,035.29		-$ 70,035.29	$ -	-$ 70,035.29	67.41	1.48%	-$ 1,039.00	-$ 1,039.00	-$ 0.00
1995	Contributions & Grants - UG Conduit	-$ 350,698.25		-$ 350,698.25	$ -	-$ 350,698.25	91.49	1.09%	-$ 3,833.00	-$ 3,833.00	-$ 0.00
1995	Contributions & Grants - UG Cond&Dev	-$ 408,830.11		-$ 408,830.11	$ -	-$ 408,830.11	68.24	1.47%	-$ 5,991.00	-$ 5,991.00	-$ 0.00
1995	Contributions & Grants - OHLine Trans	-$ 4,185.76		-$ 4,185.76	$ -	-$ 4,185.76	48.11	2.08%	-$ 87.00	-$ 87.00	-$ 0.00
1995	Contributions & Grants - UGLine Trans	-$ 331,205.07		-$ 331,205.07	$ -	-$ 331,205.07	34.30	2.92%	-$ 9,657.00	-$ 9,657.00	-$ 0.00
1995	Contributions & Grants - OHServices	-$ 7,926.93		-$ 7,926.93	$ -	-$ 7,926.93	66.61	1.50%	-$ 119.00	-$ 119.00	-$ 0.00
1995	Contributions & Grants - UGServices	-$ 368,586.76		-$ 368,586.76	$ -	-$ 368,586.76	70.54	1.42%	-$ 5,225.00	-$ 5,225.00	-$ 0.00
1995	Contributions & Grants - Meters	-$ 36,761.86		-$ 36,761.86	$ -	-$ 36,761.86	45.72	2.19%	-$ 804.00	-$ 804.00	-$ 0.00
1995	Contributions & Grants - Meters PTs CTs	-$ 2,632.26		-$ 2,632.26	$ -	-$ 2,632.26	50.00	2.00%	-$ 52.65	-$ 52.00	-$ 0.65
1609	Capital Contribution Pd Contracts	$ 38,995.20	$ -	$ 38,995.20	$ -	$ 38,995.20	45.00	2.22%	$ 866.56	$ 867.00	-$ 0.44
2440	Deferred Revenue	-$ 1,279,584.73	$ -	-$ 1,279,584.73	$ -	-$ 1,279,584.73			$ -	$ 25,499.83	-$ 25,499.83
2075	Non Utility Assets - Net Solar project	$ -		$ -	$ -	$ -			$ -	$ -	$ -
		$ -		$ -	$ -	$ -			$ -	$ -	$ -
				$ -		$ -			$ -		$ -
	Total	$ 33,427,826.74	$ 2,271,908.55	$ 31,155,918.19	$ 1,318,200.00	$ 31,815,018.19			$ 897,138.56	$ 898,279.09	-$ 1,140.53

2.5 DERVIATION OF WORKING CAPITAL

CWH has used the 7.5% Allowance Approach for the purpose of calculating its Allowance for Working Capital. CWH attests that the Power Supply Expenses are determined by the split between RPP and non-RPP customers based on actual data, used most current RPP prices and used the current UTR. Table 38 below shows CWH's calculations in determining its Allowance for Working Capital.

Table 38: Allowance for Working Capital

Expenses for Working Capital	**Last Board Approved**	**2025**	**Variance from 2018 BA**
Eligible Distribution Expenses:			-
3500-Distribution Expenses - Operation	$365,600	$487,436	$121,836
3550-Distribution Expenses - Maintenance	$319,700	$467,974	$148,274
3650-Billing and Collecting	$520,700	$713,824	$193,124
3700-Community Relations	$39,500	$46,162	$6,662
3800-Administrative and General Expenses	$1,094,050	$1,413,916	$319,866
6105-Taxes Other Than Income Taxes	$19,200	$13,926	-$5,274
			$0
Total Eligible Distribution Expenses	$2,363,500	$3,144,053	$780,553
3350-Power Supply Expenses	$17,927,954	$16,343,031	-$1,584,923
Total Expenses for Working Capital	$20,291,454	$19,487,083	-$804,370
Working Capital factor	7.50%	7.50%	$0
Total Working Capital	**$1,521,859**	**$1,461,531**	-$60,328

2.6 DISTRIBUTION SYSTEM PLAN

2.6.1 PLANNING

CWH has included its DSP in Appendix B to this exhibit as a standalone document, in accordance with the filing requirements. CWH has followed the requirements of Chapter Five and categorized capital spending by investment categories within the DSP and has consolidated those same investment categories in its capital expenditure plan. The investment categories used include System Access, System Renewal, System Service and General Plant. CWH has used a planning horizon of five years to support integrated planning, including 2024 Bridge Year, 2025 Test Year, and 2026 to 2029. CWH has also provided six historical years of capital projects within the DSP, 2018 through to 2023.

CWH uses regional planning to the best of its knowledge while it is preparing its capital budgets. The Regional Plan is discussed in detail in section 5.2.2.4 of the DSP.

Table 39, Appendix 2AA, below includes actual capital expenditures for 2018 to 2023 and projections for 2024 to 2029. CWH did file a DSP in its last CoS.

CWH completed Appendix 2-AB and is presented in the DSP at section 5.4.1, Table 4.1. All variances between the DSP values and actual expenditure by investment category have been explained in section 5.4.1.1 in the DSP.

Table 39: Capital Projects Table Appendix 2-AA (System Access)

System Access		**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
New Services	1830, 1845, 1855	$48,459	$57,865	$51,388	$74,233	21,435	96,008	63,400	71,900
UG Conductor & Devices	1840, 1845, 1855	$92,353				$28,549			
Wellington Place Hospital Service	1830, 1835, 1845, 1850, 1860	$433,070	$255,803	-$58,699					
New Subdivision Murray	1835, 1845, 1850, 1855	$25,542	$1,399	$2,346	$1,570				
New Subdivision Eastwood	1835, 1845, 1850, 1855	$20,759	$16,995	$12,066					
Granwood Subdivision	1835, 1845, 1850, 1855		$655	$18,923	$19,663	$8,215			
Switch Gear for Beatty Line				$46,073					
Mill St E Downtown improvement	1830, 1850, 1855	$21,525							
Business Park	1830, 1835, 1855						$186,924		
Beatty Line Garafraxa Street West	1830, 1835, 1840, 1845, 1850, 1855							$108,900	
Gartshore Extension	1830, 1835, 1845								$422,700
Wellington Place Hospital Service	1845, 1850, 1860	-$155,967							
Mill St E Downtown improvement	1830, 1850, 1855	-$7,967							
New Subdivision Murray	1835, 1845, 1850, 1855	-$48,323							
New Subdivision Eastwood	1835, 1845, 1850, 1855	-$39,061							
UG Conductor & Devices	1840, 1845, 1855					-$26,154			
New Services	1855	-$6,996	-$9,299		-$22,172		-$39,679		
Sub-Total System Access - Contributed Capital		-$258,314	-$9,299		-$22,172	-$26,154	-$39,679		
Total System Access		**383,394**	**323,418**	**72,097**	**73,294**	**32,045**	**243,253**	**172,300**	**494,600**

Table 40: Capital Projects Table Appendix 2-AA (System Renewal)

System Renewal		**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
CP 7 Annual Pole Replacement	1830, 1835	105,542	86,874	77,172	152,472	180,078	$63,451	105,000	114,700
CP 8 UG Conducotor & Devices	1845			$44,466		$2,676			
CP 9 Transformers	1850	$151,653	$127,568	$87,817	$13,848	$27,099	$81,187	$219,000	$305,900
CP 10 Pole Line Rebuild	1830, 1835, 1840, 1845, 1850, 1855						$273,901	$269,100	$121,300
St Patrick St Gowrie to St David	1830, 1835, 1855	$76,825							
St Patrick: Gartshore to Herrick	1830, 1835, 1855	$66,127							
St Patrick: Gowrie to Herrick	1830, 1835, 1855	$67,280							
St George: Herrick to Gartshore	1830, 1835, 1855	$137,829							
Mill Street Conversion - Twp CoShare									
Maiden Ln:Garafraxa to St Andrew St	1830, 1835, 1855		$105,631						
Wellesley: Church to Colborne	1830, 1835, 1855		$42,708						
Queen St Transformer Upgrade	1820, 1845		$773,368	$10,710					
Mary St: David St to Moir St	1830, 1835, 1855			$32,660					
John St: Moir to Colborne	1830, 1835, 1850			$35,732					
John St: David to Moir St	1830, 1835			$29,021					
Gzowski: Stn 4 to Hill St	1830, 1835			$123,066					
Air Brake replace	1830, 1835			$51,716					
Victoria Terrace: Forfar to Strathallen	1830, 1835, 1845, 1855				$125,757				
Moir St: Mary St to John St	1830, 1835, 1855				$49,097				
Cameron St: Garafraxa to St Andrew	1830, 1835, 1845, 1855				$93,827				
Gowrie St: St Patrick to Garafraxa	1830, 1835, 1845, 1855				$103,878				
St David St between Union St and Albert St	1830, 1835, 1850					$31,623			
Angus St Upgrade Between Union St and Albert St	1830, 1835, 1850					$32,120			
Glengarry Cres - Pole Line Rebuild	1830, 1835, 1845, 1855					$62,176			
Gartshore St Rebuild between Glengarry and Trail							$137,462		
Albert St Rebuild between Tower St and Perth St	1830, 1835, 1850					$49,339			
CP122 St David St N Reconst connecting link	1830, 1835, 1840, 1845								$114,000
Poles and Tx	1830		-$16,512	-$40,311	-$53,741	-$6,573	-$7,399		
Sub-Total System Renewal - Contributed Capital			-$16,512	-$40,311	-$53,741	-$6,573	-$7,399		
Total System Renewal		**605,256**	**1,119,637**	**452,049**	**485,138**	**378,538**	**548,602**	**593,100**	**655,900**

1 **Table 41: Capital Projects Table Appendix 2-AA (System Service)**

System Service		2018	2019	2020	2021	2022	2023	2024	2025
Revenue Meters	1860	$33,910	$94,400	$37,686	$25,507	$79,554	$22,721	$52,500	$24,900
UG Conductor & Devices	1845		$64,266		$69,936				
St David St Bridge UG Addition	1840, 1845	$8,993	$32,643						
Station Fans #4	1820		$32,321						
Station Fans Elora #2 Waterloo	1820	$40,752							
Reclosers	1820						$103,275		
EMS – 2 Transformer	1820							$993,500	
		$0	$0	$0	-$14,706	$0	$4,879	$0	$0
Sub-Total System Service - Contributed Capital					-$14,706		-$4,879		
Total System Service		**83,655**	**223,630**	**37,686**	**80,737**	**79,554**	**121,117**	**1,046,000**	**24,900**

2

3 **Table 42: Capital Projects Table Appendix 2-AA (General Plant)**

General Plant		2018	2019	2020	2021	2022	2023	2024	2025
Capital Contributions Paid	1609	$34,393							
Computer Software	1611	$6,900	$52,827	$26,060	$20,815	$124,708	$4,000	$246,400	
Buildings & Fixtures	1908	$40,965	$7,504				$117,560	$45,000	$72,300
Office Furniture	1915	$15,625	$0			$14,253	$2,420		
Computer Hardware	1920	$15,633	$16,181	$27,492	$7,986	$29,158	$13,209	$65,200	$57,400
Transportation	1930		$168,738				$77,079	$640,000	
Store Equipment	1935		$2,735				$6,338		
Tools, Shop & Garage	1940	$6,400	$2,600	$2,584	$5,859	$2,026	$3,136	$5,100	$11,600
Measurement & Testing Equip	1945	$975	$5,027	$2,393		$18,805		$1,500	$1,500
Power Operated Equipment	1950				$1,894				
Communication Equip	1955			$8,216		$4,994			
Misc Equip	1960	$1,895		$2,611	$2,600		$2,355		
System Supervisory Equip	1980								
Sub-Total General Plant - Contributed Capital									
Total General Plant		**122,786**	**255,612**	**69,356**	**39,154**	**193,944**	**226,097**	**1,003,200**	**142,800**

2.6.2 DISTRIBUTION SYSTEM PLAN

CWH has provided a copy of the Distribution System Plan (“DSP”) as Appendix B.

2.6.3 CAPITALIZATION POLICY

Changes to Capitalization Policy

CWH has implemented the regulatory accounting changes to its capitalization policy effective January 1, 2013, as evidenced in the last COS Application for rates effective January 1, 2018. No further changes to the capitalization policy have been made since the last COS Application.

CWH has inserted the Capitalization policy below in Appendix A.

2.6.4 CAPITALIZATION OF OVERHEAD

Indirect overhead costs, such as general and administration costs that are not directly attributable to an asset, are not, nor have been, capitalized. CWH did not complete Appendix 2-D. CWH sets the burden rate as part of its internal budget process. Presented below are the rates that have been used. The allocation is based on labour that is directly attributable to the capital job. These burden rates are applied to all labour hours worked by the operation staff. No administration costs are capitalized.

Table 43: Burden Rates

Overhead Type	2018 Board Approved	2018 Actual	2019 Actual	2020 Actual	2021 Actual	2022 Actual	2023 Actual	2024 Bridge	2025 Bridge
Lines Labour Overhead	45.06%	46.19%	43.32%	45.21%	49.73%	52.10%	55.44%	57.11%	58.72%
Material Overhead	3.36%	3.65%	3.89%	4.7%	4.8%	5.1%	5.2%	5.78%	5.94%
Vehicle Rate per hour	$18.00	$17.75	$18.00	$18.00	$19.00	$20.00	$20.20	$21.50	$21.75

2.6.5 COSTS OF ELIGIBLE INVESTMENTS FOR DISTRIBUTORS

CWH attests that it has not included any costs or included any Investments to Connect Qualifying Generation Facilities in its capital costs or in its DSP.

2.6.6 NEW POLICY OPTIONS FOR THE FUNDING OF CAPITAL

CWH is requesting an Advanced Capital Module (ACM) approval for one capital project, to build a new "Fergus MS-5" station to be constructed at an estimated budgeted cost of $3,355,200, with the station commissioned and in-service in 2026. CWH currently services customers in Fergus through four Distribution Stations. All four existing distribution stations are 44kV to 4kV and are located within the urban boundaries of the urban areas of Elora and Fergus. The capacity of the existing 4 stations is a total of 21MVA, and the aggregate peak load for the stations, averaged over the 2021 to 2023 years was 16.5MVA, with an absolute peak aggregate load of 19.1MVA. The current capacity allows for one of the stations to be removed from service for planned or unplanned outages with no room for additional stations to also be taken out of service at the same time. Further to this, the geographical location of the existing stations are situated in a manner that limits feeder egress to the location of loads and customers in a large part of Fergus. Through various consultations including the Regional Planning Process (RPP) with the Independent Electricity System Operator ("IESO") and Hydro One Networks Inc. ("HONI"), CWH's load forecast data identified approximately 5% increased load year over year over the 5-year CoS timeframe. Further details regarding the project can be found in the DSP's appendix A, Material Narratives within the System Service investment category. Below is a further breakdown of the capital cost for the new station.

Table 44: Breakdown of MS-5 Costs

	Component	Summary
1)	**Property Costs**	**$ 60,000**
2)	**Engineering, Design, Construction Mgmt**	**$ 180,500**
3)	**Major equipment**	**$ 1,573,600**
4)	**Civil Construction**	**$ 727,500**
5)	**Electrical**	**$ 296,000**
6)	**Miscellaneous**	**$ 55,000**
7)	**NBH Staff Costs**	**$ 25,000**
	Sub-Total	$ 2,917,600
	Contingency 15%	$ 437,640
	Total	**$ 3,355,240**

Design	Pole Mt 44 kV LBS, Padmounted 15 kV Switchgear, Underground Construction Padmounted Reclosers and Isolating Switches Underground 12.47 kV Risers x 3
Voltage	44 - 4.16/2.4 kV
Installed Capacity	6/8 MVA
Switchgear Type	Padmount
Main Breaker	none
Feeder Breakers	15 kV 630A Solid Dielectric Reclosers
Schedule	Summer 2025, energize Q1 2026

Eligibility for Incremental Capital.

To be eligible for incremental capital, an ICM claim must be incremental to a distributor's capital requirements within the context of its financial capacities underpinned by existing rates, and satisfy the eligibility criteria of materiality, need, and prudence set out in section 4.1.5 of the Board's Report - New Policy Options for the Funding of Capital Investments: The Advanced Capital Module (EB-2014-0219), issued on September 18, 2014 ("the ACM Report").

Materiality Threshold Test

The OEB notes in the ACM Report that "a capital budget will be deemed material, and thus reflect eligible projects, if it exceeds the OEB-defined materiality threshold." Any incremental capital amounts permitted for recovery must fall within the total eligible incremental capital amount (as described in this ACM Report) and undoubtedly have a major impact on the distributor's operations." Table 45 illustrates the components of this threshold calculation.

Table 45: ACM Threshold Calculation

	Cost of Service Test Year 0	Price Cap IR Year 1 1	Year 2 2	Year 3 3	Year 4 4
Distribution System Plan CAPEX	$ 1,318,200	$4,432,800	$1,313,100	$1,130,900	$1,823,300
Materiality Threshold		$1,143,306	$1,144,955	$1,146,619	$1,148,298
Maximum Eligible Incremental Capital (Forecasted CAPEX less Threshold)		$3,289,494	$168,145	$ -	$675,002
Maximum Eligible Incremental Capital (Forecasted Capex less Threshold)		$3,289,494	$168,145	$ -	$675,002
Proposed Capital Projects Eligible for ACM treatment					
Project Descriptions:	**Cost of Service Test Year 0**	**Price Cap IR Year 1 1**	**Year 2 2**	**Year 3 3**	**Year 4 4**
New Distribution Station – Fergus MS-5		$3,355,200			

CWH has populated the OEB's 2025 Capital Module ACM Model, and a live Excel model is included with this application. The following excerpt from Sheet 9a of the ACM Model demonstrates that the project meets the criteria for ACM treatment. Between 2018 and 2022, CWH's average annualized capital expenditures were $1.11 million. Therefore, a distribution station project costing $3.35 million is a large capital investment for CWH.

Project-Specific Materiality and Significant Influence on Operations

As indicated in the Filing Requirements, a portion of project spending above and beyond the OEB-defined threshold calculation is intended to be absorbed within the total capital budget. CWH maintains that the Fergus MS-5" station, which is expected to cost $3,355,200, is clearly substantial on a project-specific basis and will have a significant impact on the company's operations.

When comparing the Fergus MS-5 build to the net capital expenditures shown in this exhibit and the DSP, the amounts in question meet the materiality criteria. When the MS-5 is removed for illustrative purposes, the average annualized capital expenditure is $1.3M, which is a more normal annual spend than when it is included in the average annualized spending, which is $2.0 million. As previously indicated, CWH does not have an annualized capital expense for distribution stations, hence establishing a new station is not currently included in CWH's rate base.

Section 5.4.1.2 of the DSP includes an evaluation of all future capital projects, including 2026. Tables 4-9 and 4-10 of the DSP illustrate CWH's capital expenditures by year. Table 4-9 contains all the expected capital expenditures, including MS-5, while Table 4-10 has the forecasted capital expenditures minus MS-5.

Need

To qualify for ICM funding for a specific project, a distributor must demonstrate the need for additional funding. The OEB's ACM Report requires a three-part test to show need: (1) The Means Test; (2) The amounts must be based on discrete projects that are directly related to the asserted driver; and (3) The amounts must be clearly outside of the base from which the rates were calculated.

As previously stated, the existing four stations have a total capacity of 21MVA, and the average peak demand for the stations from 2021 to 2023 was 16.5MVA, with an absolute peak aggregate load of 19.1MVA. The existing capacity allows for the removal of one of the stations for scheduled or unplanned outages, but no other stations can be removed at the same time. The construction of the new substation is crucial to maintaining the accessibility and reliability of its service to customers.

Means Test

In addition to the materiality criteria, a distributor must pass the Means Test (as defined in the ACM Report) in order to qualify for funding through an ICM in an Incentive Rate setting term. If a distributor's regulated return, as calculated in its most recent RRR 2.1.5.6 filing, exceeds 300 basis points above the deemed ROE embedded in the distributor's rates, the funding for any incremental capital project will not be allowed. CWH confirms that its latest ROE does not exceed 300 basis points.

Based on CWH's calculations, the expected ROE for 2024 is 10.06%, which also does not exceed the regulated return by more than 300 basis points. With CWH rebasing for January 1, 2025 rates, CWH anticipates the achieved ROE for 2025 will also not fall outside of the 300 basis points.

CWH will be attaining additional financing for MS-5 from a third-party in 2025. Further details are provided in Exhibit 5, Section 5.5.3.

Discrete Project

CWH proposed investment to build a new Station (MS-5) is a discrete, one-off project that is required to facilitate CWH future needs and enhance its resiliency. CWH does not have a recurring Station New Build program. Whilst CWH regularly invests in renewing its station assets as they reach end of life, it does not have a regular program to build new stations, and is not seeking funding for a series of projects that are more related to recurring capital programs for replacements or refurbishments. CWH has not added a distribution station since its inception. The last time a distribution station was built was under Elora Hydro in 1998.

2.6.7 ADDITION OF ICM ASSETS TO RATE BASE

CWH did not have an ICM during the last CoS, therefore no schedule, variances or explanations are provided.

CWH does not have a rate adder to recover an investment through the OEB's Incremental Capital Module.

2.6.8 MISCELLANEOUS CAPITAL EXPENDITURES

CWH does not have any non-distribution activities that require being reconciled to the total capital budget.

CWH is not applying for funding through distribution rates to pursue any programs such as CDM programs.

1 # APPENDICES

Appendix A	CWH Capitalization Policy
Appendix B	DSP

Centre Wellington Hydro Ltd.

Exhibit 2

Appendix A

CWH Capitalization Policy

CWH CAPITALIZATION POLICY

CWH has applied the following general capitalization policies and principles based on International Financial Reporting Standards ("IFRS"), as well as guidelines set out by the Ontario Energy Board, including the "Asset Amortization Study for the Ontario Energy Board" prepared by Kinetrics Inc., Report No: K-418033-RA-001-R000 for the OEB.

The amount to be capitalized is the cost to acquire or construct a capital asset, including any ancillary costs incurred to place a capital asset into its intended state of operation.

- Assets that are intended to be used on an on-going basis and are expected to provide future economic benefit greater than one year will be capitalized.

- Expenditures that create a physical betterment or improvement of the asset will be capitalized.

- With respect to transportation equipment all costs associated with placing a vehicle into service are capitalized.

GUIDELINES FOR CAPITALIZATION

Capital Assets:

Capital Assets include tangible assets which include; property, plant and equipment provided they are held for use in the production or supply of goods and services. A capital expenditure must provide a benefit lasting beyond one year and have a total cost over $1,000. It is implied that a number of expenditures can be grouped together under a specified capital project in order to reach the minimum threshold and be recorded as a capital asset. Capital expenditures also include the improvement or "betterment" of existing assets. Intangible assets are also considered capital assets and are identified as assets that lack physical substance.

Betterment:

A "betterment" is a cost which enhances the service potential of a capital asset and is therefore capitalized. A "betterment" includes expenditures which increase the capacity of the asset, lower associated operating costs of the asset, improve the quality of output or extend the asset's useful life.

Repair:

A repair is a cost incurred to maintain the service potential of a capital asset. Expenditures for repairs are expensed to the current operating period. Expenditures for repairs and/or maintenance designed to maintain an asset in its original state are not capital expenditures and should be charged to an operating account.

CAPITAL ASSET COST

Cost:

Cost is the amount of consideration given up to acquire, construct, develop or better a capital asset. Capital assets will be recorded at the fully allocated cost which includes all expenditures necessary to put a capital asset in service including all appropriate overhead cost.

Payroll Overhead:

Payroll allocation is comprised primarily of the following benefits paid for employees: health benefits, vacation, sick, statutory holidays, clothing and safety footwear allocation, WSIB and the employer portion of OMERS, CPP and EI. The payroll overhead costs are allocated to capital jobs based on hours charged to the specific capital job. No administrative charges are included in overhead calculations.

Vehicle Overhead:

The vehicle overhead is allocated to capital jobs based on the time that the vehicle is used on site for the capital job. Therefore, the use of the vehicle is directly attributable to an item of PP&E.

Amortization:

Capital and intangible assets are amortized using the straight-line method. A majority of the assets are based on the Typical Useful Lives ("TUL") from the Kinectrics report mentioned above, with the exception of SCADA (USoA #1980) System Supervisory Equipment.

CWH has used 8 years as a life span for SCADA instead of twenty years as suggested in the Kinectrics Study. CWH believes that based on the fact that the previous technologies used became obsolete within fourteen years that eight years' useful life would be more appropriate. The hardware and software for computer systems is ever changing and improvements to these systems are fast paced.

CWH uses the half-year rule for calculating depreciation expense in the first and last year of useful life. Land is not depreciated. Construction-in-progress assets are not depreciated until the project is complete and the asset is available for use.

Amortization methods and useful lives of all assets are reviewed at each reporting date and adjusted prospectively if appropriate, as in accordance with IAS 8 Accounting Policies, Changes in Accounting Estimates and Errors.

Capital Spares:

Spare transformers and meters will be accounted for as capital assets at the time of purchase since they form an integral part of the reliability program for a distribution system. These spares are held for the purpose of backing up transformers and meters in-service for a distribution system.

General Policy for Capitalization and Depreciation:

CWH capital assets, and their designated service life, should be categorized as follows:

Account #	Description	CWH Proposed Useful Life	Kinectric's Study
1806	Land Rights	50	50
1820	Distribution Stations	45	45
1825	Storage Battery Equip	25	25
1830	Poles - Concrete/Steel	60	60
1830	Poles - Wood	45	45
1835	OH Conductors	60	60
1840	UG Conduits	70	70
1845	UG Conductors	55	55
1850	Transformers -UG	30	40
1850	Transformers -OH	40	40
1855	OH Secondary Services	60	60
1855	UG Secondary Services	55	55
1860	Meters	15	25-35
1860	CT's & PT's (meters)	50	35-50
1908	Building & Fixtures	25-50	50-75
1915	Office Furniture & Equipment	10	5-15
1920	Computer Hardware*	4	3-5
1925	Computer Software	5	2-5
1930	Transportation***	7-12	5-50
1935	Stores Equipment	10	5-10

1940	Tools, Shop & Garage Equipment	10	5-10
1945	Measurement & Testing Equipment	10	5-10
1950	Power Operated Equipment	8	5-10
1955	Communication	10	2-10
1980	System Supervisory Equipment**	15	20

Centre Wellington Hydro Ltd.

Exhibit 2

Appendix B

CWH’s Distribution System Plan (DSP)

Centre Wellington Hydro

Distribution System Plan

2025 Cost of Service Application

Historical Period:

2018 – 2024 (2024 Bridge Year)

Forecast Period:

2025 – 2029

[April 2024]

CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

Acronym	Meaning
ACA	Asset Condition Assessment
AM	Asset Management
CHEC	Cornerstone Hydro Electric Concepts Inc.
CHI	Customer Hours Interrupted
CI	Customers Interrupted
CVP	Construction Verification Program
CWH	Centre Wellington Hydro
DSC	Distribution System Code
DSP	Distribution System Plan
ESA	Electrical Safety Authority
GS	General Service
HI	Health Index
HONI	Hydro One Networks Inc.
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Planning
IRM	Incentive Rate-setting Mechanism
LDC	Local Distribution Company
LOS	Loss of Supply
MED	Major Event Detail
METSCO	METSCO Energy Solutions Inc.
OEB	Ontario Energy Board
OH	Overhead
OMS	Outage Management System
OPA	Ontario Power Authority
REG	Renewable Energy Generation
RIP	Regional Infrastructure Planning
RRFE	Renewed Regulatory Framework for Electricity Distributors
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SmartVu	Survalent SCADA system
UG	Underground
OEB	Ontario Energy Board

5.2 Distribution System Plan

Centre Wellington Hydro ("CWH") has prepared this Distribution System Plan (DSP) in accordance with the Ontario Energy Board's (OEB's) Chapter 5 – Distribution System Plan Filing Requirements for Electricity Distribution Rate Applications, dated December 15, 2022 (the "Filing Requirements") as part of its 2025 Cost of Service Application (the Application). CWH retained METSCO Energy Solutions Inc. ("METSCO") to advise on and assist with the preparation of this DSP.

The DSP is a stand-alone document that is filed in support of CWH's Application. The DSP's duration is a minimum of ten years in total and comprises of a historical period and a forecast period. The DSP covers the historical period of 2018 to 2024, with 2024 being the bridge year, and a forecast period of 2025 to 2029, with 2025 being the Test Year.

The DSP contents are organized into three major sections:

- Section 5.2 provides a high-level overview of the DSP, including coordinated planning with third parties and performance measurement for continuous improvement.
- Section 5.3 provides an overview of asset management practices, including an overview of the assets managed and asset lifecycle optimization policies and practices.
- Section 5.4 provides a summary of the capital expenditure plan, including a variance analysis of historical expenditures, an analysis of forecast expenditures, and justification of material projects above the materiality threshold.

The materiality threshold for CWH is $50,000, and detailed descriptions of specific projects/programs exceeding the materiality threshold are provided in Section 5.4.2.1 and Appendix A. Other pertinent information relevant to this DSP is included in the Appendices.

This DSP follows the chapter and section headings in accordance with the Chapter 5 Filing Requirements.

5.2.1 Distribution System Plan Overview

5.2.1.1 Description of the Utility Company

Centre Wellington Hydro's (CWH) service territory is shown in Figure 5.2.1-1, and covers the town of Fergus and the village of Elora, serving approximately 7,521[1] Residential and General Service customers in addition to some Unmetered Scattered Load customers and both Street Light and Sentinel Light connections.

[1] As of December 31, 2023.

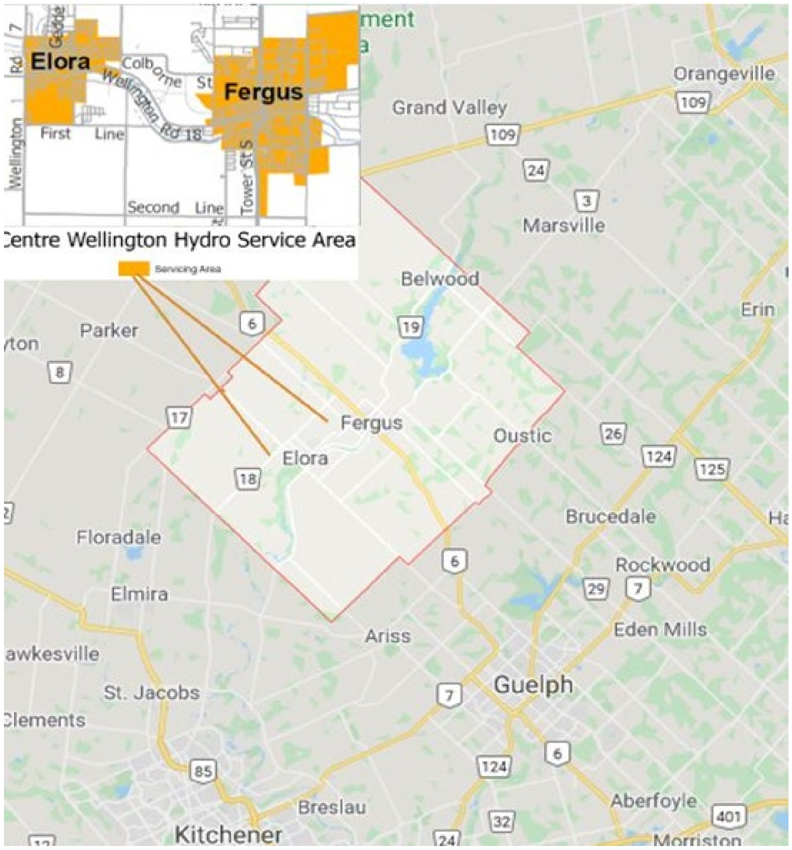


Figure 2-1: CWH Service Territory

The service territory is comprised of approximately 11sq. km. of high-density urban area, with a customer density of approximately 680 per sq. km. The service areas have a combined population of approximately 19,000. The electric utility customer base for 2023 is indicated in Figure 2-2 and Table 2-1.

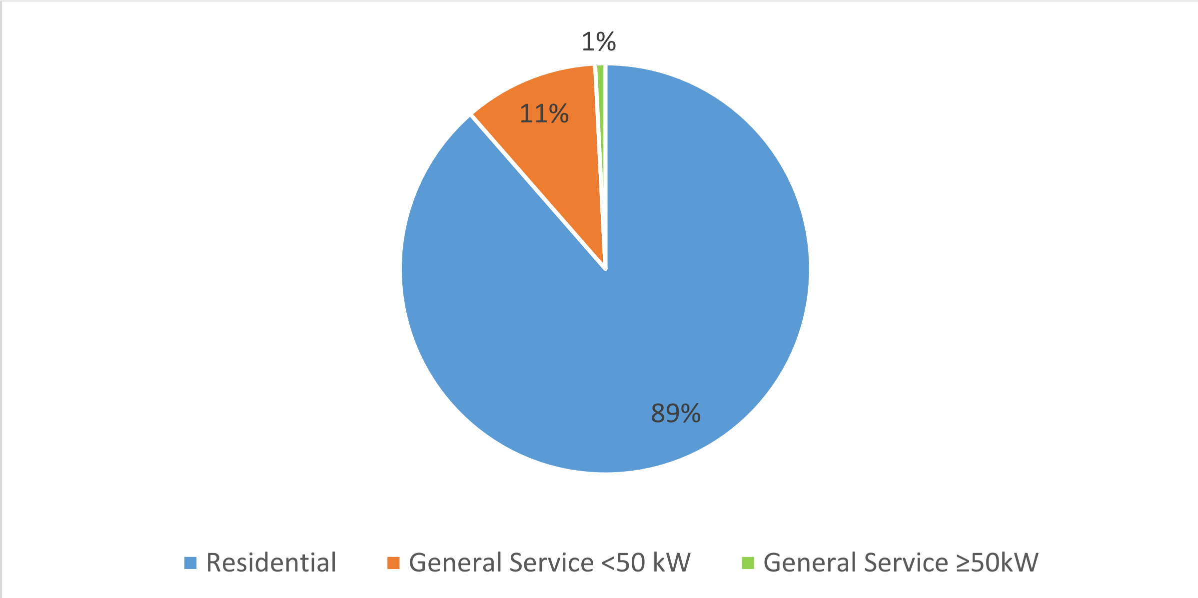


Figure 2-2: Customer Mix by Type

Table 2-1: Customer Count by Type

Customer Class Name	2023 Count
Residential	6642
General Service < 50 kW	795
General Service 50 to 2999 kW	61
General Service 3000-4999 kW	1
Unmetered Scattered Load	12
Sentinel Lighting	8
Street Lighting	2
TOTAL	**7,521**

CWH's distribution system consists of two distinct distribution networks, one each in Fergus and Elora. Both distribution networks receive power from Hydro One at 44kV, which is stepped down to 4.16 kV at six distribution stations, four of which are located in Fergus and two located in Elora.

CWH's distribution system consists of approximately 78km of overhead lines and approximately 82km of underground lines. The 4.16 kV distribution voltage is further stepped down to utilization voltages of 120/240V, 120/208V or 347/600V through approximately 830 distribution transformers. The distribution system is monitored through a control centre located in its office in Fergus.

CWH actively participates in Ontario's Green Energy plan and Table 2-2 shows the Green Energy generation installations connected to CWH's distribution system pursuant to IESO micro-FIT and FIT contracts. The total connected micro-FIT installations in kW is 293 kW and FIT connections are 1595 kW for a combined total of 1,888 kW connected capacity. In addition, there are 34 roof top solar net-metering installations with a 317kW total nameplate capacity rating, as shown in Table 2-3.

Table 2-2: Micro-Fit and FIT Connections and Ratings

IESO ID	Capacity / Nameplate Rating (kW)	Connected	Fuel Types
Micro-FIT			
FIT-MH8KDWN	7.6	2010-12-21	Solar Rooftop
FIT-MUJACYX	8.55	2010-10-01	Solar Rooftop
FIT-M99ZVMB	6.46	2010-08-05	Solar Rooftop
FIT-MHFD989	9.87	2010-09-30	Solar Ground Mount
FIT-MBTRHE7	9	2011-03-30	Solar Rooftop
FIT-MFEDAZ6	2.3	2011-09-21	Solar Rooftop
FIT-MMNBHMQ	10	2011-12-06	Solar Rooftop
FIT-MXV9H38	10	2011-12-20	Solar Rooftop
FIT-MTYBE6Q	7.17	2011-09-20	Solar Rooftop
FIT-M8QDDQD	8	2011-12-21	Solar Rooftop
FIT-MR8GW29	10	2012-01-19	Solar Rooftop
FIT-MIRXXM2	10	2012-04-06	Solar Rooftop
FIT-M2YQYMT	10	2012-04-06	Solar Rooftop
FIT-MIUZ3JT	10	2012-04-01	Solar Rooftop
FIT-MX6TPV7	10	2012-04-06	Solar Rooftop
FIT-MCPIXUN	10	2012-04-27	Solar Rooftop
FIT-MVCZB7V	5	2012-05-29	Solar Rooftop
FIT-MQBQWB8	8	2012-06-05	Solar Rooftop
FIT-M6WAIXZ	10	2012-07-02	Solar Rooftop
FIT-M6B4TFQ	10	2012-10-29	Solar Rooftop
FIT-MNPU6WK	10	2012-12-04	Solar Rooftop
FIT-MK9E49B	10	2013-04-18	Solar Rooftop
FIT-MJJE82C	10	2013-06-14	Solar Rooftop
FIT-M2MYDKF	10	2013-11-18	Solar Rooftop
FIT-MK43ZXT	10	2014-05-01	Solar Rooftop
FIT-MMWWPFV	10	2014-07-10	Solar Rooftop
FIT-M9GG79B	10	2014-12-23	Solar Rooftop
FIT-M396NJA	10	2015-03-19	Solar Rooftop
FIT-M9VWJXP	4	2015-08-11	Solar Rooftop
FIT-MUQMY98	10	2016-04-07	Solar Rooftop
FIT-MQYW7Z3	10	2016-07-28	Solar Rooftop
FIT-ME4DB49	10	2017-05-11	Solar Rooftop
FIT-MHUEEFC	7.6	2018-05-03	Solar Rooftop

FIT			
FIT-FFZDCIP	185	2012-06-09	Solar Rooftop
FIT-F6VP5TR	60	2012-10-05	Solar Rooftop
FIT-FDBG0VP	250	2014-06-01	Solar Rooftop
RESOP	150	2006	Hydraulic
FIT-F000678 WAT 130-301	950	2017	Hydraulic

Table 2-3: Solar Net-Metered Installations and Ratings

Installed Capacity (kW)	Connected	Technology
9.5	2017-09-21	Solar Rooftop
3.45	2018-06-26	Solar Rooftop
5	2019-07-16	Solar Rooftop
5	2020-03-05	Solar Rooftop
10	2020-07-14	Solar Rooftop
10	2020-08-21	Solar Rooftop
10	2021-01-22	Solar Rooftop
10	2021-03-01	Solar Rooftop
10	2021-04-09	Solar Rooftop
10	2021-03-20	Solar Rooftop
10	2021-07-01	Solar Rooftop
8.375	2021-09-08	Solar Rooftop
8.5	2021-09-03	Solar Rooftop
5	2021-10-06	Solar Rooftop
8.64	2021-10-06	Solar Rooftop
9.36	2021-11-01	Solar Rooftop
3.8	2022-01-03	Solar Rooftop
7.6	2022-03-01	Solar Rooftop
7.6	2022-05-02	Solar Rooftop
10	2022-08-02	Solar Rooftop
10	2022-08-15	Solar Rooftop
10	2022-09-30	Solar Rooftop
7.6	2022-10-06	Solar Rooftop
9	2022-11-01	Solar Rooftop
10	2023-03-09	Solar Rooftop
6	2023-06-01	Solar Rooftop
5	2023-06-27	Solar Rooftop
10	2023-07-06	Solar Rooftop
30	2023-08-01	Solar Rooftop

7.6	2023-09-01	Solar Rooftop
7.6	2023-09-19	Solar Rooftop
7.6	2023-09-01	Solar Rooftop
30	2023-11-08	Solar Rooftop
5	2023-12-01	Solar Rooftop

CWH is the Local Distribution Company ("LDC") for the town of Fergus and the village of Elora. This DSP is the second five-year plan submitted to OEB and has been prepared in line with the Filing Requirements. The DSP is designed to provide detailed information on different aspects of system planning such as asset management planning, performance monitoring, coordinated planning with 3rd parties, and capital expenditure planning including business case development for program material investments. It also demonstrates major initiatives CWH plans to undertake over the forecast period to modernize its grid and improve its reliability, safety, and security of supply.

CWH's DSP has been prepared in consultation with customers and stakeholders such as municipalities, townships, and CWH's residential and commercial customers, with the objective of producing outcomes that meet or exceed their expectations. The information retrieved from such 3rd party resources was integrated with CWH's internal knowledge about their distribution network and expert resources from external consultants to develop a plan that serves the system's short and long-term needs. As with the previous DSP submission for the period from 2017-2022, the 2025-2029 plan continues to reflect the incentive rate-setting mechanism ("IRM") methodology that is aligned with OEB policy guidelines.

The DSP describes the rigorous investment strategy developed by CWH that targets all four OEB defined investment categories: System Access, System Renewal, System Service, and General Plant. CWH is continuing with the commitments made in its previous DSP of maintaining consistent performance across its service quality, safety, and other performance metrics. To continue attaining these performance targets, investments to renew deteriorating or aging assets, and to meet the obligation of providing network access to customers remain the highest priority. To achieve this goal, CWH has also made improvements in its asset management planning that will enhance the short and long-term management of its assets. The new plan proposed in this DSP has been strategically adopted to produce an investment strategy of programs and projects that will be executed during the 2025-2029 period.

The 2025-2029 DSP balances the need to manage aging and degrading assets to enable CWH to maintain its performance targets, meeting system needs, addressing customer satisfaction, and ensuring electricity rates are as manageable as possible for its customers. Historical information, inspection and testing data and forecast information have been used to develop the proposed expenditure. CWH plans to invest a total of $10 million (gross) across all four investment categories during the forecast period from 2025 to 2029.

CWH is driven by its corporate vision, mission, and values. Together, they provide the basis to deliver on targeted strategic goals and performance objectives. CWH's mission, vision, and core values statements are comprised of principles which drive its planning and operational activities at a high level. They outline aspects of service which CWH strives to provide to its customers and encompass considerations beyond business operations such as the broader community, company culture, and shareholder priorities. Their impact is evident in CWH's planned investments, performance tracking, and other operational areas. For example, CWH's performance measures (discussed in detail in Section 5.2.3) include several safety and reliability related measures which align to values such as safety and responsiveness. The mission, vision, and core values statements are provided below.

Mission
"To provide safe, reliable, efficient delivery of electrical energy within the Township of Centre Wellington while being accountable to our shareholders…. the citizens of Centre Wellington"

Vision
"To be a sustainable local distribution company for our customers and shareholder equally by being dedicated and responsive to their needs and adaptable within the electricity sector."

Values

- *Community:* We value People, including the progress of social, economic, and environmental betterment to support them.
- *Local presence:* We value local control, local accountability, local employment, and local purchasing.
- *Professionalism:* We value commitment to excellence and teamwork including collaboration, respect, and accountability.
- *Accessibility:* We value flexible convenient access to our services for customers, developers, contractors, and the public.

5.2.1.2 Capital Investment Highlights

CWH's capital investments over the planning period have been aligned to the 4 categories of system access, system renewal, system service, and general plant outlined in the Filing Requirements. Table 2-4 presents CWH's historical actuals and forecast expenditures for both capital and O&M categories.

Table 2-4 Historical and Forecast Capital Expenditures and System O&M

Category	Historical ($ '000)						Bridge	Forecast ($ '000)				
	2018	2019	2020	2021	2022	2023	2024*	2025	2026	2027	2028	2029
System Access (Gross)	642	333	72	95	58	283	301	495	565	72	72	193
System Renewal (Gross)	605	1136	492	538	385	556	730	656	421	753	679	590
System Service (Gross)	84	224	38	95	80	126	1046	25	3407	272	272	272
General Plant (Gross)	123	256	69	39	194	226	1003	143	41	216	108	768
Gross Capital Expenses	1453	1948	671	768	716	1191	3080	1318	4433	1313	1131	1823
Contributed Capital	-258	-26	-40	-91	-33	-51	-79	0	0	0	0	0
Net Capital Expenses after Contributions	1195	1923	631	678	684	1139	3001	1318	4433	1313	1131	1823
System O&M	772	851	777	689	888	899	904	955	982	1011	1041	1072

**2024 expenditures are forecasted.*

The Filing Requirements outline four categories of investments into which projects and programs must be grouped. The drivers for each investment category align with those listed in the Filing Requirements. For reporting purposes, a project or program involving two or more drivers associated with different categories is included in the category corresponding to the trigger driver. To note, all drivers of a given project or program were considered in the analysis of capital investment options and are further described in Section 5.4 of the DSP.

5.2.1.2.1 System Access

These investments are modifications (including customer driven asset relocation) to the distribution system CWH is obligated to perform to provide a customer or group of customers with access to electricity services via CWH's distribution system.

The proposed investments in the "System Access" category include expenditures required by CWH to meet its regulatory obligations. These investments consist of three main components:

1. Line extensions to permit new customer connections;
2. Line relocations required in conjunction with municipal road widening programs; and
3. Investments to maintain revenue meters compliant with regulations.

Although it is difficult to accurately forecast the level of investments needed over the next five years in this category, CWH has used all available information obtained through its consultations with the municipal government, local developers, and major customers, to estimate the required expenditure as accurately as possible. CWH annually reviews its proposed expenditure in this category, updating it with the latest information from its customers and stakeholders.

Over the past 5 years, CWH has experienced a stable customer-base with the number of metered customer accounts increasing at an average rate of <2% per year. At the present time, there is no backlog of customers requiring new services within CWH service areas and no significant change is anticipated in the rate of new services required from those in the recent previous years. CWH receives only a modest number of requests each year for new services and service upgrades, a trend that is notexpected to change over the planning horizon.

Road widening, and municipal infrastructure replacement projects undertaken in the municipality occasionally require relocation of some power distribution lines, necessitating capital investments by CWH. Planning for these projects has been reviewed with the municipality and county, although the design plans are still in the preliminary stages and the scheduled completion years are only tentatively set. Although these projects are part of municipal budget planning, the scope and timing of the projects can change due to final costing projections, and potential funding opportunities from higher tiered government. CWH continues to be flexible when addressing the timing of these projects and is prepared to move CWH driven projects ahead or back by a calendar year or two when necessary. There are no adverse affects to critical projects (at risk assets) or major fluctuations in budgetary capital expenditures to do so.

5.2.1.2.2 System Renewal

These investments involve replacing and/or refurbishing system assets to extend the original service life of the assets and thereby maintain the ability of CWH's distribution system to provide customers with reliable and safe electricity services.

CWH engaged METSCO Energy Solutions (METSCO) in 2021 to perform a comprehensive condition assessment of all distribution system assets. This information is a key input into the asset management planning process that CWH undertook to determine the investments required. The scope of capital investments proposed in the "System Renewal" category has been determined with the objective of maintaining reliability and safety.

Historically, CWH has been systematically planning and implementing investments into asset renewal projects to replace the assets that were in poor and very poor condition and/or have reached the end of their useful service life. By prioritizing investments into those assets with the highest impact on reliability and safety when they fail in service. In addition, assets that are in fair condition will also be assessed further to determine if it is prudent to consider replacing/refurbishing these assets within the next five years. The results of the asset condition analysis are detailed in section 5.3.2.2.2.

5.2.1.2.3 System Service

These investments are modifications to CWH's distribution system to ensure the distribution system continues to meet CWH operational objectives while addressing anticipated future customer electricity service requirements. These investments primarily include the purchasing of new meters for inventory to enable the changing meters to be sent for testing, calibration and resealing.

This category includes investments into the continued replacement and renewal of smart meters (revenue meters) to remain compliant with the regulatory requirements for

Measurement Canada. CWH owns approximately 7,700 revenue meters, and all active meters were changed with smart meters in 2009 and 2010. CWH completed sampling of the vast majority of its meters (residential) in 2019 and acquired seal extensions for these meters for an extended 8 years. These meters will require resealing in 2027, at which time CWH will assess the potential of sampling this group under Measurement Canada's S-S-05 regulations. The maximum available seal extension length possible would be 6 years.

The remainder of smart meters (mostly commercial and industrial) were changed out in the field with 100% reverification in the years 2019, 2020, and 2021, and these meters will require changing out again for reverification and resealing purposes between 2027 and 2029. In addition to planned resealing activities, CWH experiences an annual meter failure rate of approximately 2% that require replacement on a day-to-day basis. CWH expects this failure rate to increase as the life of meters is extended. CWH requires an adequate stock of meters at all times to address the above-mentioned planned and unplanned meter change out activities. Like many inventoried items and equipment, the lead time for ordering and shipment of material is becoming longer, and it is therefore prudent that CWH order these items in a timely manner to ensure there is minimal downtime if a meter requires replacing.

A major planned investment into System Service is a new Distribution Station, "Fergus MS-5", project planned for commissioning in Q1 of 2026. CWH has 4 distribution stations in Fergus, with 3 of them located on the North side of the Grand River and 1 located on the South bank of the Grand River. The geographical locations of the current stations and associated feeders makes it challenging to service load in certain areas of the distribution system and relies heavily on Fergus MS-2 station that has limited flexibility for feeder load support from other stations. The new station will increase CWH's ability to switch load throughout the system for regular planned operations and maintenance activities as well as respond to outages. The Fergus MS-5 station will also increase capacity to service new growth load that is anticipated in the Township of Centre Wellington, as well as load growth associated with the increase in electrification that Ontario is seeing due to increased uptake of EVs and heating electrification.

5.2.1.2.4 General Plant

These investments are modifications, replacements, or additions to CWH's assets that are not part of the distribution system; including land and buildings; tools and equipment; rolling stock; fleet vehicles; and electronic devices and software used to support day-to-day business and operations activities.

Capital investments under the "General Plant" category include investments into replacement of components in buildings and facilities and renewal of motor vehicle fleet, tools and equipment and IT hardware and software as they reach the end of their useful service life. These investments are aimed at improving worker productivity, operating efficiency and employee safety.

5.2.1.3 Key Changes since Last DSP Filing

Important Changes to Asset Management Processes

CWH has made several changes and improvements to its asset management (AM) process. The updated AM process clearly identifies the inputs that are used at various process points. The latest AM process takes CWH's updated Corporate and Strategic Objectives into account. It also includes clear decision points that articulate when programs, projects, capital, and operational budgets are reviewed and approved. In addition, CWH's process now clearly indicates that the process is iterative, continually incorporating the latest information on asset condition, inspection and maintenance data, information from completed capital projects, and updates from third-party engagements. In addition to developing its five-year expenditure plan for this DSP, CWH uses this same process to optimize and update its budget and plans each year for the following year.

CWH continues to improve the following activities that contribute to its asset management processes:

- Updating maintenance and GIS records of assets.
- Improving the accuracy of documentation of the assessed condition of assets.
- Improving the accuracy of cost estimating.
- Understanding the effect on the reliability of deteriorating assets.
- Engaging with stakeholders, including the municipal governments, to optimize its customer driven projects.

System Modernization

CWH plans to modernize its grid by replacing assets that no longer meet CWH's design standards with assets that meet the latest standards. CWH assesses the use of new technologies on a project-by-project basis to determine if there is value in their adoption.

Grid Modernization, Energy Resource, and Climate Change Adaptation

All CWH customer connections for revenue metering is operated through CWH's Automated Metering Infrastructure ("AMI") network and is used for collecting operational data that is used to determine billing quantity, monitor outages, and identify voltage quality issues. CWH will continue to look to capitalize on potential outage monitoring improvements as they become available.

CWH completed major distribution station rehabilitations from 2013 to 2016, implementing automated reclosers and monitoring equipment that will be the foundation for modernizing grid connected devices downstream when appropriate and prudent to do so. Along with the station rebuilds, CWH implemented a Survalent SCADA system using the Worldview application platform. CWH migrated to Survalent's latest SmartVu application in Q1 of 2022. CWH will continue to investigate grid modernization technologies and weigh the appropriateness of these technologies for its Distribution System characteristics, their overall costs and benefits for CWH's customers, and their potential for connecting renewable energy resources.

Proactively adapting to climate change is a priority of CWH and establishing a distribution system that can accommodate reliably REG's is an important way to affect positive change. The adoption of EV's is a positive step to fighting climate change and CWH is encouraging the use of EV's by installing chargers across its service areas. CWH has installed 14 level 2, EV chargers in its service territory to date that are strategically located within the municipality for outside travelers and local EV users alike. CWH is collecting data on the usage and habits of users and will consider installing more in the future, if deemed appropriate and cost effective.

Realized Efficiencies due to Smart Meters
CWH, like other Ontario utilities, has installed smart meters across its region which has enabled improvements to the services customers receive. An example of taking advantage of the technological improvements in CWH's system occurred in 2019 with a scenario that started as a power quality issue. Operations staff picked up on voltage abnormalities in pockets of the Fergus region while monitoring CWH's smart meter networks Outage Management System, from the Operational Data Storage (ODS) provider. Through the smart meters AMI system's operational data, staff identified a situation where all customers that were connected to the 'Red' phase on all three feeders from this station were abnormally high and outside of the ESA's normal operating conditions.

CWH staff was able to pinpoint the cause being a faulting distribution station transformer that had the potential to catastrophically fail in the field under existing load if the fault continued. This transformer, located at the Fergus MS-2 station on Queen St, was scheduled to be replaced in 2022 and was a major project within CWH's Distribution System Plan for that year. Due to this issue being identified in 2019, the project was reprioritized and moved ahead to 2019, and the transformer was replaced without adversely affecting any customers. Of note, distribution transformers in CWH's six stations that step voltage down from 44kV to 4.16kV have the highest value of any CWH single piece of equipment/asset in the field. This example highlights the strategic planning of capitalizing on technological advancements to effectively manage and maintain a reliable grid and prudently plan capital projects.

5.2.1.4 DSP Objectives

CWH's DSP is a stand-alone document and is filed in support of CWH's Application. The DSP is designed to present CWH's fully integrated approach to capital expenditure planning. This includes comprehensive documentation of its AM process that supports its future five-year capital expenditure plan while assessing the performance of its historical five-year period. It recognizes CWH's responsibilities and commitments to provide customers with reliable service by ensuring that its asset management activities focus on customer preferences, operational effectiveness, public policy responsiveness and financial performance.

1. ***Customer Focus:*** *services are provided in a manner that responds to identified customer preferences.*
2. ***Operational Effectiveness:*** *continuous improvement in productivity and cost performance is achieved, and utilities deliver on system reliability and quality objectives.*
3. ***Public Policy Responsiveness:*** *utilities deliver on obligations mandated by the government (e.g., in legislation and regulatory requirements imposed further to Ministerial directives to the Board).*

4. ***Financial Performance:*** *financial viability is maintained, and savings from operational effectiveness are sustainable.*

The key objectives of the capital investment program proposed by CWH for the next five years include:

- Ensuring customer needs for supply system security and reliability are met through implementation of cost-effective solutions, by mitigating the risk of asset failures in service, through economically efficient investments.
- Mitigating and reducing the public safety risks from distribution system operations.
- Meeting CWH's regulatory obligations with respect to customer service, including the obligation to serve customers within the service territory and the obligation to relocate lines when requested by the Regional and Municipal Governments, in conjunction with road widening programs and compliance with Measurement Canada regulations related retail revenue metering.
- Providing access to connect green energy generation to distribution system through improving protection, controls and monitoring of distribution stations and effective use of data provided by smart meters for energy conservation and demand management; and
- Improving worker safety and productivity.

5.2.2 Coordinated Planning with Third Parties

In preparing this DSP, CWH has considered the needs of its customers, the municipal government of Centre Wellington, HONI and the IESO. This DSP considers the outcomes of completed consultations, reports, and plans as well as a continued effort in coordinating with any future ongoing developments with third parties. The following sections describe each consultation CWH participated in that was considered for this DSP.

5.2.2.1 Customers

CWH engaged its customers recently on its cost-of-service application to inform customers of its plans as well as gather further feedback beyond its normal engagement channels. Below are the top priority investment wants CWH's customers identified:

- Maintain and Upgrade Equipment to continue to maintain existing reliability levels.
- Replace assets prior to failure to maintain reliability levels whilst minimizing rate impacts.
- Consider replacing vehicles with lower emissions solutions.
- Consider investment in infrastructure that will accommodate new technologies.
- Move to only electronic billing if it results in monthly savings to electricity bills.

CWH has built these priorities into its planning process and specific project needs. Below are direct links to how CWH's DSP addresses these customer priorities:

- Replacing one vehicle due for replacement with an EV.
- Proactive replacement programs, such as annual pole replacements, pole line rebuilds, and distribution transformer, station transformer replacements to replace assets in poor condition and/or past end of useful life before they fail.
- Continue to facilitate customer requests and share information through website.

- Continue to invest in computer software to enable a good customer experience for when customers need to access information from CWH.

CWH regularly carries out customer engagements to understand its customers issues and needs. This information is then fed into its AM process for determining its capital and operational budgets. Formally, CWH engages a third-party provider to facilitate a customer satisfaction survey every two years. The most recent engagement in 2023 was undertaken by Advanis and was completed with a group of participatory Cornerstone Hydro Electric Concepts Inc. (CHEC) members. These members are of similar sized utilities. By joining this group, it is more cost effective than individually carrying out these surveys. CWH reports the results of these surveys in its scorecard to the OEB. Typically, around 400 randomly selected CWH customers are contacted and respond to the survey questions.

Additionally, CWH, as part of CHEC, uses Redhead Media Solutions Inc and Advanis to carry out an Electrical Safety Public Awareness Survey every two years. The objective of the survey is to provide a Public Safety Awareness (PSA) index score for CWH. This is a calculated aggregate value based on the responses of individuals to six core measures in the survey instrument and is completed with a group of participatory CHEC.

Between December 18,2023 and January 14, 2024, CWH proceeded to complete its DSP customer engagement for both residential and business customers. The purpose of this engagement was to consolidate and consider the feedback received on CWH's upcoming DSP filing and its proposed investment plan. CWH sought direct input from customers to determine if CWH's operational and capital plans aligned with customer preferences and whether customers would ultimately support CWH's decision-making in providing the best, optimized and effective plan for its customers. The results and effectiveness of the customer engagement are further detailed in the full customer survey report can be found in Appendix B.

Specific to this DSP application, CWH completed a customer survey in December and January of 2023 and 2024, respectively. The survey outlined the proposed capital investments in this DSP and solicited feedback for general satisfaction of service and future investments. Some key highlights from the engagement are summarized below:

- 96% of respondents are very satisfied or satisfied with the service they receive from CWH.
- 83% of respondents indicated that CWH was effective in responding to a power outage, of note, 16% indicated it wasn't applicable as they have not had an outage.
- 60% of respondents indicated that CWH was effective in posting information on the website and Twitter. 17% indicated it wasn't applicable.
- 95% of respondents agree or somewhat agree with CWH's investment plan to replace assets prior to failure.
- 92% of respondents want CWH to continue with the current approach of maintaining the current levels of reliability and minimal increases to rates to cover inflation and material cost escalation.

- 51% of respondents say it is very important that CWH invests in infrastructure that will accommodate new technologies.
- 97% of respondents are confident that CWH will continue to make responsible decisions about future electricity infrastructure and capital investment in their community.

The full customer engagement survey and results can be found in Appendix B.

In addition to the customer surveys CWH carries out, they also participate in the Centre Wellington Home Show. CWH has a stand at this show, where they have representatives available to answer questions and queries from the public, as well as explain any major investments or projects CWH is undertaking or planning to.

Table 2-5 highlights the engagements CWH has undertaken in the past five years.

Table 2-5: Summary of Engagements Undertaken by CWH from 2018-2023

Customer Satisfaction Survey	2019, 2021, 2023
Electrical Safety Public Awareness Survey	2018, 2020, 2022
Distribution System Plan Survey	2023
Centre Wellington Home Show	2018, 2019, 2022, 2023
Trade Tracks	2023

CWH seeks to obtain customer feedback whenever it is able to do so to help inform the direction and prioritization of future capital investments into the distribution system. The objective in CWH's customer engagement strategy is to facilitate access so that customers can easily contact and communicate with the utility.

As discussed in Section 2.2.1 Customer Engagement, CWH maintains multiple communication channels with customers, including a customer engagement webpage, "outage" and "report a problem" maps, and posting reliability information on the CWH website and through Twitter. In addition, CWH targets responding to reliability and outage inquiries as effectively as possible.

<u>Customer Preference</u>

The customer engagement process has yielded results consistent with what CWH anticipated and has heard in other forms of interaction with its customers. Key preferences that customers have highlighted include:

- Replace assets prior to failure.
- Proactive replacement of assets to maintain current levels of reliability, with minimal increases to rates.
- Consider replacing fleet vehicles with lower emission vehicles.

- Continue with the current maintenance programs with increases in-line with inflation to balance electricity reliability and rates.

Additionally, CWH derived the following insights:

- CWH heard from the DSP survey that about 20% of customers were not aware of CWH's "outage map" or its "report a problem map" on its website. CWH is committed to continually improve customer engagement with on-line solutions and ways that are important to, and reach, all customers.
  - This would support the customers' preference to have CWH implement only electronic billing, as more customers are aware of the full online set of services CWH is currently offering.
- The vast majority of CWH customers support the capital investment programs for grid reliability and OM&A expenditure as identified in the customer survey, which aligns to the investment amounts presented in this DSP application.

Customer Preferences/Technology-Based Opportunities/Innovation

The final section of the issued customer survey from CWH identified customer preferences towards technology and innovation-based opportunities through grid modernization. Customer preferences were generally split between CWH investing in infrastructure that could accommodate new technologies. 51% believed that CWH should invest in new technologies and were amenable to rate increases, 43% believed these investments were important but should be deferred until these technologies were more commonplace, and 6% believed that these investments were unimportant. The difference in the results accentuated the timing of these infrastructure investments, which aligns with CWH's current plans to defer some capital investment programs to future years. In addition, CWH installed a 30kW net-metered solar rooftop generator at their office in Fergus in Q3 of 2023. This aligns with CWH continuing to drive efficiency and minimize operating costs. As previously indicated, over 50% of customers indicated that CWH should replace vehicles with lower emission solution such as electric or hybrids with an additional cost. Subsequently, as part of CWH's fleet replacement strategy, an electric half ton truck was purchased in 2023 to be used in the operations line department. In addition, CWH will consider lower emission solutions for all its future vehicle replacements when it is cost-effective to do so.

5.2.2.2 Subdivision Developers

Based on its engagement with the municipalities and developers, CWH expects there to be a similar number of new service connections in the five-year period, with additional individual connections in single in fill lots. These new service connections have been budgeted in the capital plan under the System Access category.

5.2.2.3 Municipalities

Township Of Centre Wellington Utilities Coordinating Committee

CWH staff attend an annual All Utilities Coordinating Committee meeting, as well as ad hoc meetings with the Township of Centre Wellington infrastructure departments. These meetings are normally held in person, but during COVID-19 restrictions, meetings were undertaken virtually. The aim of these meetings is to discuss the potential upcoming municipal works, both at an urban and rural level. CWH staff can comment on what is required to accommodate these works, and if it affects CWH assets and customers. CWH uses this information to further plan its capital work relating to its system access category. If required, CWH will move around projects in other categories to facilitate these mandatory projects. Information on future developments is also discussed with location, number of units, and the expected year of construction. This information feeds into CWH's AM process to allow it to properly cost and plan the relevant required to facilitate these developments.

Specific outcomes from the planning meetings that were considered and coordinated as they relate to CWH's 2025 to 2029 forecasted capital project planning include some of the following projects:

Centre Wellington Business Park (Extension of Dickson Drive) in Fergus which drove the need for capital investment for system access to ensure adequate supply for the twenty-four commercial lots the new, Township-led, development will create.

Moir Street reconstruction, driven by the construction of an apartment, resulted in a capital project to provide system access in this area of Elora.

Township recently received Connecting Link funding from the province to rebuild a significant portion of Highway 6 through Fergus. This project will see construction during 2025 and 2026. The coordination of this project with the Township will reduce cost by allowing CWH to leverage road closures needed for the civil work to perform CWH work more efficiently, as well as reduce CWH project reinstatement cost.

Carlton Place Reconstruction will see the existing overhead utilities in this area of Elora being transferred to underground. This is a significant project the Township will be pursuing over the next several years and require coordination between the Township, various utility providers as well as a private developer. The discussed works associated with this project will result in the development of a muti-year CWH capital project with construction expected to be complete in 2026.

Smaller projects within CWH's CP10 capital investment plans will be completed through the collaboration of all utilities in the Township of CW to efficiently complete work and streamline planning.

5.2.2.4 Regional Planning Process

Electricity system planning in Ontario is generally carried out at the following three levels:

- Bulk system planning;
- Regional system planning; and
- Distribution system planning.

Planning at the bulk system level typically involves the broader power system and addresses issues that impact the system on a provincial level, while planning at the regional and distribution levels addresses issues on a more regional or localized level.

The bulk power system transmits large loads both within Ontario (as between major generation sources and load centres), as well as between the provincial grid and neighbouring power systems external to the province via interconnections. The Independent Electricity System Operator ("IESO") has accountability for the integrated planning of the bulk power system.

Regional planning addresses supply and reliability issues at regional and local levels, largely considering portions of the power system that supply various parts of the province. There are portions of the power system which can be electrically grouped together due to their bulk supply points and their electrical inter-relationships whereby common facilities may impact many connected customers.

Regional planning focuses on the facilities that provide electricity to transmission connected customers, such as distributors and large directly connected customers. This typically includes the transformer stations supplying the load and the transmission supply circuits to these stations. It also includes the 115/230 kV auto-transformers and their associated switchyards.

LDCs conduct wire and resource planning at the distribution level and coordinate with Hydro One Transmission and the IESO mainly on transmission supply facilities.

Regional planning can overlap the bulk system planning and distribution system planning. Overlaps with distribution system planning occur largely at the transformer load stations that deliver power to distributors or to large, directly connected customers. Planning for the construction of transformer load stations, can sometimes take place at the distribution level. Another example where regional planning may require coordination with distribution planning occurs when a distribution solution may address the needs of the broader local area or region, for example, by providing load transfer capability between transformer stations.

Hydro One Networks Inc. (HONI) Engagement

In order to manage and prioritize regional activities, the province is divided into 21 regions, Hydro One Networks Inc. ("HONI") is the lead transmitter in all regions, except the North Moosonee Region. For each regional planning activity at the regional or sub-regional level, a study team is established for each region with representatives from the IESO, HONI, and respective LDCs of the area. CWH's service area is part of the Kitchener-Waterloo-Cambridge-Guelph ("KWCG") region. Member utilities that are also part of this region are:

- Independent Electricity System Operator
- Alectra Utilities Corporation
- ENOVA Power
- Grandbridge Energy Inc.
- Wellington North Power Inc.
- Halton Hills Hydro Inc.
- Milton Hydro Distribution Inc.
- Hydro One Networks Inc. (Distribution)
- Hydro One Networks Inc. (Transmission)

The Regional Planning Process consists of four phases: The Regional Infrastructure Planning ("RIP"), the Needs Assessment, the Scoping Assessment, and the Integrated Regional Resource Planning ("IRRP").

The first cycle of the Regional Planning Process was completed, and the RIP was published in 2015. The Needs Assessment report was published in December 2018, with the second cycle of the planning process beginning in May 2019, followed by the publication of the IESO's Scoping Assessment report. The Integrated Regional Resource Plan, led by the IESO, was published in May 2021.

CWH is a part of the Kitchener Waterloo Cambridge Guelph Regional planning group/region and the 3rd cycle planning tranche started in September of 2023 with the official kick off meeting being held in Dec of 2023. Needs Assessment data was collected in October of 2023 and discussed at a high-level emerging needs meeting to ensure the required timelines will be achieved. The timelines for the KWCG 3rd cycle regional planning process are as follows:

- September – October 2023 - Information Gathering from group members.
- October, week of 23rd 2023, – Pre-NA LDC/IESO meeting.
- December 2023– Official Needs Assessment kick-off.
- December – January 2024 – H1 prepared draft report.
- February 2024–March 2024 – TWG meetings were held to discuss findings and review draft report/ Incorporate comments.
- April 9, 2024 - Needs Assessment completed.

The needs, sensitivity analysis, and recommendations for the KWCG region that CWH falls under can be found in the Appendix F, April 9, 2024 Needs Assessment Report.

Currently, there were no identified needs that affect CWH and its distribution plan and therefore there are no inconsistencies between the Regional Plan and CWH's plan.

5.2.2.5 Telecommunication Entities

CWH engages all nine telecommunication utilities that operate within its service territories as part of the Township of Centre Wellington "Utilities Coordinating Committee" group that meets annually. This meeting allows all participants to be aware of all the municipally-and-utility driven major infrastructure projects and road reconstruction initiatives planned over the next 5 years. These utility meetings have served well to plan for these projects and take advantage of efficiencies such as common trenching and all infrastructure design planning.
The majority of the mentioned plans are new underground projects that as mentioned give all utilities the opportunity to be included in the planning process. This is advantageous for facilitation of telecommunication services in Centre Wellington which falls in line with the Provinces Broadband mandate.

In addition, overhead pole line projects driven by CWH consider telecommunications space availability. CWH makes provisions on all new pole installations through our standard of a 24' framing specification from ground to neutral and installing class 3 minimum pole. This has proven to provide all telecoms within CWH's service area adequate space for typical infrastructure installations. CWH normally receives road occupancy permits for these projects in Q1 or Q2 of each calendar year of the project and at the same time notifies parties of all planned projects and provides plan drawings.

CWH issued a letter to the telecom companies within its service territories in Dec of 2023, informing them of CWH's DSP plans. This includes giving these companies an opportunity to identify any projects that have not been a part of the Township of Centre Wellingtons all Utilities meetings within CWH's service territory. Specifically, if there are project asks for any overhead projects planned over the next 5 years.

CWH heard back from most of the 3rd parties stating they had no large-scale capital projects over and above what was discussed at the Townships Utilities Coordination Committees (UCC) meeting held in September of 2023 and previous years meetings.

5.2.2.6 CDM Engagements

The current 2021-2024 Conservation and Demand Management Framework is solely administered through the IESO including the delivery of all programs and training to facilitate energy efficiency improvements. CWH ensures customers are aware of IESO programs i.e., Save on Energy programs such as Peak Perks, Energy Affordability and Retrofit programs through links on CWH's webpage and through interactions with customers face to face, through phone calls and emails.

5.2.2.7 Renewable Energy Generation

CWH is supplied by one HONI owned TS. HONI maintains their TS, and as of the last discussions with HONI, have no plans to further modify the station specifically for renewable energy generation (REG) capacity. CWH follows the Distributed Energy Resources Connection Procedures (DERCP) and connects REG's accordingly. There are no known medium or large-scale generation projects anticipating connection to CWH's system in the next 5 years. CWH has installed a small, 30kW, net-metered solar generator on their service centre/office building in Fergus. This will enable it to generate its own electricity to minimizing the cost of its own utility bills. In addition, it helps CWH on its journey towards reducing its own carbon emissions.

5.2.2.7.1 IESO Comment Letter

CWH has determined that the distribution system as currently constructed and configured can accommodate small REG investments should any arise during the forecast period. There are currently no known REG investments planned during the forecast period.

5.2.3 Performance Measurement for Continuous Improvement

5.2.3.1 Distribution System Plan

CWH's corporate emphasis on continuous improvement is reflected in all areas of its operations. Like most utilities in Ontario, CWH must replace ageing, at risk of failure distribution infrastructure to ensure the safe and reliable supply of electricity. In addition to the strategic replacement of ageing assets, CWH continues to focus on core maintenance activities to reduce the disruption of electricity distribution to customers. CWH focuses on short and long-term planning to ensure sufficient system capacity is available, and contingencies are in place should there be a loss of critical distribution infrastructure.

5.2.3.1.1 Objectives for Continuous Improvement Set out in Last DSP Filing

No additional objectives or metrics have been set out by CWH that are not reported in its performance scorecard.

5.2.3.1.2 Performance Scorecard

CWH monitors several performance measures, including those mandated by the OEB, that may assist in the utility's continuous improvement activities and satisfying customer requests. These measures can be divided into the following general groups:

1. Customer-oriented performance
2. Cost efficiency and effectiveness
3. Asset/system operations performance

Where applicable, the performance measures included on the scorecard have an established minimum level of performance to be achieved. The scorecard is used to continuously improve CWH's AM and capital planning process. CWH's current performance state is represented by CWH's official scorecard results for the recent historical year as published by the OEB. The scorecard is designed to track and show CWH's performance results over time and helps to benchmark its performance and improvement against other utilities and best practices. The scorecard includes traditional metrics for assessing services, such as frequency of power outages and costs per customer.

Each metric provided in the table and subsections below influences CWH's DSP to achieve the best performance for its customers. The following sections address performance metrics as published by the OEB in the performance scorecard and with additional performance metrics identified in OEB's Rate Filing Requirements.

Annual performance variances that are not within target ranges or meet minimal performance thresholds would result in senior management review of performance which may result in changes to immediate or future places to direct performance back to target levels. CWH has been and continues to be, focused on maintaining the adequacy, reliability, and quality of service to its distribution customers. Since 2024 is not yet a completed year and 2023 results are yet to be finalised, the historical performance measures include 2018 to 2022 to have a complete five-year historical performance assessment.

Table 2-6 DSP Performance Measures

Performance Outcome	Measure	Metric	2018	2019	2020	2021	2022	Target
Customer Focus	Service Quality	New Residential/Small Business Services Connected on Time	99.53%	100.00%	100.00%	100.00%	100.00%	90%
		Scheduled Appointments Met on Time	99.51%	100.00%	99.69%	100.00%	100.00%	90%
		Telephone Calls Answered on Time	97.88%	98.16%	69.90%	90.92%	94.23%	65%
	Customer Satisfaction	First Contact Resolution	99.72%	99.88%	99.43%	99.03%	99.26%	No target
		Billing Accuracy	99.82%	99.72%	99.88%	99.96%	99.90%	98%
		Customer Satisfaction Survey	79.90%	79.90%	81.00%	81.00%	79.00%	No target
Operational Effectiveness	Safety	Level of Public Awareness	85.60%	85.70%	85.70%	83.70%	83.70%	No target
		Level of Compliance with Ontario Regulation 22/04	C	C	C	C	C	C
		Number of General Public Incidents	0	0	0	0	0	0
		Rate per 10, 100, 1000 km of line	0.00	0.00	0.00	0.00	0.00	0.00
	System Reliability	Ave. Number of Hours that Power to a Customer is Interrupted	0.31	0.45	0.27	0.26	0.21	0.65
		Ave. Number of Times that Power to a Customer is Interrupted	0.70	0.48	0.20	0.22	0.20	0.24
	Asset Management	Distribution System Plan Implementation Progress	100.00%	85.00%	73.00%	70.00%	76.00%	No target
	Cost Control	Efficiency Assessment	3	3	3	3	2	No target
		Total Cost per Customer	$710	$731	$675	$660	$715	No target
		Total Cost per km of Line	$31,963	$32,898	$30,739	$30,457	$33,310	No target
Public Policy Responsiveness	Connection of Renewable Generation	Renewable Generation CIA Completed on Time	100.00%					No target
		New Micro-embedded Generation Facilities Connected on Time	100.00%					90%
Financial Performance	Financial Ratios	Liquidity: Current Ratio (Current Assets / Current Liabilities)	1.52	1.28	1.42	1.49	1.53	No target
		Leverage: Total Debt (short-term & long-term) to Equity Ratio	1.07	0.98	0.93	0.86	0.80	No target
		Regulatory ROE – Deemed (included in rates)	9.00%	9.00%	9.00%	9.00%	9.00%	No target
		Regulatory ROE - Achieved	7.14%	5.19%	7.86%	9.84%	9.33%	No target

5.2.3.2 Service Quality and Reliability

CWH's service quality and reliability performance are detailed further in the following subsections. Service quality and reliability indicators can also be found in the OEB's Chapter 2 Appendices, Appendix 2-G filed with this CoS Application.

5.2.3.2.1 Service Quality Requirements

CWH measures and reports on an annual basis on each of the service quality requirements set out in the Distribution System Code ("DSC")[2]. Failure to meet minimum service quality targets would result in measures being taken to realign performance with DSC service quality standards.

Service Quality measures include the following major measures: New Residential/Small Business Services Connected on Time, Scheduled Appointments Met on Time, and Telephone Calls Answered on Time. Additional sub-measures are tracked as part of the DSC requirements. All these measures are self-explanatory, and all relate to CWH providing connection services as well as high quality customer service. CWH is committed to meeting and exceeding all targets found in the Service Quality performance measure group.

[2] Ontario Energy Board, Distribution System Code, March 1, 2020, pp.128-135.

Table 2-7: Historical Service Quality Metrics

Service Quality Metric	2018	2019	2020	2021	2022	2023	Minimum Standards
Low Voltage Connections	99.53%	100.00%	100.00%	100.00%	100.00%	100.00%	> 90%
High Voltage Connections	N/A	100.00	N/A	N/A	N/A	N/A	> 90%
Telephone accessibility	97.88%	98.16%	69.90%	90.92%	94.23%	96.12%	> 65%
Appointments met	99.51%	100.00%	99.69%	100.00%	100.00%	100.00%	> 90%
Written response to enquiries	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	> 80%
Emergency Urban Response	100.00%	100.00%	100.00%	N/A	100.00%	100.00%	> 80%
Emergency Rural Response	N/A	N/A	N/A	N/A	N/A	N/A	> 80%
Telephone call abandon rate	N/A	0.09%	0.08%	1.07%	0.16%	0.05%	< 10%
Appointment scheduling	80.88%	81.34%	99.79%	99.94%	99.54%	100.00%	> 90%
Rescheduling a Missed Appointment	100.00%	100.00%	N/A	N/A	N/A	N/A	> 100%
Reconnection Performance Standard	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	> 85%
New Micro-embedded Generation Facilities Connected	100.00	N/A	N/A	N/A	N/A	N/A	> 90%
Billing Accuracy	99.82%	99.97%	99.88%	99.96%	99.90%	99.83%	> 98%

A review of the service quality indicators data above indicates that CWH has exceeded the SQR expectations over the historical period, with the exception of the appointments scheduled in 2018 and 2019. The reason for this is explained in the narrative below. The Appointments Scheduling target was missed in 2018 and 2019.

<u>Connection of New Services (LV and HV connections)</u>
The OEB requires a minimum standard of 90% for the Connection of New Services within 5 to 10 business days (depending on low vs. high voltage). The combined performance is calculated by the sum of "Number of new low voltage services connected within 5 or 10 days (depending on low vs. high voltage)" divided by the sum of "Number of new low voltage services requested". CWH has a high success rate in connecting new services within the required timeframe, in which they have always done so for low voltage connections.

Reconnection Performance

The OEB standard for Reconnection Performance is 85%. CWH's performance has been excellent over the historical period at 100% for all years between and including 2018 and 2023.

Telephone Accessibility:

The OEB requires a minimum standard of 65% for the Telephone Accessibility metric. CWH's performance has been good during 2019 and from 2021 to 2023, in which they have maintained a telephone accessibility rate above 97% every year. In 2020, this dropped to 69.9%, which is still above the minimum standard but is a drop in CWH's otherwise exceptional performance. This low score warrants an explanation as it falls short of CWH's commitment to customer service. In March 2020, CWH's Customer Service staff transitioned to working from home due to the COVID-19 pandemic. At that time, all customer phone calls were directed to voicemail and customer messages were emailed to the Customer Service department. Customer Service Representatives (CSR) responded to these messages by a return email or phone call as preferred by the customer. The qualified calls that were received during our regular working hours were recorded as "qualified incoming calls." While the messages left by customers were dealt with as soon as CWH's CSRs were able to, CWH did not record them as "answered within 30 seconds". In August 2020, CWH upgraded our phone system to Voice Over IP (VOIP) and the enhanced capabilities gave staff the ability to receive and make calls through employees' computers whether in the office or working remotely. A further enhancement in December 2021 was made to CWH's phone system by transitioning to a different communications carrier on a much more robust fibre network. It is important to note that at all times, customers calling about a power outage or urgent matter were at all times transferred to a live customer service rep that immediately contacted CWH operations staff.

Telephone Call Abandon Rate

The OEB requirement for Telephone Call Abandon Rate is that the result should not exceed 10%. CWH's historical performance regarding telephone calls has been near perfect.

Appointments Met

The OEB requires a minimum standard of 90% for Appointments Met. CWH's "Appointments Met" metric is excellent, with the annual figure recurringly being near or at 100%.

Appointment Scheduling

The OEB requires a minimum standard of 90% for Appointment Scheduling within the required timeline of 5 business days. CWH's performance regarding this metric varies by year. In 2020, 2021, 2022 and 2023 CWH scheduled 99.8%, 99.9%, 99.54% and 100% respectively of appointments within the required timeline. However, in 2019, CWH scheduled 81.3% of appointments within the required timeline, respectively, which is significantly less than the OEB's minimum standard.

In 2018, most appointments that made up the "Appointment Scheduling" were locates. Of the 2,286 requests, 1,938 (85%) of the appointments were locate requests. CWH used a third-party to conduct all locate requests. CWH noticed from the third party's monthly reports that the threshold was not being met. Appointments that were not for locates, were all completed within the 5-day window while the appointments that were not completed within 5 days were all locate requests. When it was realised that the monthly statistics mid-year were below targets, CWH reviewed the process internally and in turn reviewed the process in more detail with the contractor. Specifically detailing the expectation of meeting the required timelines for completing all requested locates with customers. CWH continued to monitor the monthly statistics closely and communicate these to the contractor.

In 2019, most appointments that made up the "Appointment Scheduling" were locates. Of the 1,844 requests, 1,539 (83%) of the appointments are locate requests. CWH used a third-party in 2018 and 2019 to conduct all locate requests. As was the case in 2018, CWH noticed on the regular monthly reporting, from the third party, that the threshold was not being met. Appointments that were not for locates, were all completed within the 5-day window. The appointments that were not completed within 5-days were all locate requests. CWH reviewed the process in more detail with the contractor again, specifically detailing the expectation of meeting the required timelines for completing all requested locates with customers. As the third party were missing targets for two years in a row, CWH undertook a more in-depth, in-house review and decided to bring this work back in-house. In the spring of 2020, CWH brought locating back in-house, to be completed by our employees, rather than using a third party. Historically CWH has always been well above the OEB standard and anticipates achieving our goal of exceeding targets. As demonstrated by the results, in 2020 with the responsibility moved back to fully in-house, CWH exceeded the minimum standard with 99.8% of appointments scheduled within the required timelines and remained above 99% since 2020.

Rescheduling a Missed Appointment
The OEB mandates a 100% target for Rescheduling a Missed Appointment. CWH has met OEB's target of rescheduling all missed appointments throughout the 2018-2023 period.

Written Responses to Enquiries
The OEB requires performance to be at least 80% and sets a target of 10 business days for completion. CWH's performance has been excellent regarding this specific metric. During the 2018-2023 period, CWH wrote responses to all enquiries they received.

Emergency Response
The OEB requires performance to be at least 80% and sets a target of 2 hours for rural areas and 1 hour for urban areas. In urban areas, CWH exceeded OEB's minimum requirements during 2019, 2020, 2022 and 2023 and responded to all emergencies. There were no emergencies CWH had to respond to in rural areas during the 2018 -2023 period and urban areas in 2021.

CWH measures and reports on Customer Satisfaction measures which include: First Contact Resolution, Billing Accuracy and Customer Satisfaction Survey Results. CWH uses the OEB, and the utility set targets for these measures and relies on its staff to meet these targets.

First Contact Resolution

CWH measures this performance by logging all calls, letters, and emails received and track them to determine if the inquiry was successfully answered at the first point of contact. A series of logged calls would be created to assist the customer service representative to accurately choose the logged call pertaining to the inquiry received. A specific service order has been created to track any call, letter, or email that was not resolved at the first point of contact.

Billing Accuracy

CWH performs due diligence by testing the consumption levels in correlation to the amount expensed to its customers. The utility also performs analysis of meter reading data and fixing any errors that may arise before it is communicated on the customer's bill.

Customer Satisfaction

Customer satisfaction survey results and customer engagements are important to the success of CWH. CWH is proactive and reactive in its customer engagement consultations, the majority of which provide helpful insight into the day-to-day operations of CWH. The purpose of the survey is to focus on addressing issues of concern raised directly by customers. The survey asks questions of both residential and general service customers on a wide range of topics including power quality and reliability, price, billing payment, communications, and the customer service experience. The feedback is then incorporated into CWH's planning process and forms the basis of plans to improve customer satisfaction, meet the needs of customers, and address areas of improvement.

CWH sets a high standard for performance when it comes to customer care and is especially proud of the results considering the increase in customer concerns over proving value across Ontario. CWH strives to deliver customer excellence and value through the execution of its investments and operations. CWH believes they have delivered the intended performance for each metric delivering customer satisfaction demonstrating credibility and trust.

Table 2-8: Performance Measures – Customer satisfaction

Measure	Target	2018	2019	2020	2021	2022	2023
First Contact Resolution	99%	99.7%	99.9%	99.4%	99.0%	99.3%	99.3%
Billing Accuracy	98%	99.8%	100%	99.9%	99.9%	99.9%	99.8%
Customer Satisfaction Survey Results	80%	79.9%	79.9%	81%	81%	79%	79.0%

CWH's 2023 Customer Satisfaction index score was 79%, which indicates overall that customers are satisfied with CWH's service. The annual scores provide an indication that CWH is actively listening to customer needs and providing service levels that meet their expectations. The results further indicate that CWH is using strong business practices to provide a needed commodity reliably to a community that has an appreciation for the service being provided.

CWH's billing accuracy from 2018-2023 has been excellent, exceeding the target of 98% billing accuracy every year. This demonstrates that the technology and processes CWH has in place are robust and efficient to enable CWH to deliver accurate bills to its customers. In addition, CWH's performance related to resolving customers issues on first contact has been maintained at a high standard from 2019-2023 with it consistently being above 99.4%.

CWH's outstanding performance on the measures indicates no substantial additional material projects are required. CWH continues to strive to better serve the customer with the highest excellence. CWH's intended action for the measure is to maintain the performance of the historical average. When developing the DSP, CWH always considers its customers priorities and ensures that the investments it proposes will allow CWH to continue to serve its customers as they expect. CWH will continue to invest in its technology and people, as needed, to ensure it continues to provide a high standard of service of resolving customers issues at the first time of asking as well as maintain a high level of billing accuracy.

5.2.3.2.2 Reliability Requirements

System reliability is an indicator of the quality of electricity supply received by the customer. System reliability and performance are monitored via a variety of weekly, monthly, annual, and on-demand reports generated by the SCADA system and the Outage Management System (OMS). CWH collects and reports outage data using the standard format and codes specified in the RRR document. Calculations are made to determine the reliability indices SAIDI, SAIFI, and CAIDI. The data is sorted to determine frequency and duration for each feeder as well as to determine the cause and affected components.

The reliability of supply is primarily measured by internationally accepted indices SAIDI, and SAIFI as defined in the OEB's Electricity Reporting & Record Keeping Requirements dated March 31, 2020. SAIDI, or the System Average Interruption Duration Index, is the length of outage customers experience in the year on average, expressed as hours per customer per year. It is calculated by dividing the total customer hours of sustained interruptions over a given year by the average number of customers served. SAIFI, or the System Average Interruption Frequency Index, is the number of interruptions each customer experiences in the year on average, expressed as the number of interruptions per year per customer. It is calculated by dividing the total number of sustained customer interruptions over a given year by the average number of customers. An interruption is considered sustained if it lasts for at least one minute.

$$SAIDI = \frac{Total\ customer\ hours\ of\ sustained\ interruptions}{Average\ number\ of\ customers\ served}$$

$$SAIFI = \frac{Total\ customer\ interruptions}{Average\ number\ of\ customers\ served}$$

CAIDI or the Customer Average Interruption Duration Index is the average interruption time per customer affected and can be found by dividing the SAIDI value for the given year by the SAIFI value.

$$CAIDI = \frac{SAIDI}{SAIFI}$$

Loss of Supply (LOS) outages occur due to problems associated with assets owned by another party other than CWH or the bulk electricity supply system. CWH tracks SAIDI and SAIFI including and excluding LOS. Major Event Days (MED) are calculated using the IEEE Std 1366-2012 methodology. MEDs are confirmed by assessing whether interruption was beyond the control of CWH (i.e., force majeure or LOS) and whether the interruption was unforeseeable, unpredictable, unpreventable, or unavoidable.

CWH uses the CAIDI, SAIDI and SAIFI reliability indexes along with outage cause code analysis to monitor the system reliability performance and maintain tight control over capital and maintenance spending. DSP investment priorities are expected to be in alignment with maintaining the historical average reliability performance.

Furthermore, CWH uses several programs to reduce the number of controllable outages. These programs include:

- Planned renewal of end-of-life and poor condition assets such as poles and cables.
- Proactive vegetation management.
- Inspection of the plant to identify potential problems.
- Testing of wood poles.
- A map on the CWH webpage for customers to report problems.

Table 2-9 below shows CWH's historical performance for the SAIDI, SAIFI, and CAIDI reliability metrics in the years between and including 2018 and 2023. The table contains annual numbers that include all causes (including MED's and LOS), as well as average values. Table 2-10 shows values for SAIDI, SAIFI and CAIDI for the relevant years excluding LOS and MED's.

Table 2-9 Historical Reliability Performance Metrics – All Cause Codes

Metric	2018	2019	2020	2021	2022	2023	Average
SAIDI	1.26	0.44	0.27	1.34	3.61	0.07	1.17
SAIFI	1.65	0.48	0.20	0.22	1.18	0.08	0.64
CAIDI	0.76	0.93	1.36	2.68	3.06	0.88	1.83

Table 2-10 below shows CWH's historical performance for the SAIDI, SAIFI, and CAIDI reliability metrics, when adjusted for LOS and MEDs, in the years between and including 2018 and 2023.

Table 2-10 Historical Reliability Performance Metrics – LOS and MED Adjusted

Metric	2018	2019	2020	2021	2022	2023	Average
		Loss of Supply Adjusted (including MEDs, Excluding LOS)					
SAIDI	1.26	0.44	0.27	0.26	0.36	0.07	0.46
SAIFI	1.65	0.48	0.20	0.50	0.22	0.08	0.58
CAIDI	0.76	0.93	1.36	0.52	1.64	0.88	0.79
		Loss of Supply and Major Event Days Adjusted (excluding LOS and MEDs)					
SAIDI	0.31	0.44	0.27	0.26	0.21	0.07	0.27
SAIFI	0.70	0.48	0.20	0.22	0.20	0.08	0.34

CAIDI	0.44	0.93	1.36	1.19	1.05	0.88	0.79

CWH's historical performance for SAIDI, SAIFI and CAIDI is visualized in the figures below.

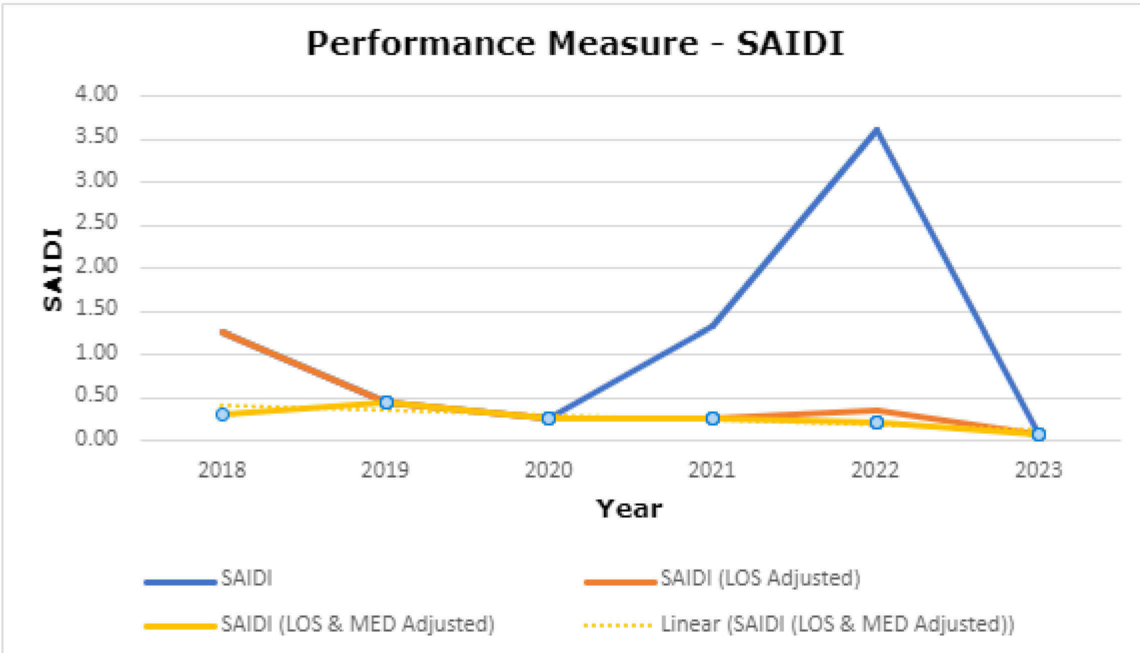


Figure 2-3 2018 to 2023 Performance Measure: SAIDI

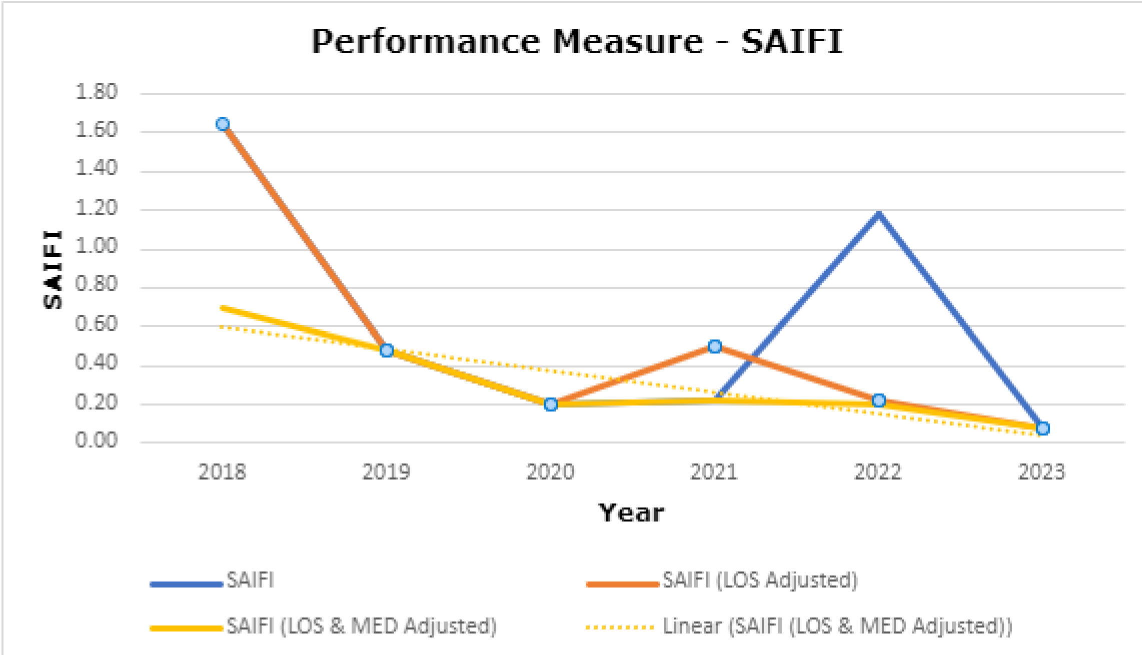


Figure 2-4: 2018 to 2023 Performance Measure: SAIFI

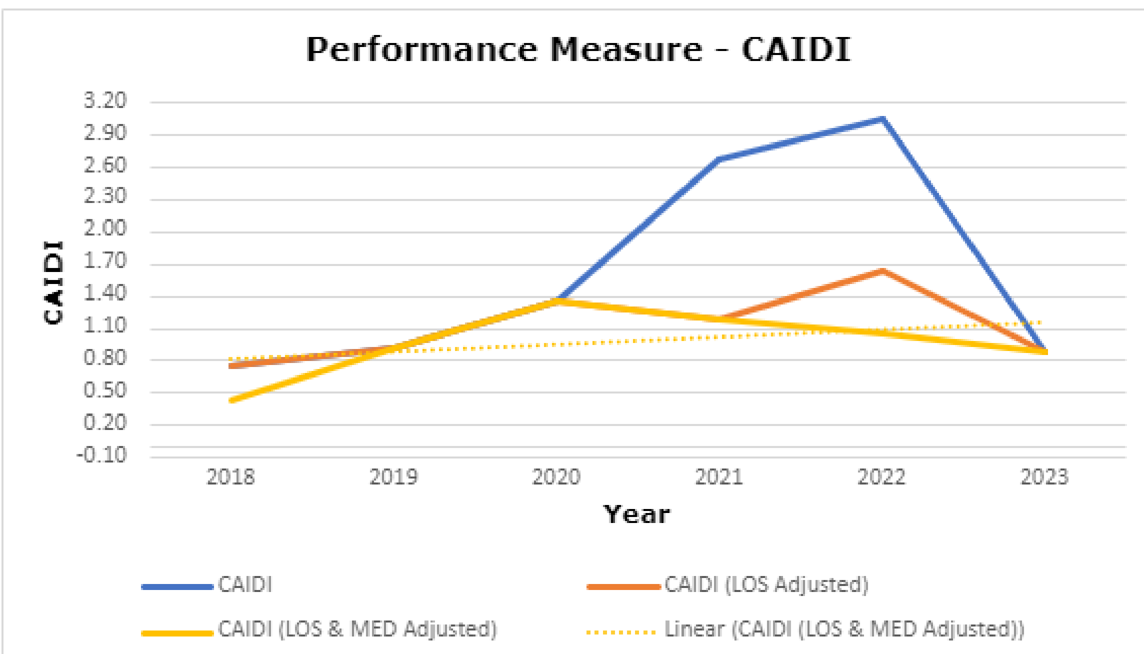


Figure 2-5: 2018 to 2023 Performance Measure: CAIDI

Both SAIDI and SAIFI peaked in 2018 after a significant increase from 2017. The 2018 spike can be credited to major outage events caused by a severe thunderstorm that is described below in this section. The SAIDI and SAIFI values decreased to a more acceptable number in 2019 and decreased further in 2020. In 2021 both SAIDI and SAIFI increased again due to two MEDs in February caused by a loss of supply, which lasted for 14 minutes, and 67 minutes as described below. In 2022, three MEDs contributed to an increase in the SAIDI and SAIFI.

Table 2-4 shows the number of outages during the historical period.

5.2.3.2.3 Outage Details for Years 2018-2023

Table 2-11: Summary of MEDs over the Historical Period

Year	# of MEDs	Cause of MEDs
2018	1	Adverse weather—wind, Loss of supply
2019	0	N/A
2020	0	N/A
2021	2	Loss of supply
2022	3	Adverse weather – wind, Loss of Supply – pole fire, Loss of Supply - wind
2023	0	N/A

Table 2-12: List of MEDs over the Historical Period

Date	Customer Base Interrupted	Description
4-May-2018	6,682	CWH experienced severe thunderstorms with Environment Canada issuing a wind warning on May 4, 2018. The entirety of CWH's customers suffered from 2 interruptions: one due to adverse weather and another due to a loss of supply. A total of 6,682 customers were affected. The outage lasted for 1 hour for all affected customers.
5-Feb-21	7,398	The entirety of CWH's customers suffered an interruption on February 5, 2021, 3:30 pm due to a loss of supply. A total of 7,398 customers were affected. The outage lasted for 14 minutes for all affected customers.
24-Feb-21	5,124	CWH's Fergus customers, fed from the 44kV, M3 feeder, suffered an interruption on February 24, 2021, 12:02 pm due to a loss of supply. A total of 5,124 customers, or 69% of CWH's total customer count, were affected. The outage lasted for 67 minutes for all affected customers.
17-Jun-22	1,169	On June 17th, 2022, CWH encountered two individual outages that affected two different feeders. Both outages were caused by trees being blown onto lines during a windstorm. The outages affected a total of 1,169 customers. This represents 15% of CWH's total number of customers. The Elora EMS2-F4 feeder outage affected 421 customers and the Fergus FMS4-F-9 feeder outage affected 748 customers. The outage lasted for 1 hour and 30 minutes for all affected customers.
1-Aug-22	5,124	There was a loss of supply due to upstream distributor equipment failure (pole fire due to tracking insulator). The outages affected a total of 5,124 customers. This represents 68% of CWH's total number of customers. The outage lasted for 1 hour and 30 minutes for all affected customers.
3-Aug-22	2,060	On Aug 3rd, 2022, CWH encountered an outage that affected all customers in Elora. The outage cause was due to numerous trees and tree limbs breaking and coming into contact with the 44kv, M7 circuit fed from Hydro One. The outages affected a total of 2,060 customers. This represents 27% of CWH's total number of customers. The outage lasted for 7 hours and 20 minutes for all affected customers.

Table 2-13: Number of Outages (2018-2023)

Categorization	2018	2019	2020	2021	2022	2023
All interruptions	56	41	29	35	40	42
All interruptions excluding LOS	56	41	29	33	39	42
All interruption excluding MED and LOS	54	41	29	33	37	42

Outages Experienced

Table 2-14 presents the count of outages broken down by cause code for the historical period. The number of outages is an indication of outage frequency and impacts customers differently based on customer class. For example, residential customers may tolerate a larger number of outages with shorter duration while commercial and industrial customers may prefer fewer outages with longer duration thereby reducing the overall impact on production and business disruption. CWH continues to assess and execute capital and O&M projects to manage the number of outages experienced.

Table 2-14 Outage Numbers by Cause Codes – Excluding MEDs

Cause Code	2018	2019	2020	2021	2022	2023	Total Outages	%
0-Unknown/Other	0	2	1	0	0	0	3	1%
1-Scheduled Outage	25	17	17	28	28	31	146	69%
2-Loss of Supply	0	0	0	1	1	0	2	1%
3-Tree Contacts	1	1	1	0	0	0	3	1%
4-Lightning	0	0	0	0	0	0	0	0%
5-Defective Equipment	9	4	6	3	5	6	33	15%
6-Adverse Weather	2	1	3	2	4	2	14	7%
7-Adverse Environment	0	0	0	0	0	0	0	0%
8-Human Element	1	0	0	0	0	0	1	1%
9-Foreign Interference	4	1	1	0	2	3	11	5%
Total	**42**	**26**	**29**	**34**	**40**	**42**	**213**	**100%**

The total number of interruptions over the historical period is shown in Figure 2-6 below, varying from a high of 42 to a low of 26, with the overall trend decreasing in the period. This represents an average of 0.115 to 0.071 interruptions per day.

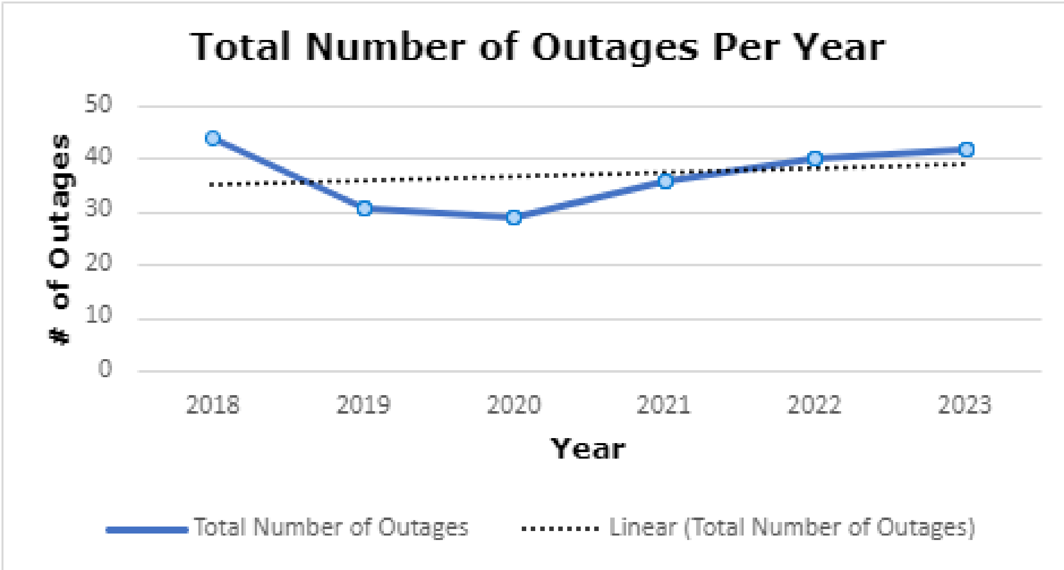


Figure 2-6 Total Number of Outages per Year

A summary of the causes of outages within CWH's system is presented in Figure 2-7 along with the percentage of overall outage incidents attributable to each cause type.

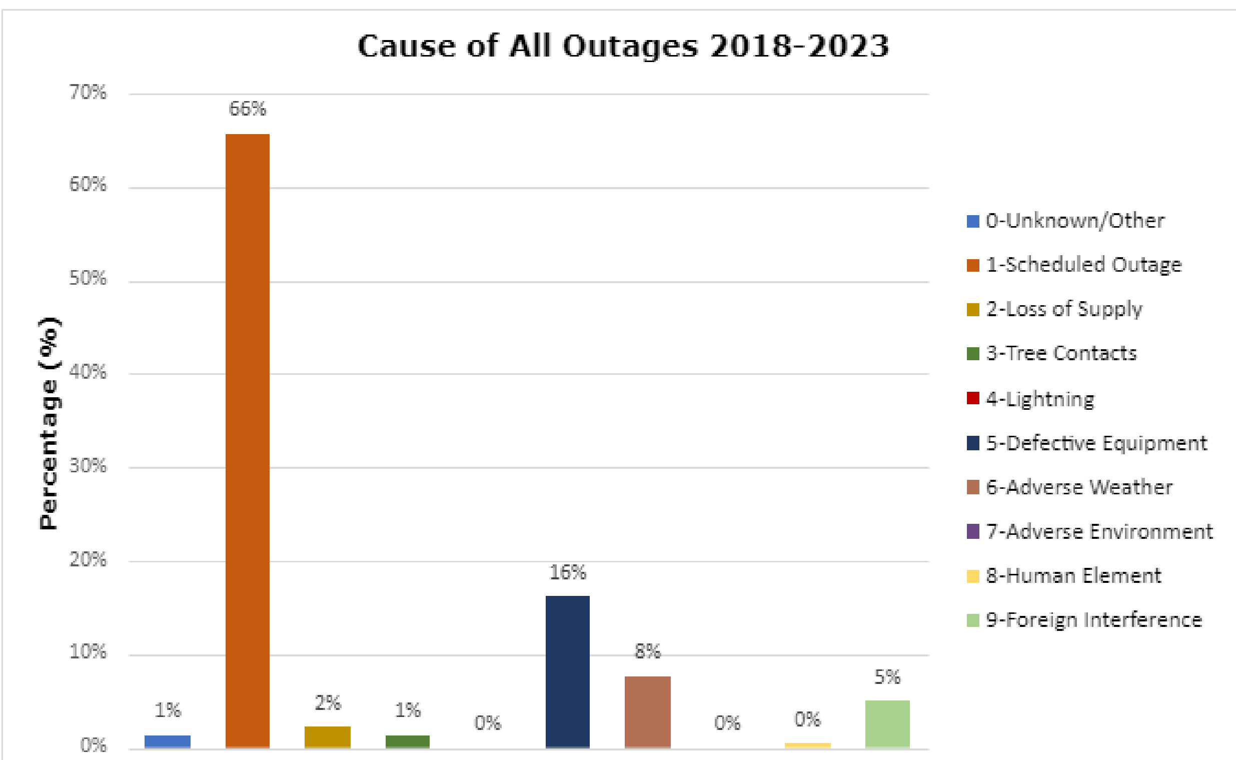


Figure 2-7 Percent of Outages by Cause Code

Scheduled outages, defective equipment, adverse weather, and foreign interference causes have been identified to be the four most common causes for outages on CWH's distribution system over the historical period. Together, these causes contributed to 95% of the total number of outages from 2018 to 2023, excluding MEDs.

Scheduled Outages is the top contributing cause to the total outages experienced by CWH, accounting for 66% of the total outages experienced over the historical period. These outages are due to the disconnection of service for CWH to complete capital investments or to perform maintenance activities on assets that require them to be disconnected for employee & public safety and efficient installation. CWH aims to plan and execute capital work and maintenance appropriately with minimal outage times and only when required to reduce the impact to its customers.

At 16%, Defective Equipment is the second top contributing cause to the total outages experienced by CWH over the historical period. The majority of these equipment related outages were caused by faulting primary and secondary connectors/taps, followed by blown fuses that protect overhead and underground transformers and underground cable from further damage. These types of material and equipment in the field breakdown due to condition deterioration over time and are not easily spotted through typical equipment inspections. CWH has planned investments to prioritize assets for replacement before experiencing a failure that may cause an outage. CWH utilizes the ACA to assist in prioritizing investments in asset classes.

Adverse Weather was identified as the third top contributing cause to the total outages experienced by CWH. Over the historical period, it has contributed to 8% of the total number of outages that occurred. Although the 3rd highest cause of outages it is relatively minor at 8% total, showing no immediate need to address with specific planned storm hardening measures.

Foreign Interference outages is the fourth top contributing cause to the total outages experienced at 5%. The outages contributing to the cause include animal interference, dig-ins, vehicle collisions and foreign objects.

<u>Customers Interrupted and Customers Hours Interrupted</u>

The number of Customers Interrupted (CI) is a measure of the extent of outages. Customer Hours Interrupted (CHI) is a measure of outage duration and the number of customers impacted. The tables and figures below provide the historical values and trends for both CI and CHI.

Table 2-15: Customers Interrupted Numbers by Cause Codes – Excluding MEDs

Cause Code	2018	2019	2020	2021	2022	2023	Total CI	%
0-Unknown/Other	0	56	12	0	0	0	68	0%
1-Scheduled Outage	367	197	221	439	186	148	1,558	10%
2-Loss of Supply	0	0	0	2,060	7184	0	2,060	13%
3-Tree Contacts	272	481	1	0	0	0	754	5%
4-Lightning	0	0	0	0	0	0	0	0%
5-Defective Equipment	3,205	1,026	765	266	110	56	5,428	35%
6-Adverse Weather	1,031	1,650	459	928	1177	377	5,622	36%
7-Adverse Environment	0	0	0	0	0	0	0	0%
8-Human Element	1	0	0	0	0	0	1	0%
9-Foreign Interference	12	5	8	0	183	12	220	1%
Total	**4,888**	**3,415**	**1,466**	**3,693**	**1656**	**593**	**15,711**	**100%**

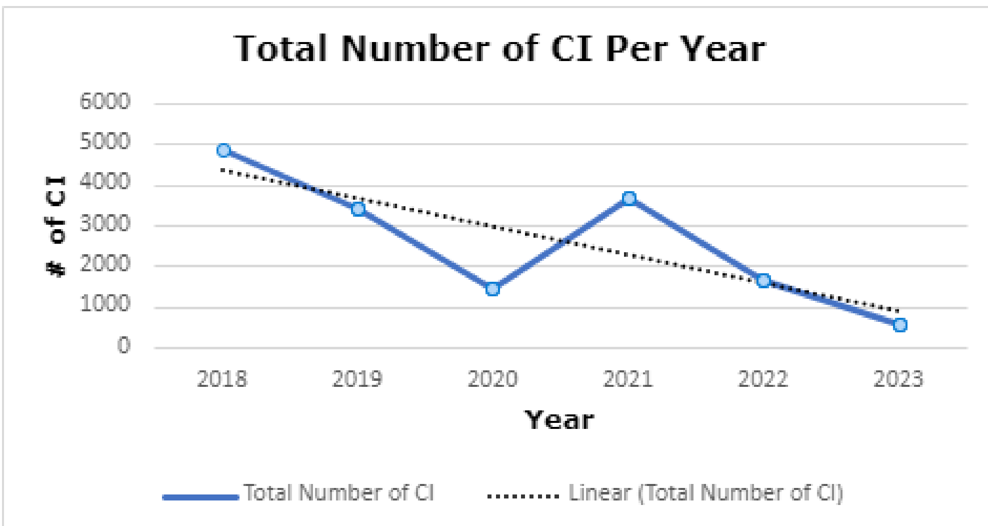


Figure 2-8: Total Number of Customers Interrupted by Year

Table 2-16: Customer Hours Interrupted Numbers (rounded) by Cause Codes – Excluding MEDs

Cause Code	2018	2019	2020	2021	2022	2023	Total CHI	%
0-Unknown/Other	0	0	0	0	0	0	0	0%
1-Scheduled Outage	632	283	372	604	303	260	2,454	22%
2-Loss of Supply	0	0	0	515	0	0	515	5%
3-Tree Contacts	159	361	2	0	0	0	522	5%
4-Lightning	0	0	0	0	0	0	0	0%
5-Defective Equipment	1,065	1,297	923	536	148	74	4,043	36%
6-Adverse Weather	265	1,201	646	798	28	201	3,139	28%
7-Adverse Environment	0	0	0	0	0	0	0	0%
8-Human Element	3	0	0	0	0	0	3	0%
9-Foreign Interference	29	5	34	0	546	21	635	6%
Total	**2,153**	**3,147**	**1,977**	**2,453**	**1,030**	**556**	**11,316**	**100%**

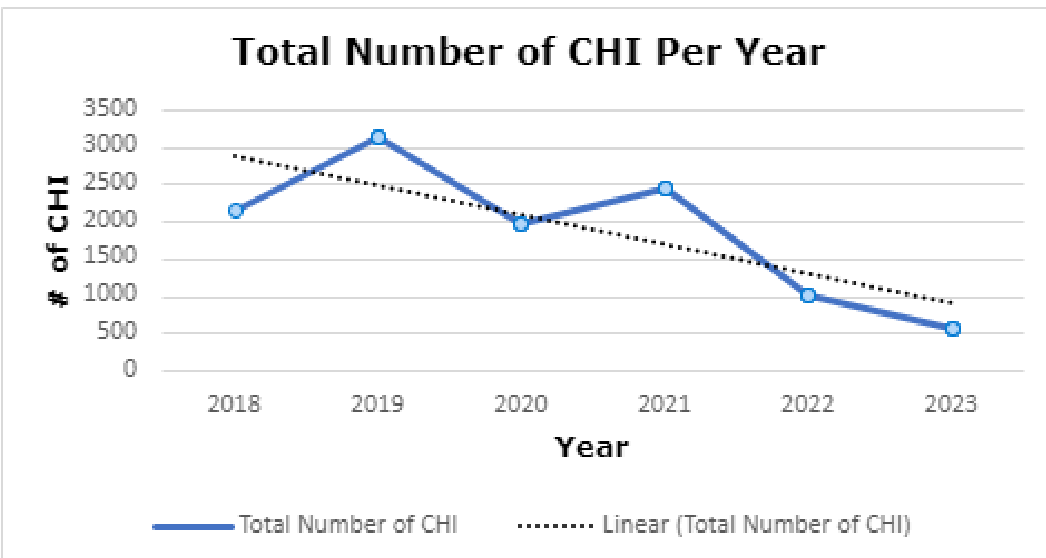


Figure 2-9: Total Number of Customer Hours Interrupted by Year

The trend for total number of CI and CHI over the historical period is decreasing (i.e., improving). The increase in CI observed in 2018 is largely driven by Defective Equipment and Adverse Weather, while the increase in CI observed in 2021 is largely driven by Loss of Supply.

When analyzing CI and CHI, Defective Equipment, Adverse Weather, and Scheduled Outage are among the top five cause codes for both CI and CHI. However, Loss of Supply is another major contributor for CI and Tree Contacts is another contributor for CHI.

- Defective Equipment is the largest outage cause for customers. At 35% of the total outages caused in Centre Wellington they have the perception of being high, although this is due in large part to CWH's unplanned interruptions for all other cause codes being extremely low. This is a low statistic and contributing factor to SAIDI, SAIFI and SAIDI statistics. This shows CWH's asset replacement schedule is having a positive effect on low outages for CWH customers. The types of equipment that contributed to these outages were porcelain switches that have not reached their useful lives, primary and secondary connections that are a typical failing point in distribution systems, and underground secondary cable vaults.

- Adverse weather is beyond the control of CWH. However, CWH has and will continue to design and invest in material, equipment, design and best practices to harden the distribution system to address weather related outages. Some examples of this are designing projects using the most up to date USF standards and structural modeling calculations. CWH has installed composite poles on a recent project within the system with anticipated improved system strength. Installing automated reclosers at all stations has improved reliability along with visibility of outages on the SCADA system. CWH's planned Fergus MS-5 station will provide support for the existing Fergus MS-2 station which is located withing the Grand Rivers flood plain.
- Scheduled Outages or planned interruptions are the most acceptable outages effecting customers and a proactive method of reducing other unplanned interruptions. CWH strives to keep planned interruption lengths to a minimum to meet customers desire to keep outages to a minimum is being met. Customers would much rather experience planned outages where CWH staff can improve their electrical system diligently rather than allow degradation to cause unplanned outages.
- Loss of Supply ("LOS") outages occur due to problems associated with assets owned by another party other than CWH or the bulk electricity supply system and CWH has no control over, nor does it maintain. LOS outages can have a significant impact on the total CI and CHI. One outage can affect a whole portion of CWH's system and may give CWH limited switching capability, resulting in customers' power not being restored quickly.
- Tree contacts are interruptions caused by faults resulting from tree contact with energized circuits. Although tree contacts are generally outside of CWH's control, CWH will continue to implement its vegetation management program in order to mitigate the risk of outages caused by tree contacts.

The top cause code that can be controlled and managed by CWH is Defective Equipment. As previously noted, there are several ongoing and planned efforts to manage the number of controllable outages and continue meeting reliability targets. These efforts include ongoing inspection and maintenance of assets to identify and mitigate potential problems and planned capital investment programs to replace assets before experiencing a failure that may cause an outage (i.e.: CWH's planned transformer, pole, recloser, switch, and switchgear replacement programs).

5.2.3.3 Distributor Specific Reliability Targets

CWH does not have any other additional specific reliability targets.

5.3 ASSET MANAGEMENT PROCESS

This section provides an overview of CWH's asset management process, a description of assets managed by CWH, and a presentation of CWH's asset lifecycle optimization policies and practices.

5.3.1 PLANNING PROCESS

5.3.1.1 Overview

Asset Management Objectives

Key elements of the process that drive the composition of CWH's proposed capital investments are highlighted along with CWH's asset management philosophy. The relationship between the Renewed Regulatory Framework for Electricity ("RRFE") outcomes, corporate goals, asset management objectives, and the linkage to the selection and prioritization of CWH's planned capital investments is explained which control CWH's financial performance and planning.

The components of the asset management process that CWH has used to prepare its capital expenditure plan are identified, including data inputs, preliminary process steps and outputs. The information generally used throughout the DSP is based on available information established at the given moment.

CWH identified the following strategic goals within its Board approved Business Plan (Appendix C). CWH's Asset Management Objectives are derived and relatable to these key goals and areas of focus.

Table 3-1: Asset Management Objectives, their weights, and relationship to the RRFE

CWH's Strategic Objectives
Keep customers, shareholders and stakeholders informed so they can make effective decisions and in turn provide support for the utility.
Be the preferred energy provider and trusted partner for existing customers and new potential customers within Centre Wellington.
Continue to form strategic alliances with other similar utilities who face similar issues and combine forces to share resources and address complex issues collectively.
Invest in our people to continually enhance their skills, maintain their focus, and give them chances to develop and realize their potential within our organization as an employer of choice.
Continued prudent investment while capitalizing on technology, innovation, and enhanced solutions to sustain our performance, reliability, efficiency, safety, and regulatory compliance while providing opportunities for customers and the shareholder.
Preserve corporate viability and return on equity for our shareholder to support new business opportunities and ventures within the sector while prioritizing based on potential to improve the customer experience.

CWH's asset management objectives form the high-level philosophy framework for its capital program. These objectives help to define the content of the programs and the major projects in the capital expenditure plan to be able to sustain CWH's electrical distribution system. The objectives guide CWH to make effective capital investment decisions, which inherently make the best use of, and maximize the value of the assets to the company. The objectives identify an initial starting point and continue to be developed, enhanced, or adjusted as necessary to be aligned with the business environment that the company operates in and help to encourage the process of continuous improvement. The asset management objectives have been qualitatively integrated into CWH's capital investment process to prioritize investments for several years including the bridge and test years.

Table 3-2: Asset Management Objectives, their weights, and relationship to the RRFE

RRFE Outcomes	Strategic Corporate Goals	Asset Management Objectives	AM Objective Measure	AM Objective Target
Operational Effectiveness	Safety	Comply with applicable regulations, acts, and standards and follow best practices	1. Lost/non-lost time 2. ESA Non-Compliance	1. WSIB rate class 10-year benchmarks 2. Zero (Max 1 NI)
	Reliability	Monitor and continue to provide high reliability performance of the distribution system.	1. SAIDI 2. SAIFI	1. SAIDI within range of past 5-year performance 2. SAIFI within range of past 5-year performance
Customer Focus	Customer Focus	Meeting customers' needs and expectations including connecting renewable net generation, ensuring quality of power, reliability of continued uninterrupted service, and availability to address concerns.	1. Customer Survey 2. New connections connected within set timescales	1. Customer survey results => previous year results 2. >90%
Financial Performance	Financial Performance	Manage the distribution system through proactively maintaining and or replacing assets in a financially prudent way that maximizes rate payers value.	1. Investment Spending 2. Investment Scheduling	1. Group 3 (within +/-10% of predicted costs) 2. >90% annual projects/ programs completed on time
Public Policy Responsiveness	Public Policy Responsiveness	Ensure public and employee safety. Control environmental risks. Facilitate smart grid development and new renewable connections.	1. Facilitation of smart grid and REG connections	1. 100% compliance when a request is made by a customer

Decisions involving investment into fixed assets play a major role in determining the optimal performance of distribution system fixed assets. Investments that are either oversized or made too far in advance of the actual system need may result in non-optimal operation. On the other hand, investments not made on time when warranted by system needs raise the risk of performance targets not being achieved and contribute to sub-optimal operation. Optimal operation of the distribution system is achieved when "right sized" investments into renewal and replacement (capital investments) and into asset repair, rehabilitation and preventative maintenance are planned and implemented based on a "just-in-time" approach. In summary, the overarching objective of the Asset Management Strategy is to find the right balance between capital investments in new infrastructure and operating and maintenance costs so that the combined total cost over the life of the asset is minimized.

5.3.1.2 Important Changes to Asset Management Process since last DSP Filing

Since issuing its last DSP, CWH has undertaken a review and update of its business plans and corporate focus. These changes have been incorporated into CWH's AM process. The changes have been fairly minor, with the adjustments revolving around enhancing the existing process by using a formal maintenance program that collects field data on assets and focusing on the ACA data available to help CWH in its decision-making process.

As a result of enhancements made to its inspections and maintenance procedures (further detailed in section 5.3.3.3.2), CWH now has access to improved asset data which has been tied into system planning and decision-making. The improved procedures and data access have enabled CWH to manage its assets based on more robust and quantified justifications.

5.3.1.3 Process

CWH's Asset Management (AM) process in Figure 3-1 demonstrates on a high-level its asset management direction, principles, and mandatory requirements. The AM process interprets the company's vision, mission, and values and serves as the connection between the top-level corporate and strategic goals and objectives through to the bottom-level asset management practices.

CWH's AM process is established in a way to coordinate activities to ensure the assets are optimally achieving the company's corporate and asset management objectives. Conceptually, the process includes items such as setting out the criteria for optimizing and prioritizing asset management objectives, lifecycle management requirements of the assets, stating the approach and methods by which the assets are managed, including performance, condition and criticality assessment, the approach to the management of risk, and identifying continuous improvement initiatives. CWH AM process is an iterative process that is regularly updated with the latest set of data and information to ensure that CWH are initiating the capital projects at the right time. As well as using this process to develop its original five-year DSP capital plan, CWH also use it annually to update its budget and plan for the upcoming year.

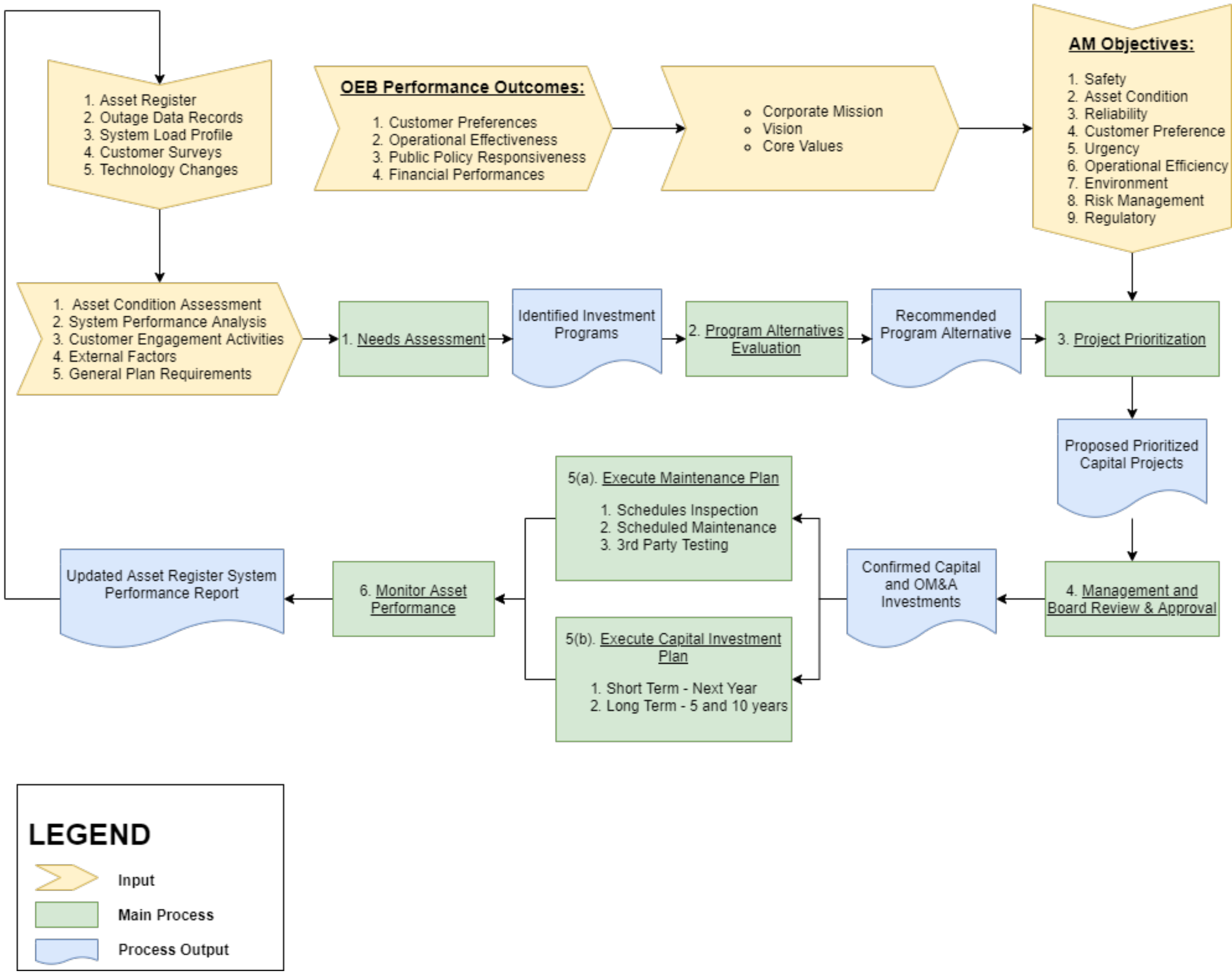


Figure 3-1: CWH's Asset Management Process

<u>Inputs</u>

CWH uses several inputs to assess the status of its distribution system assets and to assist in determining the capital and operational investments to be made in the system. This ranges from asset condition analysis, customer engagement, inspection, and maintenance results to what its AM objectives are and how they link to the OEB's performance outcomes and any external factors. Some of the key elements are explained in further detail below.

Inspection & Maintenance

CWH maintains a full schedule of distribution asset inspection and maintenance programs operating on a three-year rotation as required by the OEB's DSC. Inspection, maintenance, and operational data are collected and stored which is used to support CWH's operating and capital expenditure plans.

Completion of the inspection and maintenance programs is not only a matter of compliance but the results from the inspection and maintenance programs allow a continual update of the asset database. The programs allow for assets to be inspected and assessed for any necessary actions that need to be taken promptly in a proactive approach. CWH's inspection and maintenance programs are audited every year as required by Ontario Regulation 22/04.

External Drivers

External drivers may sometimes influence CWH's decision-making in determining the optimal plans for their system. External drivers include:

- Political – governments have their directions and strategies that CWH needs to be mindful of and to be in alignment with their plans.
- Economic – economic growth and decline within CWH's service area as well as the shift of business operations within residential units.
- Social – changes in the environment that illustrate customer needs and wants.
- Technological – innovation and development within the electrical/utility sector which includes automation, technology awareness, electric vehicle penetration, battery storage and new services.
- Environmental – ecological and environmental aspects that can affect CWH's operations or demand which includes renewable resources, weather or climate changes, and utility responsibility initiatives.
- Regulatory/Legal – legal allowances and/or changing requirements from the OEB as well as additional legal operations such as health and safety requirements, labour laws, and consumer protection laws.
- CWH continues to remain cognizant of these external drivers when developing its capital and maintenance plans.

Asset Condition Assessment

An ACA was undertaken in 2021 to assess the condition of the system and to have empirical data on which to base the revised project prioritization. The ACA involves the interpretation of condition and performance data of key assets to assess the overall condition of the asset. Essentially, the ACA is a key supporting tool for developing an optimized lifecycle plan for asset sustainability. The results of the condition assessment were incorporated into a formalized capital plan and have resulted in the revision of project prioritization within the service area for the forecast period.

CWH intends to continue using the information from its ongoing proactive inspection and maintenance programs to optimize spending, with priorities considered in the scheduling. Under the proposed capital planning model, decisions to repair, refurbish or replace existing assets continues to be based on experienced judgment and knowledge of staff augmented with improved access to electronic records and structured evaluation processes.

Reliability Analysis

CWH places a high level of importance on ensuring distribution system reliability meets the expectations of its customers. CWH strives to continually improve its processes for collecting, measuring, analyzing, and utilizing outage information within its asset management process to effectively manage distribution system reliability in its service territories.

Outage causes are tracked and analyzed by outage cause codes. This allows CWH to identify specific trends in causes of outages and allows for this information to feed into its prioritization and evaluation process when developing its capital investment plans. The analysis is ultimately used to inform CWH's asset management process in developing the O&M programs and capital expenditure plan for each year.

Main Process and Process Outputs

CWH uses the input data and information to enable it to determine its operating and capital expenditure plans. As illustrated in Figure 3-1, this is done in a multistage process with various outputs at each stage.

Firstly, using input data such as asset condition analysis, system performance, customer engagement results, a needs assessment is performed. This allows CWH to identify some high-level programs that CWH could undertake to address the needs. Following the initial identification of these programs, an evaluation of the different options to address the program drivers is performed. This includes looking at options of full replacement, refurbishments or do nothing. This allows CWH to streamline the programs it will undertake with a recommended list of programs and alternatives.

At this stage, further inputs are considered, such as CWH AM objectives, and the OEB performance outcomes. This information along with the programs identified are used to identify specific projects within the programs and identify a prioritized list of projects. In developing and implementing the asset management plan, CWH's overarching objective is to distribute electricity safely and reliably with highest operating efficiency to maintain low distribution rates and provide the shareholders the full regulated return on equity.

The key objectives on which the asset management plan is based is indicated below:

- Maintaining public and employee safety
- Maintaining reliability commensurate with customer needs
- Providing customer service quality to satisfy customer needs
- Controlling costs - minimizing asset life cycle costs
- Minimizing risk of in-service failures
- Minimizing environmental risks
- Aligning the DSP with regional planning objectives
- Facilitating new renewable generation connections
- Facilitating the smart grid development

These rankings are used to help inform a list of prioritized projects, which are then reviewed and approved by the CWH management and Board. Once the projects and associated operating and capital spend has been approved, the projects are monitored from initiation to execution. Once the projects are complete the assets are monitored on their performance and updated information is fed back into the asset registry.

CWH's capital expenditure planning process embedded within its AM process consists of the following steps:

a) Determination of investment level needed for CWH to meet its regulatory obligations i.e., the level of investments required for system access projects.
b) Determination of investment level needed to maintain adequate capacity margins to supply system security and to maintain operating efficiency and safety, i.e., investments required system service projects.
c) Determination of investments required to maintain general plant operating safely and efficiently to support services.
d) Determination of economically efficient investments for system renewal,
e) Summation of all of the investment components to determine the overall investment needed.
f) Evaluation of capital investment impacts on retail rates and scaling back of the investment levels if the retail rate impacts are not acceptable.

The level of investments required for system access projects is determined through consultations with the municipal government, based on the number of anticipated development and building permits for residential and commercial construction. The investments into system renewal are determined through condition assessment of assets and identification of economically efficient investments. Investments in system service for the 2023-2027 period is focused on purchasing revenue meters to replace, refurb and allow for testing and calibration of existing meters. Investment requirements into general plant are determined through condition assessment of motor vehicles, building and facilities and IT systems.

CWH strives to engage with their customers to ensure that their planning process for capital and maintenance work is in line with their expectations and to understand the many risks that need to be addressed. These engagements are in the form of CWH attending the meetings with municipal teams, information sessions, open houses, and the bi-annual customer satisfaction survey, as well as informal means such as front-line staff and management listening to customers at the front desk and operations staff working with customers and contractors on day-to-day projects. The summary of CWH engaging with customers, subdivision developers, municipalities, other LDCs, and telecommunication entities is provided in Section 5.2.2.

With CWH's Mission being *"To provide safe, reliable, efficient delivery of electrical energy within the Township of Centre Wellington while being accountable to our shareholders…. the citizens of Centre Wellington",* CWH has developed a prudent capital budget process and system of prioritization. This system reflects its long-term investment strategy, recognizes shorter-term requirements, and can address the ongoing need for CWH to respond to external and internal priority changes. It respects the priorities of a wide range of stakeholders, CWH's corporate strategies and regulatory requirements. Figure 3-2 illustrates CWH's Capital Expenditure Process at a high level.

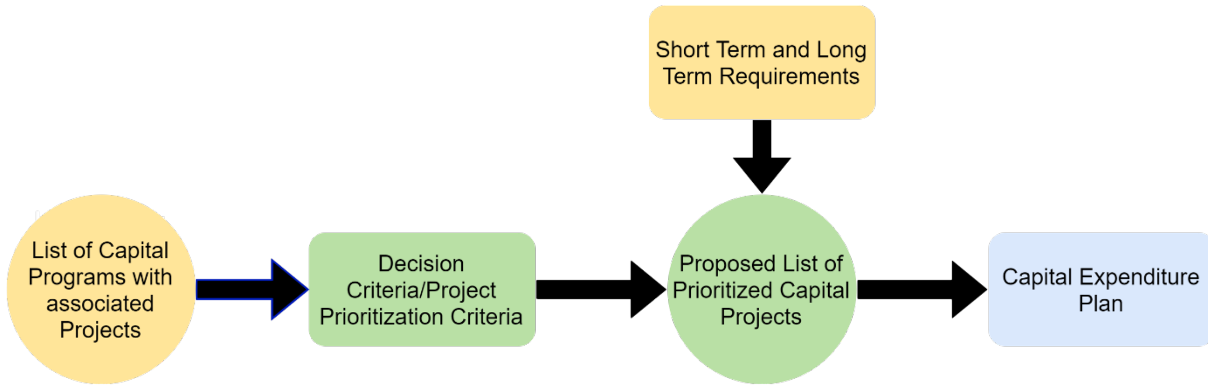


Figure 3-2: Capital Planning Process

5.3.1.3.1 Project Identification

Capital spending is driven by customer value, corporate and AM objectives, and capital needs identification through CWH's asset management process.

System Access projects such as customer development driven projects are identified throughout the year by way of engagement with external proponents, through various engagement processes. In addition to the updates throughout the year, CWH reforecasts its budget and planned expenditure each year for the following year. These projects are mandatory and are budgeted and scheduled to meet the timing needs of the external proponents.

System Renewal projects are identified through CWH's asset management process. The project needs for a specific period are supported by a combination of asset inspection and maintenance, individual asset performance, and asset condition assessments as summarized in the asset management process.

System Service projects are identified through CWH's asset management process and operational needs. For the 2025-2029 period, this is primarily associated with revenue meters, which includes purchase of new meters for inventory to enable the changing of meters to be sent for testing, calibration, and resealing.

General Plant projects are identified internally by specific departments (engineering, finance, operations, administration, etc.) and supported through specific business cases for the specific need. These investments include the identification of facilities, fleet, tools and IT projects. Fleet vehicles are replaced when they reach end of useful life.

5.3.1.3.2 Project Prioritization

There are two categories that CWH projects fall within: non-discretionary and discretionary. Non-discretionary projects are automatically selected and prioritized based on externally driven schedules and needs. System Access projects fall into this category and may involve multi-year investments to meet customer or developer requirements. Projects that reside in System Renewal, System Service, and General Plant are classed as discretionary. These projects are prioritized based on risk associated with not undertaking each project, and the resource and budget available to deliver those projects.

Where appropriate CWH looks to group projects into programs, mainly within its System Renewal category. For example, CWH knows each year it needs to replace a number of poles that have reached end of life and/or in poor and very poor condition.

Ultimately the final decision on prioritizing the projects and programs reside with the senior management of the company. These meetings include senior representatives from both the operations and finance teams. Management aligns its priority rankings for investments with its AM objectives as shown in Table 3-3: In all cases, safety and regulatory compliance projects have the highest priority.

Table 3-3: CWH Prioritization Criteria

Prioritization Criteria	Priority Ranking
Maintaining public and employee safety	5
Maintaining reliability commensurate with customer needs	5
Providing customer service quality to satisfy customer needs	5
Controlling costs - minimizing asset life cycle costs	4
Minimizing risk of in-service failures	4
Minimizing environmental risks,	4
Aligning the DSP with regional planning objectives	3
Facilitating new renewable generation connections;	3
Facilitating the smart grid development	2

Public and Employee Safety

CWH always prioritizes investments that ensure public and employee safety and comply with the regulations set out by the OEB and industry. This includes prioritizing investments that comply with the Electrical Safety Authority (ESA) Standards, for example, meters and the installation, re-calibration and testing to comply with the Distribution System Code and Measurement Canada requirements. In addition, another critical element of public safety is related to cyber security requirements and guidelines. These programs/projects are aimed at increasing the protection of CWH’s IT and operational technology (OT) systems and platforms and support the OEB’s cyber security requirements, as well as initiatives that enhance the protection of CWH’s and its customers data and information.

Maintaining Reliability

A key component of CWH aims and objectives is to ensure its customers continue to experience a reliable supply of electricity. CWH acknowledges this is always a high priority for its customers, and hence why projects that enable reliability to be maintained at acceptable levels are given a high priority ranking.

Customer Service Quality

In addition to system reliability being a high priority for customers, the quality of other services they receive from CWH are also ranked highly. CWH assess projects based on the impacts to customer service, which can include minimizing outages, improving response times to customer requests etc.

Cost Control

When assessing projects, CWH always looks to understand the impacts on the overall cost impact to customers. Projects that can minimize cost impacts to customers are often given a higher weighting, as this enables CWH to continue to minimize impacts to customer rates. Projects can include replacing end of life assets as identified through its asset condition analysis and inspections with the assets that are new and comply with the latest USF and construction standards. Through these projects, maintenance costs can be minimized, and the number of unexpected failures can be maintained and therefore reactive costs can be controlled to minimize impacts to customers. Clearly a balance of cost versus benefit needs to be assessed, as in some cases it may be more cost effective to have an ongoing expense to maintain/repair the existing asset rather than replace with a brand-new asset.

In-Service Failures

One key problem for most utilities, is the number of in-service failures they have and the reactive costs that are incurred to address these. CWH assess projects that can help target the replacement/refurbishment of assets such that an in-service failure can be minimized to a manageable level. Part of this process is using results from its asset condition analysis and inspections to identify assets/areas that are reaching end of useful life and/or in poor and very poor condition within the next five years. CWH then prioritize these programs and projects. An example of this type of program is the annual pole replacement program.

Environmental Risks, REG Connections and Smart Grid Developments

Environmental risks are also assessed as part of CWH's capital planning process. This can include identifying projects and programs that address climate change challenges, such as the installation of EV charging stations. CWH has already installed EV chargers in its service area which are free to use for all residents. CWH will continue to assess the cost of undertaking these versus the benefit to customers, both from a financial and environmental standpoint.

In addition, CWH will continue to enable REG and smart grid connections when inquiries are made by potential developers and customers. Currently, the priority for these projects is low due to the fact CWH has only two of these developments happening in the next five years based on information currently available.

5.3.1.3.3 Project Pacing

Project pace for System Access projects is generally determined by external schedules and needs of the customers, developer and/or the municipalities. CWH aims to smooth out its investment across System Renewal, System Service and General Plant projects throughout the five-year forecast period. Where possible, CWH looks to group certain types of projects in annual programs to enable it to plan its projects and resources required to deliver them. For example, in System Renewal, CWH has an Annual Pole Replacement Program with a total pole replacement goal over the 5-year period, with the annual replacement fluctuating accordingly to accommodate all projects. In doing this CWH is able to monitor and minimize large impacts to customer bills. CWH also takes efforts to minimize the variance of the budget within a given fiscal year. These three investment types are paced with consideration of available resources and managing the program cost impacts on the customer's bill, as well as taking into account the amount of System Access (Mandatory) projects that need to be delivered.

REG Investment Prioritization
CWH does not use a separate prioritization for REG investments. In addition, CWH assesses that the distribution system has sufficient capacity to accommodate foreseeable renewable generation connections within the period covered by the DSP. CWH's planning objective concerning renewable generation is to continue to facilitate the connection of renewable generation promptly consistent with the provisions of the DSC.

5.3.1.4 Data

Main Data Sets
CWH uses a range of datasets to help inform its asset management inputs and process. The following are some of the main data sets that CWH utilize:

- Asset registers, station single line diagrams and operating maps, indicating line lengths, conductor type and sizes, equipment ratings, and service age of assets.
- Asset Condition Analysis by asset class. This includes identification of assets that are in very poor and poor condition, which are more closely inspected to determine the level of current risk to CWH.
- Station peak loading data, indicating equipment capacities and maximum load.
- Equipment inspection data sets, indicating operating condition of distribution system assets, and substation test result data sets.
- Outage information by cause code. This enables CWH to identify any specific assets/locations that are causing these outages, which in turn allows for more targeted investments.

5.3.2 Overview of Assets Managed

5.3.2.1 Description of Service Area

5.3.2.1.1 Overview of Service Area & Summary of System Configuration

CWH owns and operates two distinct distribution networks, one in the Town of Fergus and a second in the Village of Elora. Both distribution networks receive power from Hydro One at 44 kV, which is stepped down to 4.16 kV at six distribution stations, four of which are located in Town of Fergus and the remaining two are located in Village of Elora. CWH'S service territory is depicted in Section 5.2.1.1.

Table 3-4 summarizes the station ratings for each of the stations. All stations receive power from 44 kV lines, embedded into the Hydro One 44 kV system. As shown, four of the municipal stations supply 4.16 kV feeders serving the Town of Fergus and two of the municipal stations supply 4.16 kV feeders serving the Village of Elora.

Table 3-4: CWH Municipal Station Ratings

Station ID	Installed Capacity	Number of 4kV Feeders
Fergus MS1	5 MVA	3
Fergus MS2	6 MVA	3
Fergus MS3	5 MVA	3
Fergus MS4	5 MVA	3
Fergus Total	**21 MVA**	**12**
Elora MS1	6 MVA	3
Elora MS2	5 MVA	3
Elora Total	**11 MVA**	**6**

As shown in Table 3-5, the 44 kV distribution system is predominantly overhead, while the 4.16 kV system consists of both overhead and underground circuits. CWH's distribution system consists of approximately 78 km of overhead lines and approximately 82 km of underground lines.

Table 3-5: Length of Overhead Lines and Underground Cable Circuits

	Overhead Circuit Length (m)		Underground Circuit Length (m)	
	4.16 kV	44 kV	4.16 kV	44 kV
1 Phase	10,555	-	72,235	-
3 Phase	43,406	23,821	7,842	2,017

The 4.16 kV distribution voltage is further stepped down to utilization voltages of 120/240V, 120/208V or 347/600V through approximately 876 distribution transformers. The distribution system is monitored through a control centre located in its office at Fergus.

CWH's service area is within the temperate climate region of Southern Ontario. Throughout the year, the temperature typically varies from -10ºC during the winter to 25ºC in the summer.

CWH service areas are seeing moderate growth, which requires CWH to invest in its system to maintain reliability and safety.

5.3.2.1.2 Customers Served

In 2021, CWH served 7,385 electricity distribution customers across its service area. Most of CWH's customers are divided among three rate classes: residential, general service less than 50 kW ("GS<50"), and general service 50 kW up to 4,999 kW ("GS≥50").

Table 3-6 summarizes the year-end customer counts for each rate class to highlight the changes in CWH's customer base over the historical period. Residential customer counts have increased by 1.70% cumulative annual growth rate ("CAGR") over the historical period and the number of GS<50 customers increased by 1.22% CAGR over the same period. The GS≥50 customer count increased over this time period (2.24% CAGR). These trends in customer counts are reflective of the focused development of residential areas and small businesses in the Town of Fergus and Village of Elora.

Table 3-6: Changing Trends in Customer Base

Annual Year	Residential	General Service <50 kW	General Service ≥50kW	Total
2017	6,115	747	54	6,916
2018	6,213	755	54	7,022
2019	6,324	782	50	7,156
2020	6,447	777	59	7,283
2021	6,542	784	59	7,385
2022	6,612	786	61	7,459
CAGR	**1.70%**	**1.22%**	**2.24%**	**1.65%**

5.3.2.1.3 System Demand & Efficiency

Figure 3-3 shows the annual peak demand for summer and winter, in kilowatts (kW), as well as the average annual peak from 2017 to 2021. CWH experiences its overall system peak during the summer months.

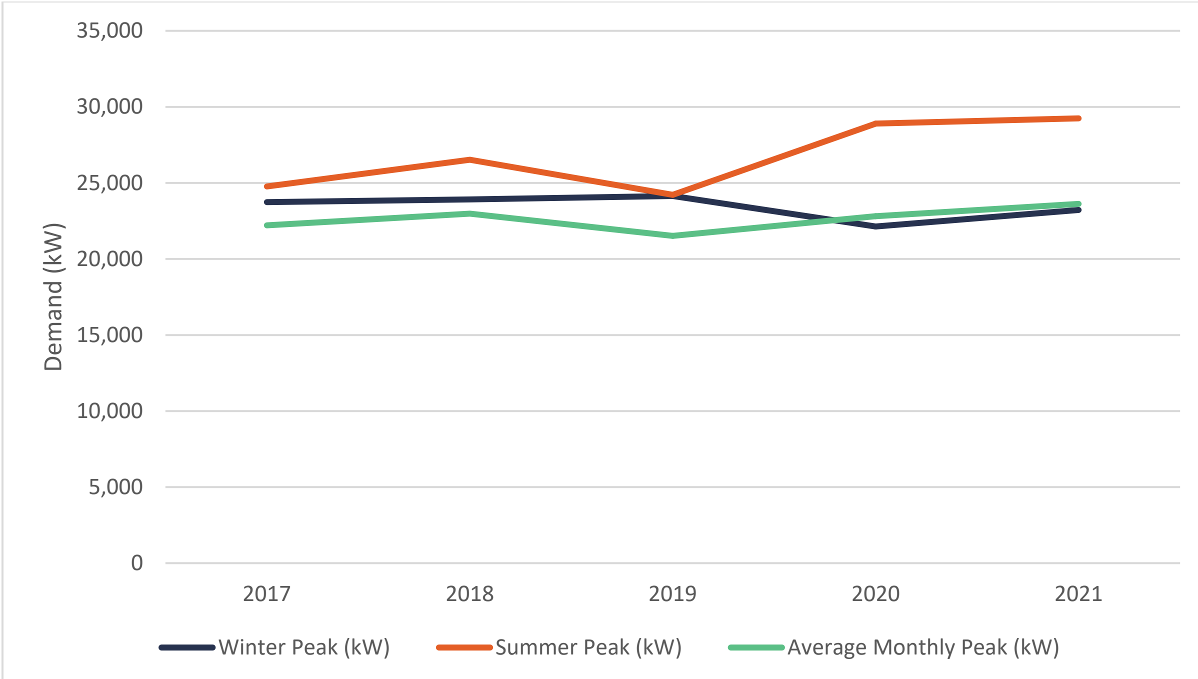


Figure 3-3: Historical Annual Peak Demand (kW)

As demonstrated in Table 3-7 the winter peak has decreased by a CAGR of -0.55% over the historical period and the summer peak has increased by 4.24%.

Table 3-7: Peak System Demand Statistics (with embedded generation)

Annual Year	Winter Peak (kW)	Summer Peak (kW)	Average Peak (kW)
2018	23,915	26,524	25,220
2019	24,141	24,218	24,180
2020	22,135	28,899	25,517
2021	23,224	28,408	25,816
2022	25,001	28,168	26,585

Table 5.3-3 indicates the efficiency of the kilowatt hour purchased by CWH. Total kWh purchased has increased by a CAGR of 1.49%.

Table 3-8: Efficiency of kWh Purchased by CWH

Annual Year	Total kWh Delivered (excluding losses)	Total kWh Purchased	System Losses (kWh)
2018	143,311,162	150,180,982	6,857,880
2019	140,210,973	147,279,221	7,068,249
2020	141,625,816	148,457,529	6,831,442
2021	146,341,995	153,248,432	6,906,437
2022	147,036,989	154,053,312	7,016,323

5.3.2.2 Asset Information

5.3.2.2.1 Asset Capacity & Utilization

System utilization is assessed based on the peak load of each feeder and station transformer, relative to their respective ratings. Feeders are typically rated at the calculated ampacity. Station transformers are typically rated based on their rated nameplate capacity.

Station Capacity

Table 3-9: Station Capacity and Utilization

Municipal Station	Base Rating (kVA)	2022 Peak Loading	2022 % Utilization	2023 Peak Loading	2023 % Utilization
Elora MS 1	6000	3251	54.18%	3242	54%
Elora MS 2	5000	2802	56.04%	2471	49%
Fergus MS 1	5000	3112	62.24%	3080	62%
Fergus MS 2	6000	5239	87.32%	4393	73%
Fergus MS 3	5000	3104	62.08%	3502	71%
Fergus MS 4	5000	4626	92.52%	4620	92%

In 2022, all of CWH’s stations had utilization under 100%. It can be seen that Fergus MS-4, and Fergus MS-2 had high utilization rates of 93% and 87% respectively. The Fergus MS-4 station should be monitored further to ensure no further actions for replacement is required during the five-year period. Whilst overall the data in the above table demonstrates that CWH still has satisfactory capacity to service the total current customer load at 16,081kVA in Fergus, there is only allowance for one station at any given time to be out of service for planned or unplanned reasons. Furthermore, managing operational functions such as switching for load transfers for planned and unplanned purposes is challenging. Mainly due to the geographical location of the current stations and specifically Fergus MS-2, which is the most heavily loaded station, with limited feeders available to service a large portion of Fergus customers and businesses South of the Grand River. CWH has a planned capital project to construct a new, Fergus MS-5 distribution station to be commissioned in 2026. CWH has identified another project that will replace and upgrade the Power Transformer at Elora MS-2. The need for this project is to eliminate a capacity shortfall if the power transformer at Elora MS-1 were to fail during peak periods, which is typically when transformers can fail as they are loaded the most. Elora MS-2's transformer would not be able to handle its own load and the load of Elora MS-1. This would cause a significant number of customers to experience an outage during these peak periods. To ensure that this does not happen, and customers continue to receive safe and reliable supply, CWH is replacing the power transformer at Elora MS2 in 2024.

Feeder Capacity

Table 3-10: Feeder Capacity and Utilization

Feeder	Planning Capacity (Amps)	2022 Typical Peak Load (Amps)	2022 % Utilization	2023 Typical Peak Load (Amps)	2023 % Utilization
Elora_MS1_F1	370	182	49%	158	43%
Elora_MS1_F2	370	224	61%	183	49%
Elora_MS1_F3	370	261	71%	374	101%
Elora_MS2_F4	300	362	121%	158	53%
Elora_MS2_F5	300	121	40%	122	41%
Elora_MS2_F6	300	293	98%	230	77%
Fergus_MS1_F1	300	141	47%	129	43%
Fergus_MS1_F2	300	254	85%	306	102%
Fergus_MS1_F7	300	294	98%	284	95%
Fergus_MS2_F4	370	268	72%	260	70%
Fergus_MS2_F5	370	271	73%	253	68%
Fergus_MS2_F8	370	281	76%	285	77%
Fergus_MS3_F3	300	257	86%	284	95%
Fergus_MS3_F6	300	244	81%	303	101%
Fergus_MS3_F12	300	211	70%	202	67%
Fergus_MS4_F9	300	318	106%	340	113%
Fergus_MS4_F10	300	300	100%	277	92%
Fergus_MS4_F11	300	340	113%	332	111%

Most of the feeders supplying CWH are moderately loaded with enough capacity to address emergency and capacity demands with little room for more load.

Conclusion

Based on the loading and capacity information, CWH has near future concerns with the supply capability for several feeders and at the station level. At the station level, transformers at Fergus MS2, and MS4 were highly loaded in 2022. As explained above CWH is planning a new Fergus MS-5 station build to alleviate the feeder and station capacity issues on the 4kV Fergus Distribution system.

5.3.2.2.2 Asset Condition & Asset Demographics

The Asset Condition Assessment ("ACA") study was carried out by METSCO for CWH to establish the health and condition of station and distribution assets in-service. The ACA results are based on condition data recorded by CWH and its contractors up to the end of 2020 for distribution assets and May 2021 for station assets. Figure 3-4 and Figure 3-5 present the summary results of the ACA.

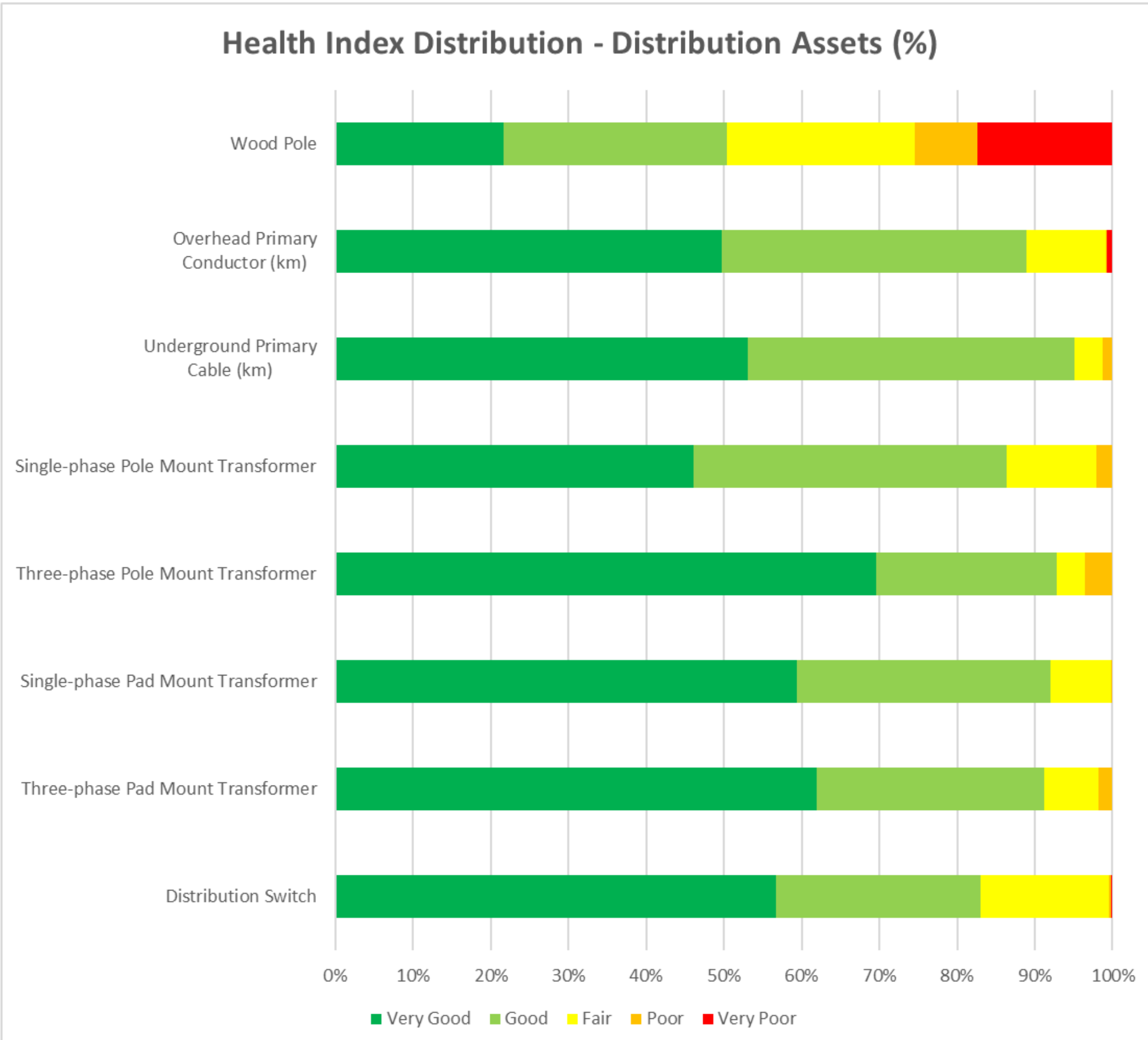


Figure 3-4: Distribution Asset Health Index Results

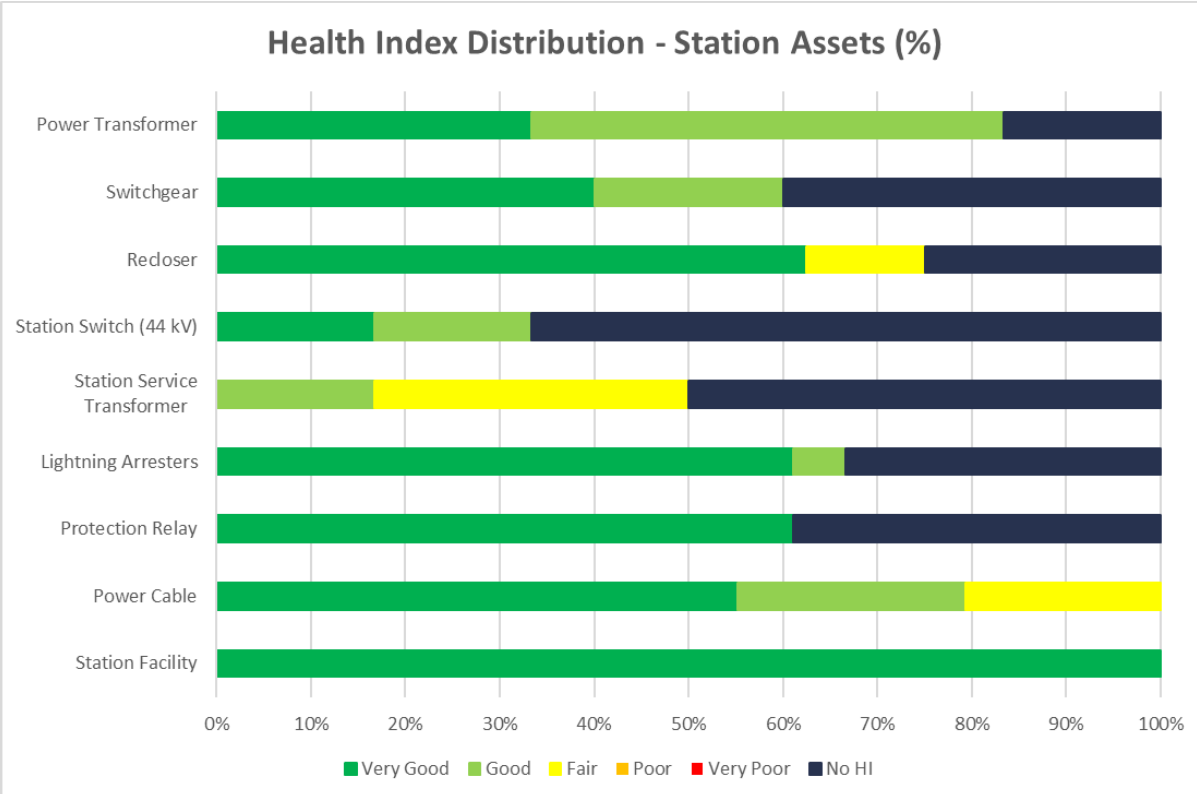


Figure 3-5: Station Asset Health Index Results

Where there is sufficient data to calculate a health score for an asset, the figures above indicate that the majority of CWH's distribution system is in a healthy condition, with only a few asset classes containing units in Poor and Very Poor conditions. Notably, wood poles have a noticeable portion of assets in Poor or Very Poor conditions. The ACA report is found in Appendix D, which contains detailed results for each asset class.

Poles

CWH owns 1,628 wood poles within its service territory. The installation date is known for the entirety of the in-service population. CWH's pole maintenance and nameplate data were used to calculate the HI. The overall extrapolated HI distribution for wood poles is presented in Figure 3-6. Most of the poles are either in Fair, Good or Very Good condition, with around 25% of the total population being in Poor or Very Poor condition. These assets were further assessed by CWH to identify action that needs to be taken, such as refurbishment or replacement as required. The vast majority of the identified Poor and Very Poor condition poles will be replaced within this DSP's timeframe through pole line rebuild, or pole replacement projects that are planned.

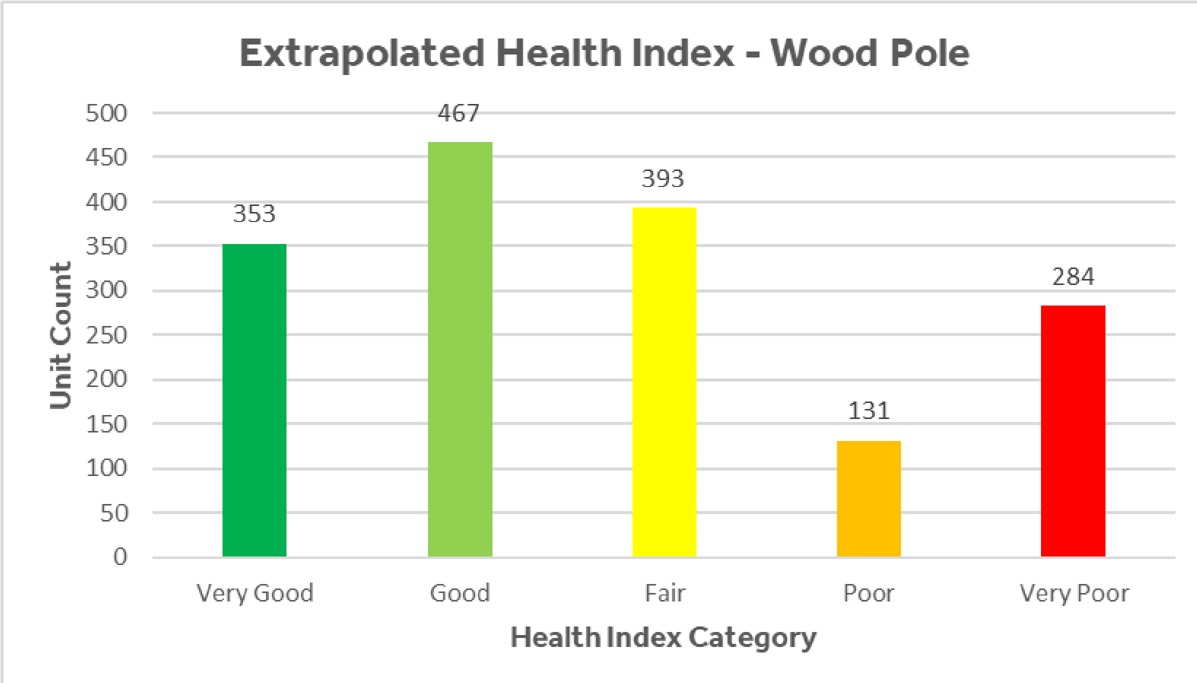


Figure 3-6: Extrapolated Wood Pole HI Results

Overhead Primary Conductors

CWH owns approximately 78 km of the overhead primary conductor within its service territory, with 82% of the conductor having age data found in CWH's GIS. Most of the primary conductors are in Very Good and Good condition with approximately 1% in Poor and Very Poor condition. The overall Health Index for overhead primary conductors is illustrated in Figure 3-7.

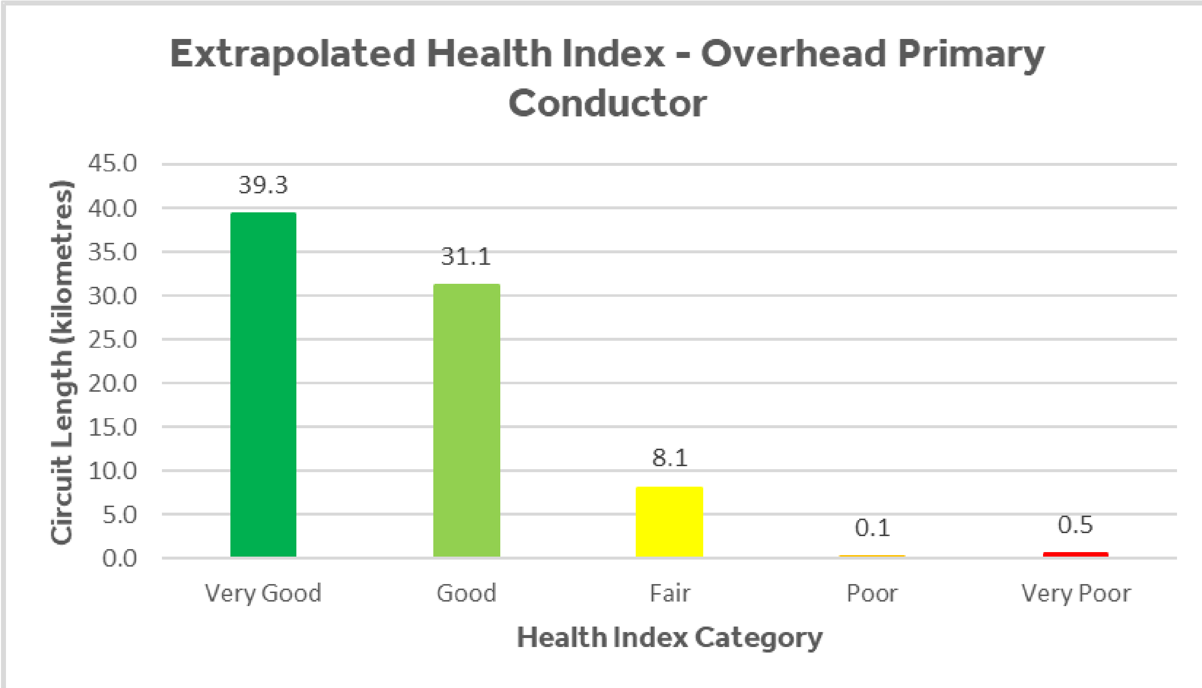


Figure 3-7: Extrapolated Overhead Primary Conductor HI Results

Underground Primary Cables
CWH owns approximately 82 km of underground primary cable within its service territory. CWH's GIS contains the cable installation year for all its cables. Most of the primary cables are in Very Good and Good condition. A little over one percent of primary cables are in Poor condition, with none being deemed Very Poor. The overall Health Index for underground primary cables is illustrated in Figure 3-8.

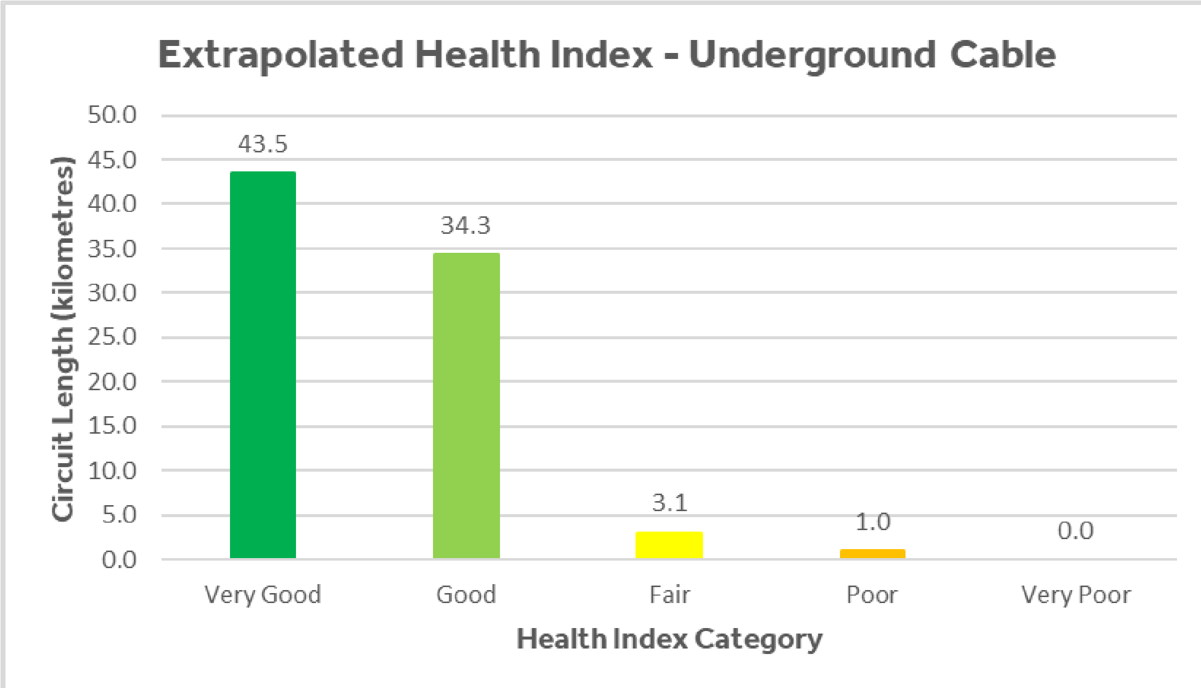


Figure 3-8: Extrapolated Underground Primary Cable HI Results

Single Phase Pole Mount Transformers

CWH owns 241 single-phase pole mount transformers. Installation dates are known for almost 100% of the total in-service population. For unknown installation dates, the age is estimated to be the average age of in-service pole mount transformers. Most of the single-phase pole mount transformers are in a Good condition or better. Only five single-phase pole mount transformers are in a Poor condition, as can be seen in Figure 3-9.

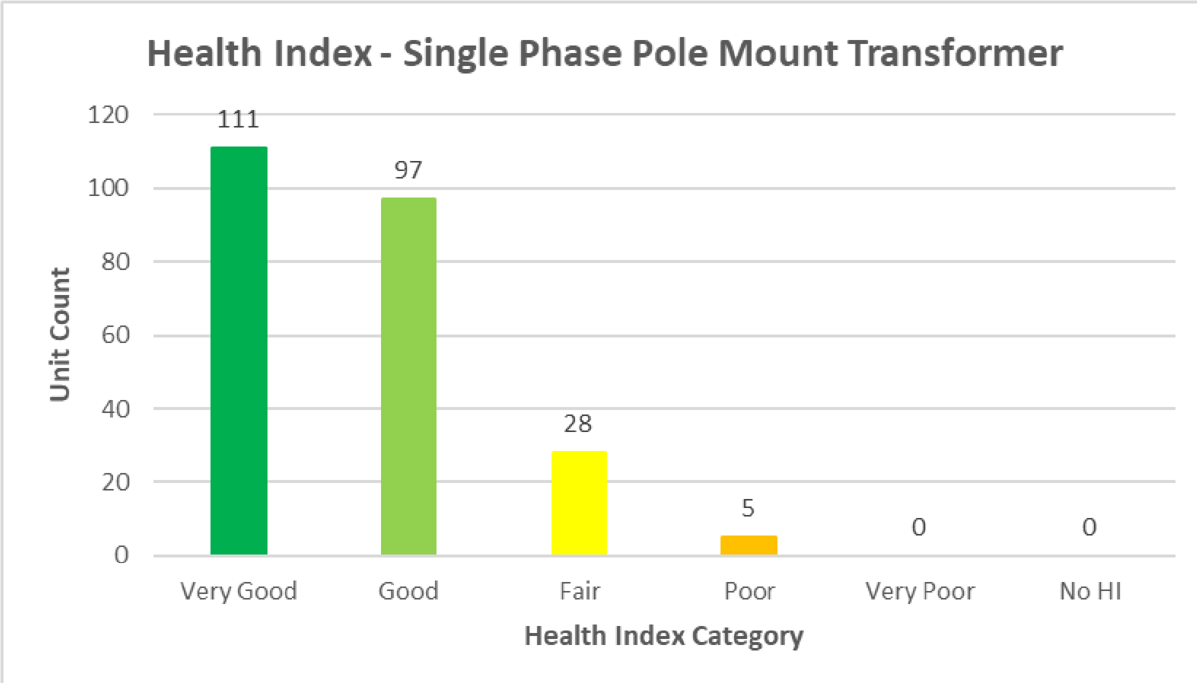


Figure 3-9: Single-phase Pole Mount Transformer HI Results

Three Phase Pole Mount Transformers

CWH owns 56 three-phase pole mount transformers within its service territory. The installation dates were known for the entire three-phase pole mount transformer population. A valid HI was calculated for all the three-phase overhead transformers. As can be seen in Figure 3-10, most three-phase pole mount transformers are in a Very Good or Good condition. Only two three-phase pole mount transformers are considered to be in Poor condition.

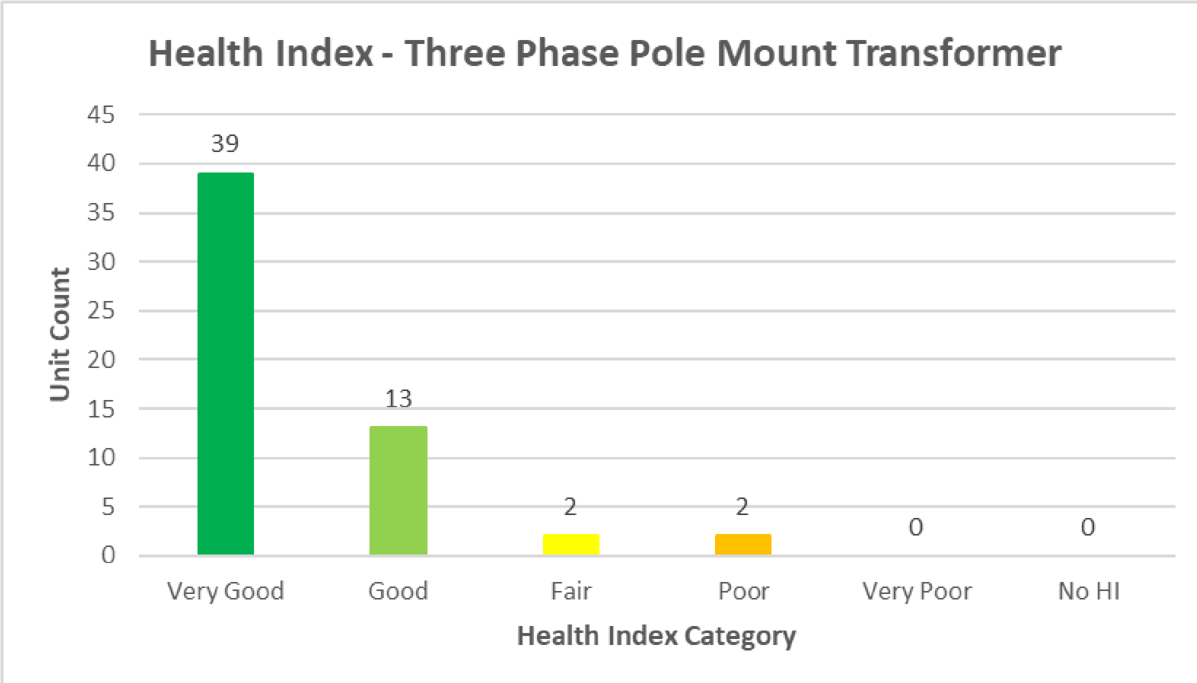


Figure 3-10: Three-phase Pole Mount Transformer HI Results

Single Phase Pad Mount Transformers
CWH owns 466 single-phase pad mount transformers within its service territory. Installation dates were provided for the entire asset population. As illustrated in Figure 3-11, most of the single-phase pad mount transformer population are in Very Good or Good condition.

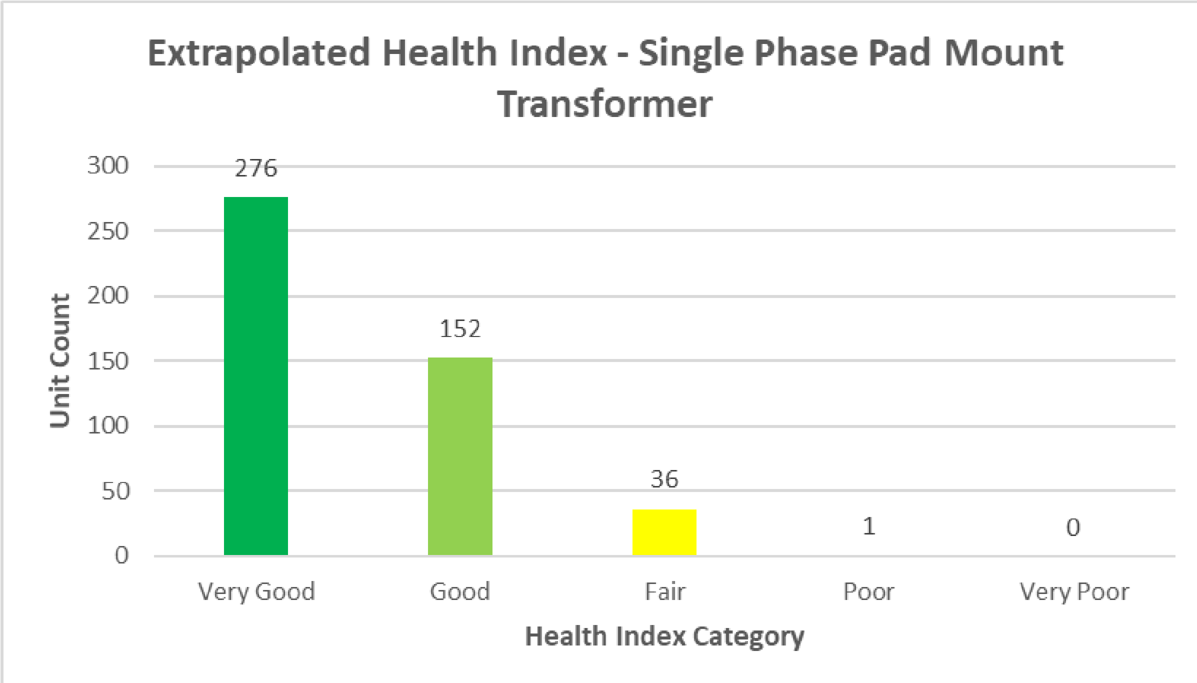


Figure 3-11: Extrapolated Single-phase Pad Mount Transformers HI Results

Three Phase Pad Mount Transformers

CWH owns 113 three-phase pad mount transformers within its service territory. Installation dates were provided for the entire asset population. As illustrated in Figure 3-12, most of the three-phase pad mount transformer population are in Very Good or Good condition.

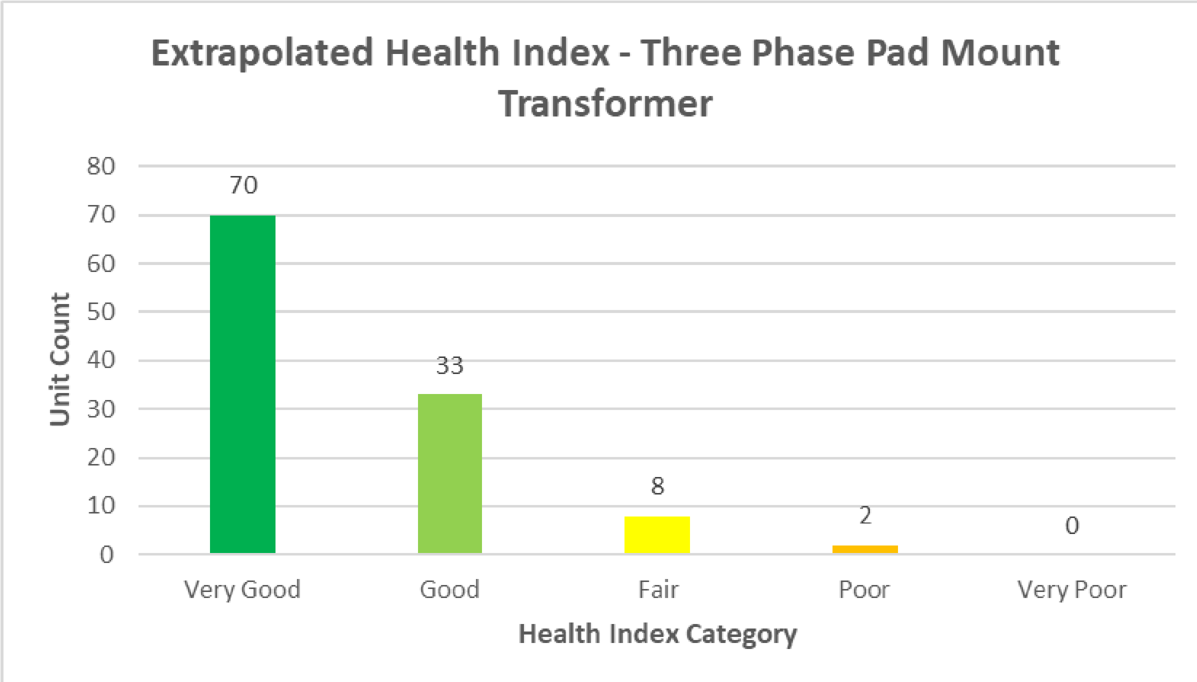


Figure 3-12: Extrapolated Three-phase Pad Mount Transformers HI Results

Distribution Switches

CWH owns 379 distribution switches within its service territory. Nearly the entirety of the distribution switches' population (99%) has known installation dates. For assets with unknown installation dates, the assumption made was to use the average age of distribution switches with known installation dates. As shown in Figure 3-13, most switches are in Very Good or Good condition, with 16% of distribution switches in Fair condition. Only 1% of switches are in Poor or Very Poor condition.

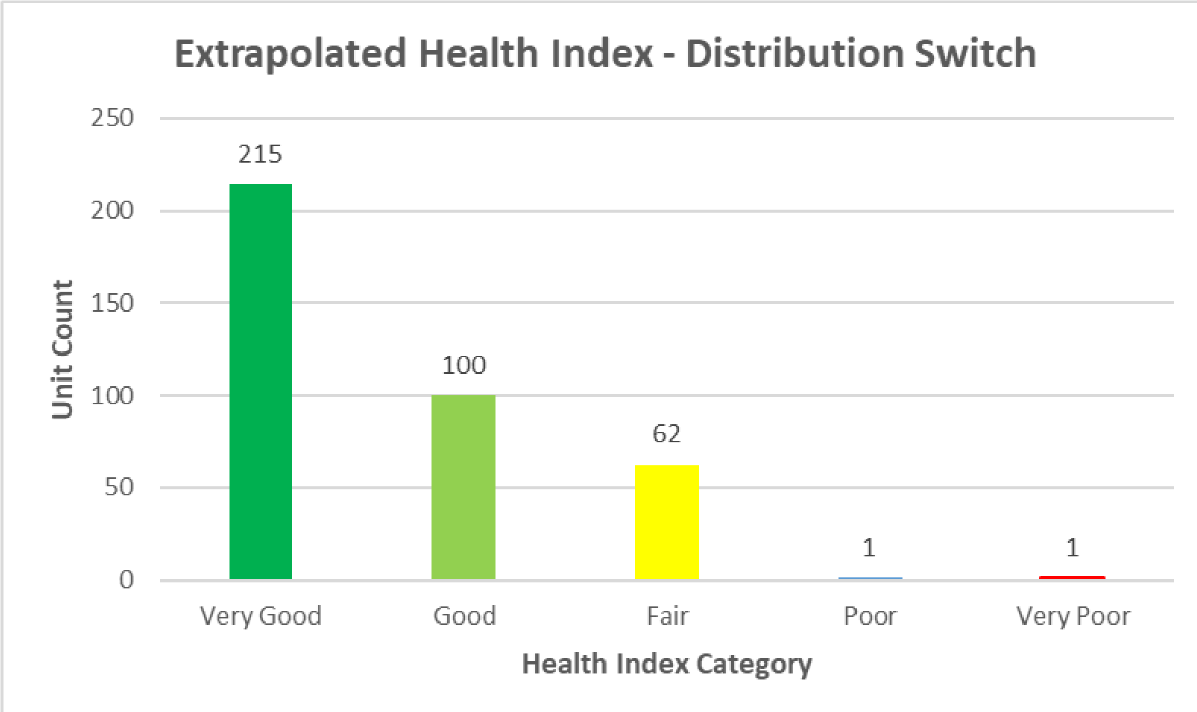


Figure 3-13: Extrapolated Distribution Switch HI Results

Power Transformers

Power transformers are key station assets owned by CWH that are used to step down the voltage from the 44-kV sub-transmission system to distribution levels. CWH owns six power transformers. The HI distribution for the in-service power transformers is presented in Figure 3-14. All the power transformers are in Very Good or Good condition. The average HI of power transformers is 82%, which is considered Good. For the power transformer that a HI could not be calculated, this asset was installed in 2019 and has not had a full inspection and maintenance performed yet. However, as it is a relatively new asset it could be considered as being in Very Good condition.

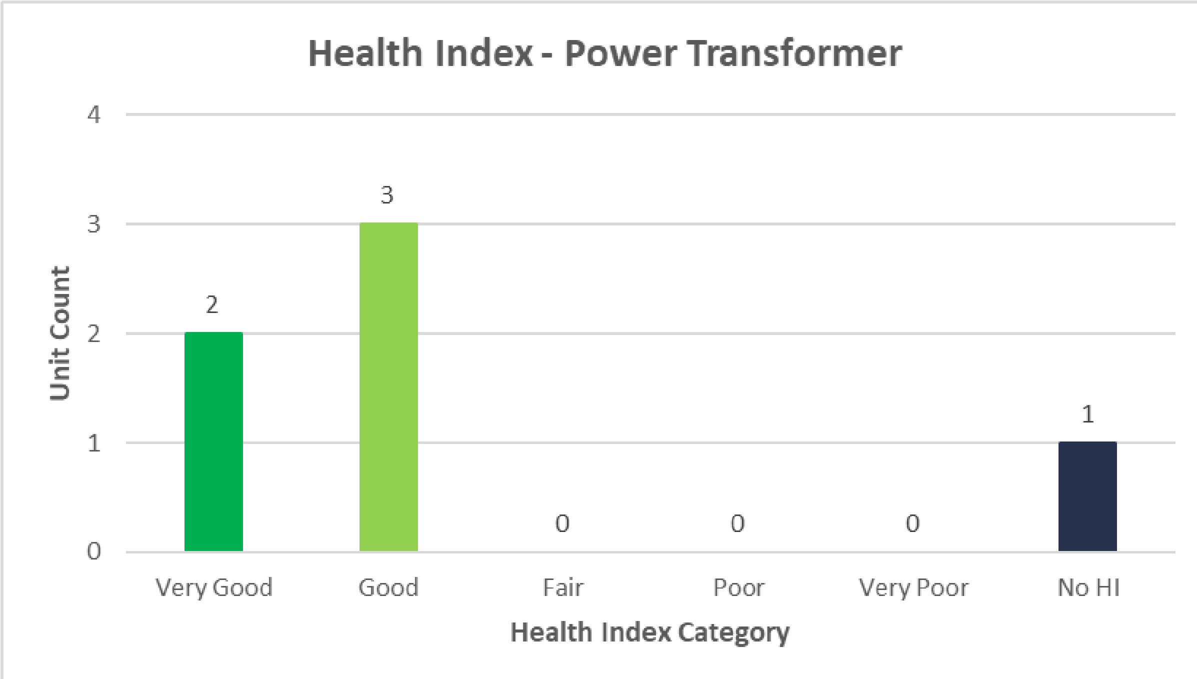


Figure 3-14: Power Transformer HI Results

Station Switchgear

Station switchgear consists of breakers, fuses, and switches that control and regulate the current flowing through the distribution system. During a fault, the switchgear can isolate and clear the fault. It is also used to de-energize equipment during maintenance and testing. CWH owns five station 4.16kV switchgears across five of their six stations. The HI distribution of station switchgear is presented in Figure 3-15. Two out of the three switchgears with a valid HI were assessed to be in Very Good condition, while the remaining switchgear was assessed to be in Good condition. The remaining 2 switchgears do not have a HI calculated due to insufficient data to be able to calculate an accurate HI. However, based on the age of these two switchgears being similar to the three switchgears with calculated HI, it could be surmised that they are in Very Good/Good condition.

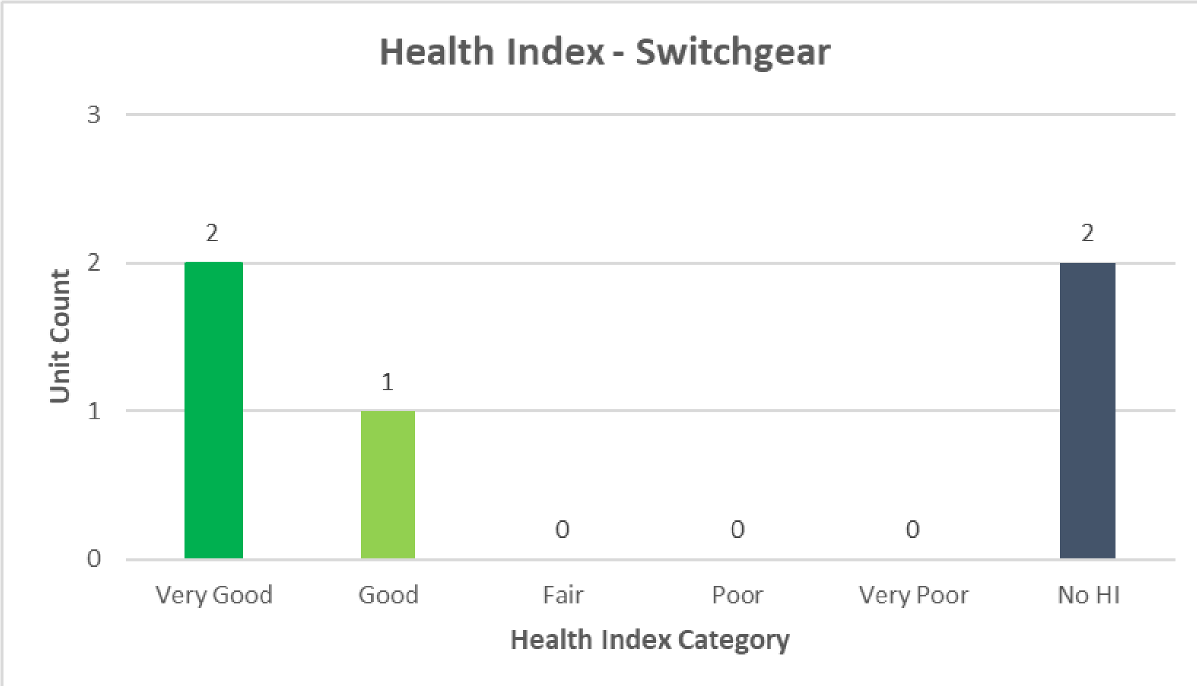


Figure 3-15: Switchgear HI Results

Reclosers

Reclosers are electrical devices that operate automatically during a fault. All CWH's stations, except Elora MS-2, have G&W Viper St vacuum reclosers in pad mount whereas Elora MS-2 has Nova-TS single reclosers. The reclosers protect other electrical assets from damage due to short-circuit current. CWH has 24 reclosers within its stations. A valid HI was calculated for 75% of the total population, as shown in Figure 3-16. Fifteen of the eighteen reclosers with a valid HI are in Very Good condition, while the remaining three are in Good condition.

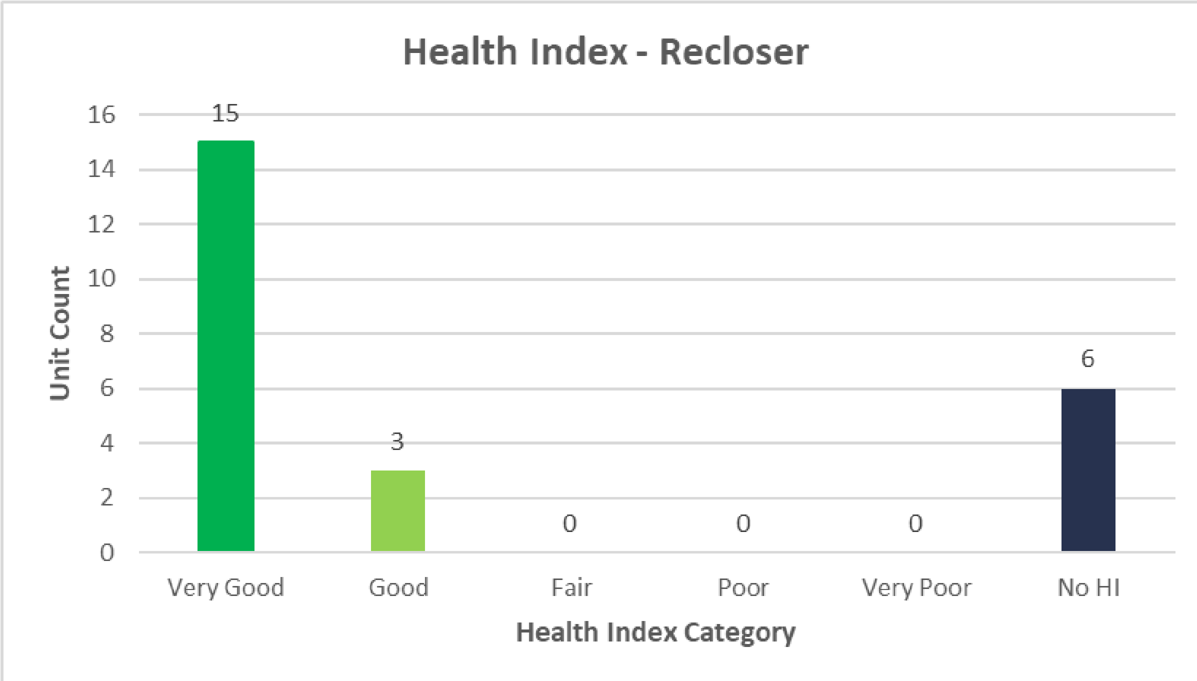


Figure 3-16: Recloser HI Results

Stations Switches (44 kV)

Station switches provide isolation and can make or break load. This ACA includes the 44 kV station switches. CWH owns six 44 kV station switches within its stations. The HI distribution for in-service 44 kV station switches is presented in Figure 3-17. Two 44 kV station switches have valid HI's, one of which is deemed to be in Good condition while the other is in Very Good condition. Four switches could not have a valid HI calculated due to insufficient data associated with these assets. 3 of these switches were installed new during station rebuilds in 2013, 2014, and 2019. The remaining 3 station switches were thoroughly maintained during station rebuilds in 2015 and 2016. CWH will gather further data for station switches during maintenance activities to enable a valid HI to be calculated in the future.

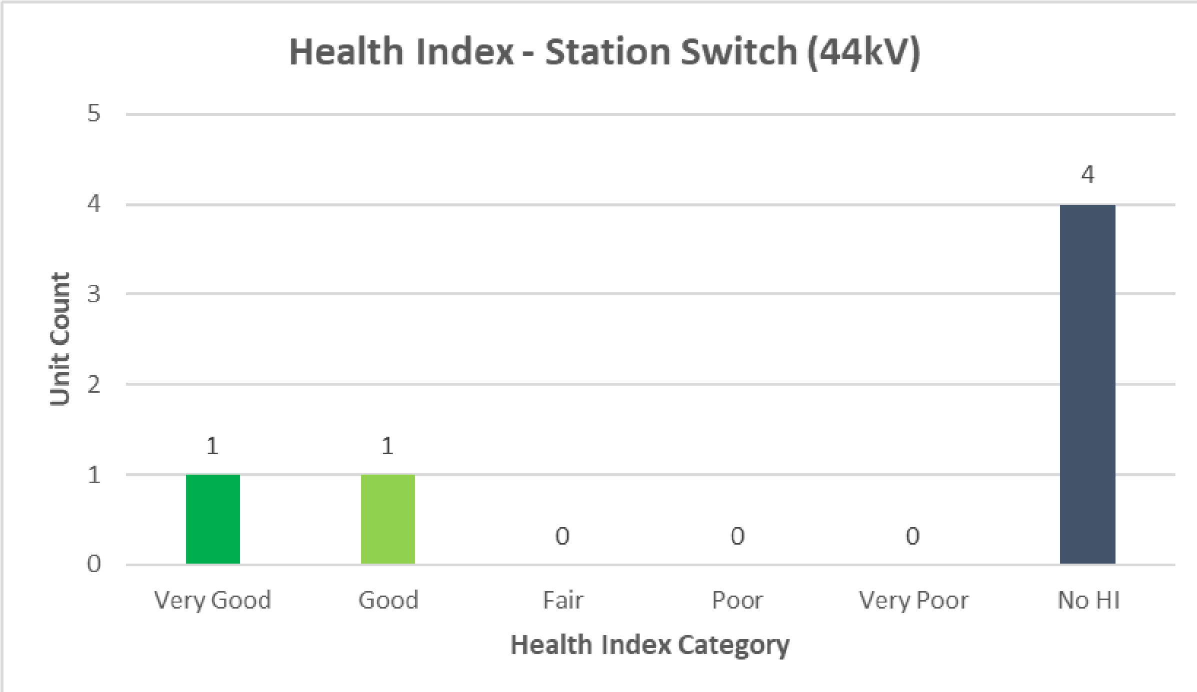


Figure 3-17: Station Switches HI Results

Station Service Transformers

Station service transformers supply power to auxiliary equipment in the station including lights and security systems. CWH owns six station service transformers. The HI distribution for the in-service station service transformer is presented in Figure 3-18. Three station service transformers' conditions could be assessed, one of which was considered to be in Good condition while the other two were deemed Fair. Three station service transformers could not have a valid HI calculated due to insufficient data associated with these assets. All station service transformers were installed new during each station rebuild in the years from 2012 to 2016, further to this all stations have a secondary connection to the distribution system as a backup power supply during station outages. CWH will gather further data for station service transformers to enable a valid HI to be calculated in the future.

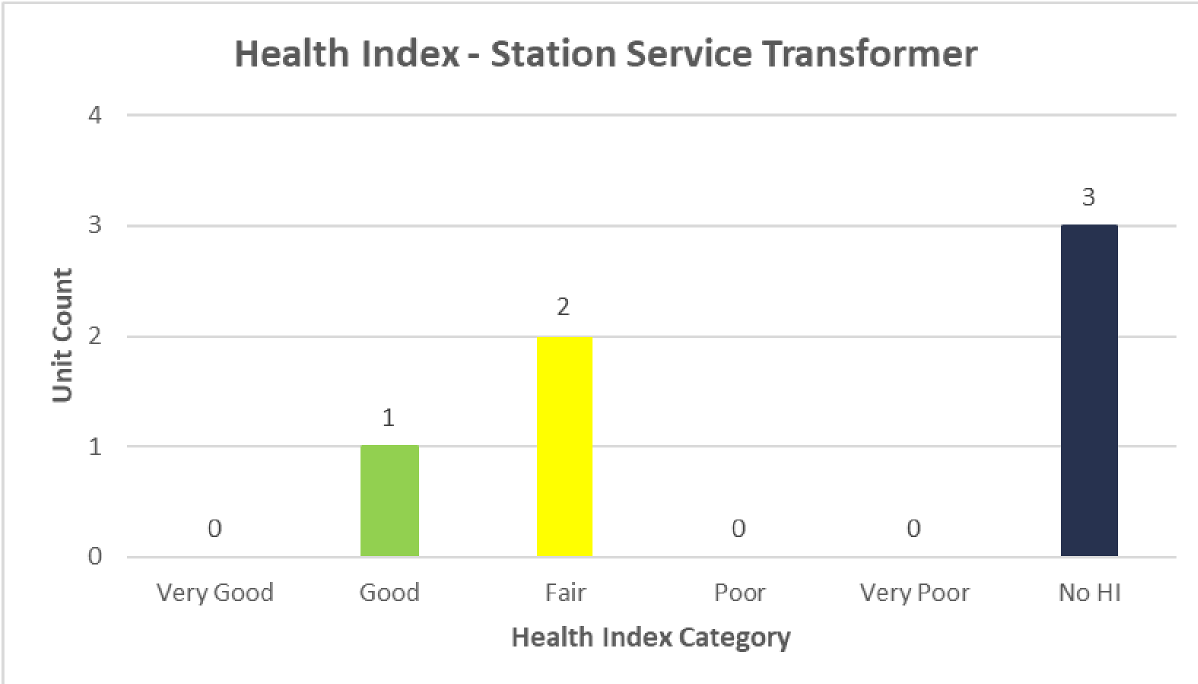


Figure 3-18: Station Service Transformer HI Results

Lightning Arresters

Lightning arresters are used in stations to protect electric systems from the damaging effects of lightning. CWH has 18 lightning arresters within their stations. Of the eighteen lightning arresters owned by CWH, twelve had valid HI's. Eleven were considered to be in Very Good condition while one was considered to be in Good condition. The HI results for lightning arresters can be seen in Figure 3-19. Six lightning arrestors could not have a valid HI calculated due to insufficient data associated with these assets. CWH will gather further data for these 6 lightning arrestors to enable a valid HI to be calculated in the future.

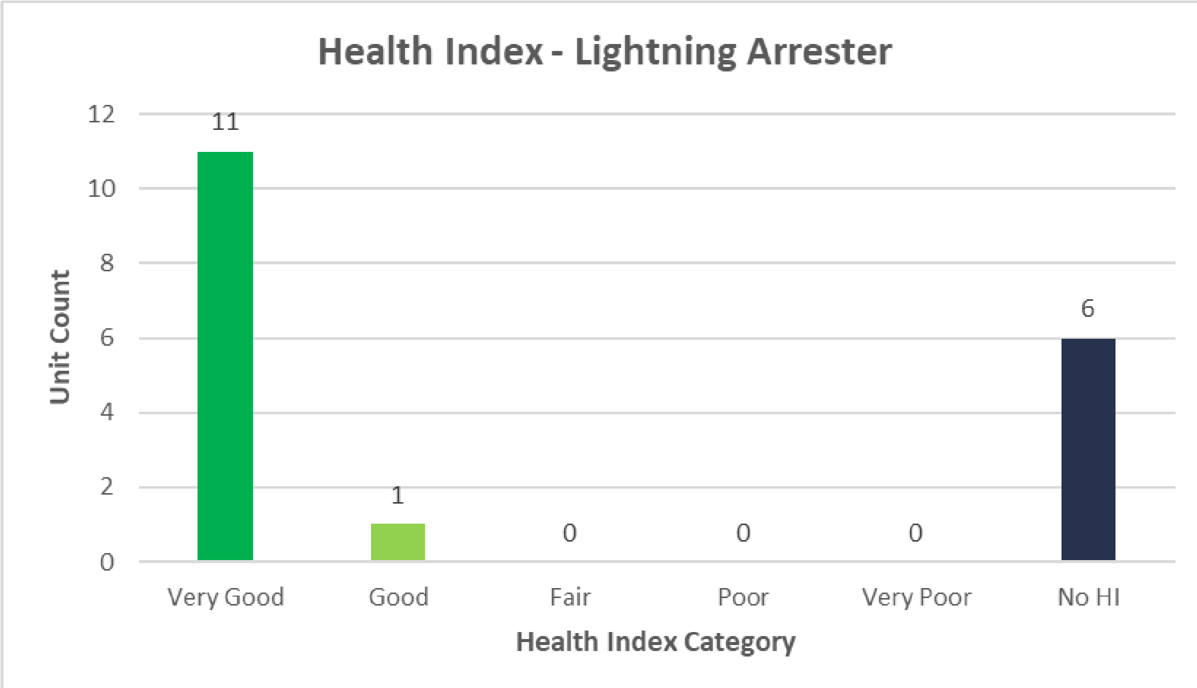


Figure 3-19: Lightning Arrester HI Results

Protection Relays

The function of protection relays in distribution systems is to detect abnormal operating conditions and initiate a recloser trip to isolate faulty circuits from healthy circuits. Protection relays obtain their input from instrument transformers, process the information, and automatically take corrective action with adequate speed and selectivity. CWH operates 18 protection relays among their stations. Eleven of eighteen protection relays have a valid calculated HI, all of which were placed in the Very Good category. Figure 3-20 presents the HI distribution for protection relays. Seven protection relays could not have a valid HI calculated due to insufficient data associated with these assets. CWH will gather further data for these 7 protection relays to enable a valid HI to be calculated in the future.

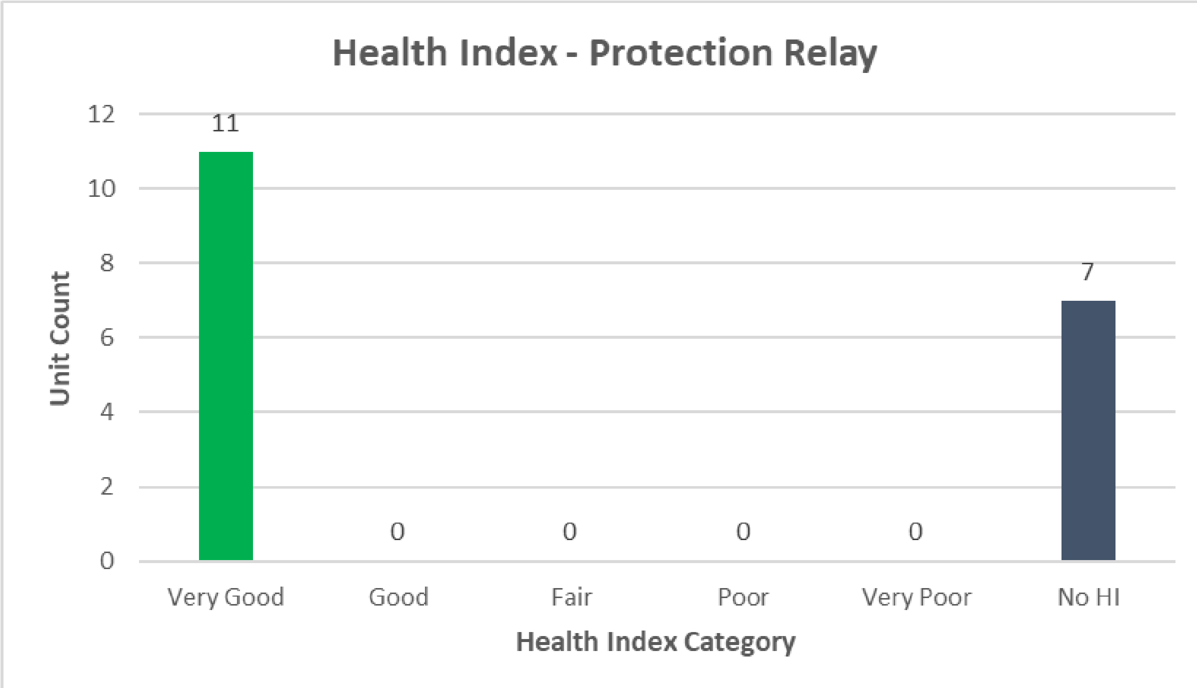


Figure 3-20: Protection Relays HI Results

Station Power Cables

Station power cables are a key part of the medium-voltage system. Station power cables could either be cables that carry the entire phase load for the feeder, connect the feeders to the ground, or are connected to power transformers. CWH owns 29 station power cables. The HI for station power cables is presented in Figure 3-21. The entire population of power cables has a valid HI. Of the 29 station power cables with a valid HI, 16 are in Very Good condition, seven are in good condition, and the remaining six are in Fair condition.

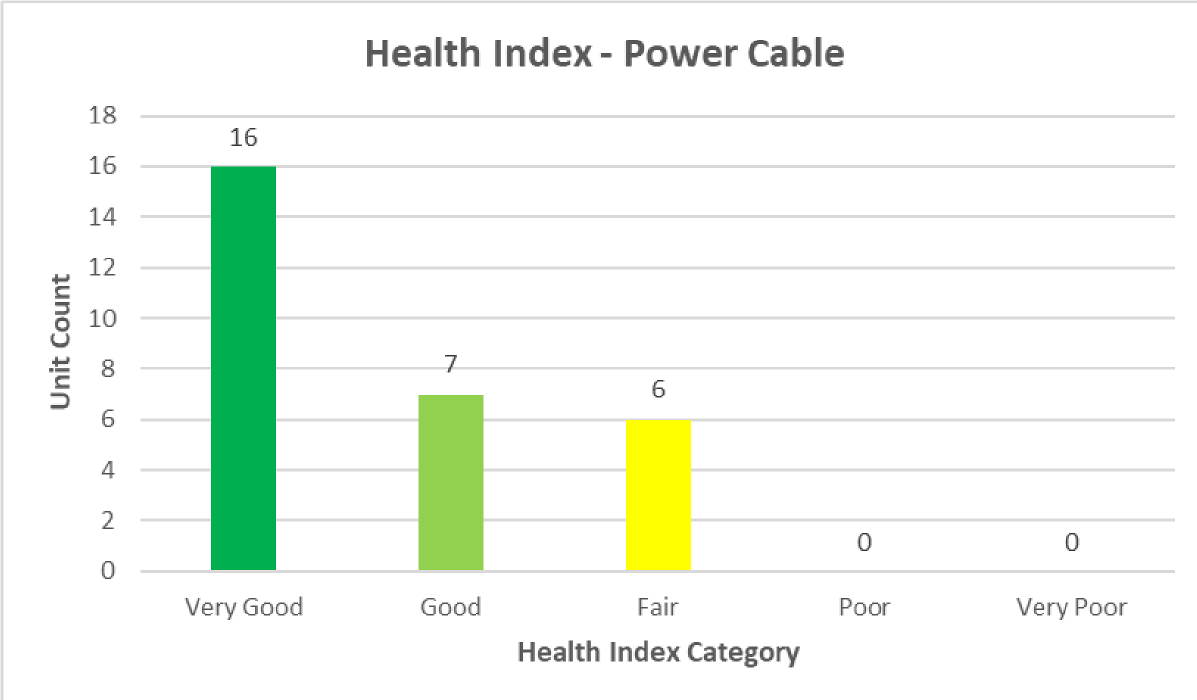


Figure 3-21: Station Power Cables HI Results

Station Facilities
The integrity of the station building, fence, gate, and yard contribute to the safety of the station and the performance of the assets therein. CWH owns six stations within its service territory. The HI distribution for station facilities is presented in Figure 3-22. All of the population are in Very Good condition.

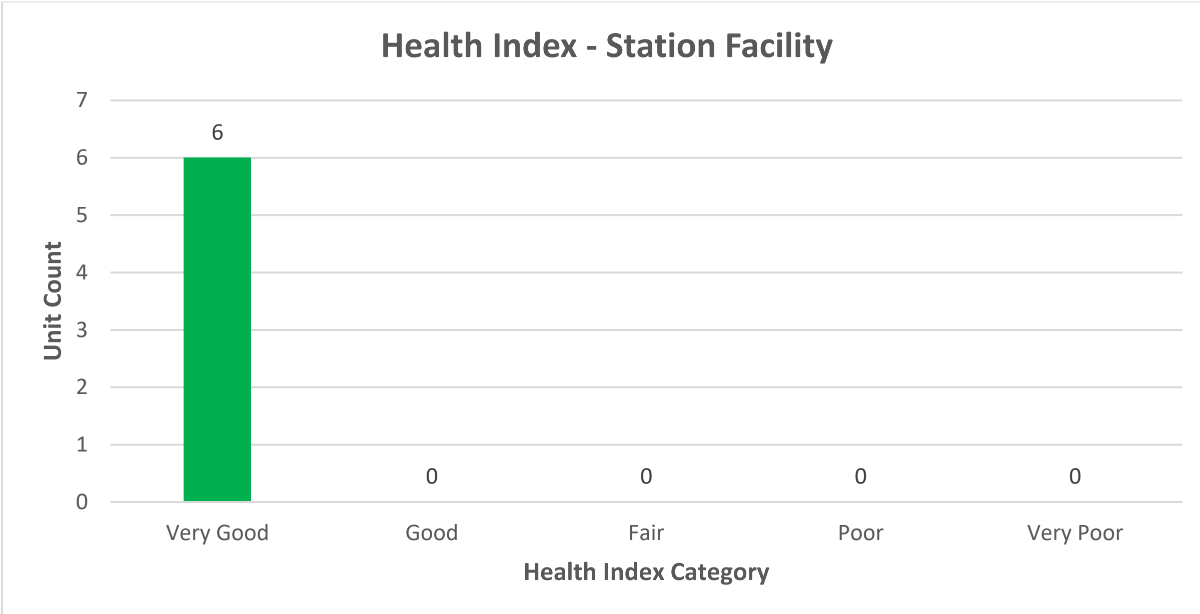


Figure 3-22: Station Facility HI Results

5.3.2.2.3 Asset Risks

CWH's AM strategy covers the full life cycle of a fixed asset, from the preparation of the asset specification and installation standards to the scope and frequency of preventative maintenance during the asset's service life and finally to the determination of the assets end-of-life and retirement from service. At each stage of an asset's life cycle, decisions are made to achieve the right balance between achieving maximum life expectancy, highest operating performance, lowest initial investment (capital costs), and lowest operating costs.

Asset risks (probability of failure x consequence of failure) are considered as part of CWH's prioritization process and are used to determine the prioritized list of capital projects and programs over the forecast period.

5.3.2.3 Transmission or High Voltage Assets

CWH has no transmission assets.

5.3.2.4 Host & Embedded Distributors

CWH is an entirely embedded Distributor to Hydro One with no Transmission assets.

5.3.3 Asset Lifecycle Optimization Policies and Practices

5.3.3.1 Asset Replacement and Refurbishment Policy

The lifecycle optimization policies and procedures employed for preparation of this DSP, including the optimization of the capital investment plan as well as optimization of the preventative maintenance practices is described in the following sections.

CWH's asset replacement practices include a combination of proactive and reactive asset replacements. A number of factors inform the decision to replace an asset, including asset condition, risk of failure, impact of failure (safety, reliability, environmental), number of customers or load impacted, asset performance, obsolescence, and industry standards. Proactive replacement is utilized where assets have deteriorated to the point where the risk of failure is high, and the impact of that failure poses a significant safety, reliability, or other risk to CWH, its customers and the public. For example, if a station power transformer experienced a catastrophic failure, it could result in thousands of customers being interrupted for a long period of time and could pose significant safety risks to the public if an explosion or fire occurred. Reactive replacement is utilized where asset failure poses little to no impact to CWH's asset management objectives. Table 3-11 and Table 3-12. below provides a summary of the maintenance activities as well as refurbishment/ replacement strategies of CWH's distribution and station assets respectively.

Table 3-11: Summary of Lifecycle Optimization Practices for Key Distribution Assets

Asset Class	Inspection Activities	Maintenance/ Testing Activities	Refurbishment Activities	Current Replacement
Wood Poles	Visual Inspection on a 3-year cycle.	Pole Testing & Inspection Program	Repair work is done if visual inspection deems it necessary	Proactive
Concrete Poles	Visual Inspection on a 3-year cycle.	None	Repair work is done if visual inspection deems it necessary	Proactive
Overhead Conductor	Visual Inspection on a 3-year cycle.	- Line Clearing Program - Infrared Inspection Program	Repair work is done if visual inspection deems it necessary	Reactive
Underground Cable	None.	Infrared Inspection Program	Repair work is done if visual inspection deems it necessary	Proactive
Pole mount Transformers	Visual Inspection on a 3-year cycle.	Infrared Inspection Program	Repair work is done if visual inspection deems it necessary	Reactive
Pad mount Transformers	Visual Inspection on a 3-year cycle.	Pad mount Equipment Refinishing Program	Repair work is done if visual inspection deems it necessary	Proactive
Switches	Visual Inspection on a 3-year cycle.	Infrared Inspection Program	Repair work is done if visual inspection deems it necessary	Reactive

Table 3-12: Summary of Lifecycle Optimization Practices for Key Stations Assets

Asset Class	Inspection Activities	Maintenance/ Testing Activities	Refurbishment Activities	Current Replacement
Power Transformers	Completed monthly	Preventive Maintenance	Repair work is done if visual inspection deems it necessary	Proactive
Switchgears	Completed monthly	None	Repair work is done if visual inspection deems it necessary	Proactive
Reclosers	Completed monthly	None	Repair work is done if visual inspection deems it necessary	Proactive
Station Switches (44kV)	Completed monthly	Preventive Maintenance	Repair work is done if visual inspection deems it necessary	Proactive
Service Transformers	Completed monthly	None	Repair work is done if visual inspection deems it necessary	Proactive
Lightning Arresters	Completed monthly	Preventive Maintenance	Repair work is done if visual inspection deems it necessary	Proactive
Relay	Completed monthly	Preventive Maintenance	Repair work is done if visual inspection deems it necessary	Proactive
Power Cable	Completed monthly	None	Repair work is done if visual inspection deems it necessary	Proactive
Station Yard	Completed monthly	Preventive Maintenance	Repair work is done if visual inspection deems it necessary	Proactive

5.3.3.2 Description of Maintenance and Inspection Practices

Inspection and maintenance activities are a critical component of CWH's asset management process. Inspection programs help determine asset conditions, identify risk to safety, reliability and/or the environment and subsequently address findings through prudent capital, operations, and maintenance expenditures, as necessary. CWH has a formal documented distribution maintenance plan (DMP) it follows which details its annual inspection program of distribution system assets in compliance with Appendix C of the DSC. CWH completes inspections as prescribed in the DSC with an approach and frequency that addresses public safety and cost-efficiency. The inspection and maintenance cycles and patrol inspections for each of the major distribution assets are presented in Table 3-13. CWH's DMP is also included in Appendix E.

Table 3-13: Summary of CWH's Inspection and Maintenance Activities

Asset Class	Category	Activity	Frequency
Wood Poles	Inspection	Visual inspection	3-year cycle
		Pole Testing & Inspection Program	400 poles/year
Concrete Poles	Inspection	Visual inspection	3-year cycle
Overhead Conductor	Inspection	Visual inspection	3-year cycle
		Infrared Inspection Program	Annually
	Preventive maintenance	Line Clearing Program	2-year cycle
Underground Cable	Inspection	Infrared Inspection Program	Annually
Pole mount Transformers	Inspection	Visual inspection	3-year cycle
		Infrared Inspection Program	Annually
Pad mount Transformers	Inspection	Visual inspection	3-year cycle
	Preventive maintenance	Pad mount Equipment Refinishing Program	45 units/year
Switches	Inspection	Visual inspection	3-year cycle
		Infrared Inspection Program	Annually
Power Transformers	Inspection	Visual inspection	Monthly
	Preventive maintenance	Substation Preventive Maintenance Program	6-year cycle
Switchgears	Inspection	Visual inspection	Monthly
Reclosers	Inspection	Visual inspection	Monthly
Station Switches (44 kV)	Inspection	Visual inspection	Monthly
	Preventive maintenance	Substation Preventive Maintenance Program	6-year cycle
Service Transformers	Inspection	Visual inspection	Monthly
Lightning Arresters	Inspection	Visual inspection	Monthly
	Preventive maintenance	Substation Preventive Maintenance Program	6-year cycle
Relay	Inspection	Visual inspection	Monthly
	Preventive maintenance	Substation Preventive	6-year cycle

Asset Class	Category	Activity	Frequency
		Maintenance Program	
Power Cable	Inspection	Visual inspection	Monthly
Station Yard	Inspection	Visual inspection	Monthly
	Preventive maintenance	Substation Preventive Maintenance Program	6-year cycle

After the inspections are carried out, the information is processed which allows CWH to manage and complete all follow-up work within reasonable periods. The information is appropriately retained and is available for future review or verification should it be needed.

Asset Lifecycle Risk Management Policies and Practices
As discussed earlier, CWH employs two main approaches to managing its assets, reactive and proactive. This combination of methods, along with the prescribed type and frequency of inspection and maintenance, allows CWH to actively manage its assets such that it can maintain a safe and reliable supply to its customers, whilst identifying assets that may require refurbishment or replacement. While doing this by employing both reactive and proactive methods, CWH is managing its costs in a manner that allows it to manage any bill impacts to its customers.

Wood Poles
Wood pole visual inspections are part of the Overhead Visual Inspection Program. The Overhead Visual Inspection Program requires the entire overhead system to be reviewed every three years. The expected outcome of the program is to identify structural and electrical problems and hazards. The results of the visual inspection are used to determine if any repair work is required. The expectation is that the corrective action will be completed in the year that the inspection was completed. The following items regarding wood poles are inspected:

- Bent, cracked, or broken poles
- Excessive surface wear or scaling
- Loose, cracked or broken cross arms and brackets
- Woodpecker or insect damage, bird nests
- Loose or unattached guy wires or stubs
- Guy strain insulators pulled apart or broken
- Guy guards out of position or missing
- Grading changes, or washouts
- Indications of burning

Wood poles are also a part of the Pole Testing & Inspection Program. The program covers the inspection of CWH owned poles as well as associated hardware attachments, third party plant, and vegetation control. The program also covers the testing of CWH owned wood poles only. The program allows a minimum of 400 poles to be tested each year.

The goal of the program is to identify significant decay and degradation of wood fibers. The results of pole testing are used to determine if any repair work is required.

Concrete Poles

Concrete pole visual inspections are part of the Overhead Visual Inspection Program. The Overhead Visual Inspection Program requires the entire overhead system to be reviewed every three years. The expected outcome of the program is to identify structural and electrical problems and hazards. The results of the visual inspection are used to determine if any repair work is required. The expectation is that the corrective action will be completed in the year that the inspection was completed. The following items regarding concrete poles are inspected:

- Bent, cracked, or broken poles
- Excessive surface wear or scaling
- Loose, cracked or broken cross arms and brackets
- Woodpecker or insect damage, bird nests
- Loose or unattached guy wires or stubs
- Guy strain insulators pulled apart or broken
- Guy guards out of position or missing
- Grading changes, or washouts
- Indications of burning

Overhead Conductors

Overhead conductor visual inspections are part of the Overhead Visual Inspection Program. The Overhead Visual Inspection Program requires the entire overhead system to be reviewed every three years. The expected outcome of the program is to identify structural and electrical problems and hazards. The results of the visual inspection are used to determine if any repair work is required. The expectation is that the corrective action will be completed in the year that the inspection was completed. The following items regarding overhead conductors are inspected:

- Low conductor clearance
- Broken/frayed conductors or tie wires
- Exposed broken ground conductors
- Broken strands, bird caging, and excessive or inadequate sag
- Insulation fraying on secondary

The Line Clearing Program deals with maintaining overhead lines free from interference of vegetation and other obstructions. Line clearing will be completed in Fergus on all overhead lines in even years and completed in Elora in odd years as required. The program includes work on:

- All 3 phase and single-phase Primary Feeders both express and radial feeds (44 kV and 4.16 kV)
- Roadside secondary bus
- Rear lot construction secondary bus

The Infrared Inspection Program covers the inspection of overhead conductors. All overhead conductors will be inspected annually for the purpose of this program. The objective of infrared inspections is to identify thermal anomaly conditions on the electrical distribution equipment. The results of the infrared inspection are used to schedule repair work. It is expected that corrective actions will be completed within 12 months from the date that the inspection was completed.

Underground Cables

The Infrared Inspection Program covers the inspection of underground cables as they rise to connect to the overhead system. All underground cables will be inspected annually for the purpose of this program. The objective of infrared inspections is to identify thermal anomaly conditions on the electrical distribution equipment. The results of the infrared inspection are used to schedule repair work. It is expected that corrective actions will be completed within 12 months from the date that the inspection was completed.

Pole mount Transformers

Pole mount transformer visual inspections are part of the Overhead Visual Inspection Program. The Overhead Visual Inspection Program requires the entire overhead system to be reviewed every three years. The expected outcome of the program is to identify structural and electrical problems and hazards. The results of the visual inspection are used to determine if any repair work is required. The expectation is that the corrective action will be completed in the year that the inspection was completed. The following items regarding pole mount transformers are inspected:

- Paint condition and corrosion
- Phase indicators and unit numbers match operating map (where used)
- Leaking oil
- Flashed or cracked insulators
- Contamination/discolouration of bushings
- Ground lead attachments
- Damaged disconnect switches or lightning arresters
- Ground wire on arresters unattached

The Infrared Inspection Program covers the inspection of pole mounted transformers. All pole mount transformers will be inspected annually for the purpose of this program. The objective of infrared inspections is to identify thermal anomaly conditions on the electrical distribution equipment. The results of the infrared inspection are used to schedule repair work. It is expected that corrective actions will be completed within 12 months from the date that the inspection was completed.

Pad-mount Transformers

Pad mount transformer visual inspections are part of the Underground Visual Inspection Program. The Underground Visual Inspection Program requires the entire underground system to be reviewed every three years. The expected outcome of the program is to identify structural and electrical problems and hazards. The results of the visual inspection are used to determine if any repair work is required. The expectation is that the corrective action will be completed in the year that the inspection was completed. The following items regarding pad mount transformers are inspected:

- Paint condition and corrosion

- Placement on pad or vault
- Check for lock and penta bolt in place or damage
- Grading changes
- Access changes (Shrubs, trees, etc.)
- Phase indicators and unit numbers match operating map (where used)
- Leaking oil
- Lid damage, missing bolts, cabinet damage
- Cable connections
- Ground connections
- Nomenclature
- Animal nests/damage
- General conditions

The Pad-Mount Equipment Refinishing Program involves dealing with refinishing pad-mount transformers and switchgears. CWH, through a contractor, will refinish approximately 35 pieces of equipment annually, within the approved budget. The objective of the program is to remove damaged paint, remove surface rust by sanding/grinding/sand blasting, and prime and paint the exterior of the equipment.

Switches

Switch visual inspections are part of the Overhead Visual Inspection Program. The Overhead Visual Inspection Program requires the entire overhead system to be reviewed every three years. The expected outcome of the program is to identify structural and electrical problems and hazards. The results of the visual inspection are used to determine if any repair work is required. The expectation is that the corrective action will be completed in the year that the inspection was completed. The following items regarding switches are inspected:

- Bent, broken bushings and cut-outs
- Damaged lightning arresters
- Ground wire on arresters unattached

The Infrared Inspection Program covers the inspection of switches. All switches will be inspected annually for the purpose of this program. The objective of infrared inspections is to identify thermal anomaly conditions on the electrical distribution equipment. The results of the infrared inspection are used to schedule repair work. It is expected that corrective actions will be completed within 12 months from the date that the inspection was completed.

Power Transformers

Visual Inspections for power transformers are covered by the Substations Visual Inspection Program. Station inspections are performed every month for all six of CWH's stations. These visual inspections are expected to identify structural and electrical hazards. The results of the visual inspections are utilized to schedule any required repair work. The corrective action is done in the same year the inspection is completed. The following items regarding power transformers are inspected:

- Paint condition and corrosion

- Phase indicators and unit numbers match operating map (where used)
- Leaking oil
- Flashed or cracked insulators
- Contamination/discolouration of bushings
- Ground lead attachments

Power transformers are also part of the Substations Preventive Maintenance program. Through this program, preventive maintenance is performed for one station every year, meaning that it is performed on the same substation once every six years. As part of the program, the following tests are performed on power transformers:

- Dielectric absorption (insulation resistance test)
- Capacitance and dissipation factor
- Turns ratio rest
- Winding resistance test

Switchgears

Visual Inspections for switchgears are covered by the Substations Visual Inspection Program. Station inspections are performed every month for all six of CWH's stations. These visual inspections are expected to identify structural and electrical hazards. The results of the visual inspections are utilized to schedule any required repair work. The corrective action is done in the same year the inspection is completed. The following items regarding switchgears are inspected:

- Paint condition and corrosion
- Placement on pad or vault
- Check for locks
- Grading changes
- Leaking oil

Reclosers

Visual Inspections for reclosers are covered by the Substations Visual Inspection Program. Station inspections are performed every month for all six of CWH's stations. These visual inspections are expected to identify structural and electrical hazards. The results of the visual inspections are utilized to schedule any required repair work. The corrective action is done in the same year the inspection is completed. The following items regarding reclosers are inspected:

- Bent, broken bushings and cut-outs
- Damaged lightning arresters
- Ground wire on arresters unattached

Station Switches (44 kV)

Visual Inspections for station switches are covered by the Substations Visual Inspection Program. Station inspections are performed every month for all six of CWH's stations. These visual inspections are expected to identify structural and electrical hazards. The results of the visual inspections are utilized to schedule any required repair work. The corrective action is done in the same year the inspection is completed. The following items regarding station switches are inspected:

- Bent, broken bushings and cut-outs
- Damaged lightning arresters
- Ground wire on arresters unattached

Station switches are also part of the Substations Preventive Maintenance program. Through this program, preventive maintenance is performed for one station every year, meaning that it is performed on the same substation once every six years. In addition to cleaning and servicing the components of switches, as part of the program, the following tests are performed on station switches:

- Contact resistance
- Insulation resistance

Service Transformers
Visual Inspections for service transformers are covered by the Substations Visual Inspection Program. Station inspections are performed every month for all six of CWH's stations. These visual inspections are expected to identify structural and electrical hazards. The results of the visual inspections are utilized to schedule any required repair work.

Lightning Arresters
Lightning arresters are part of the Substations Preventive Maintenance program. Through this program, preventive maintenance is performed for one station every year, meaning that it is performed on the same substation once every six years.

Protection Relays
Visual Inspections for relays are covered by the Substations Visual Inspection Program. Station inspections are performed every month for all six of CWH's stations. These visual inspections are expected to identify structural and electrical hazards. The results of the visual inspections are utilized to schedule any required repair work.

Station Power Cables
Visual Inspections for power cables are covered by the Substations Visual Inspection Program. Station inspections are performed every month for all six of CWH's stations. These visual inspections are expected to identify structural and electrical hazards. The results of the visual inspections are utilized to schedule any required repair work.

Station Yards
Visual Inspections for station yards are covered by the Substations Visual Inspection Program. Station inspections are performed every month for all six of CWH's stations. These visual inspections are expected to identify structural and electrical hazards. The results of the visual inspections are utilized to schedule any required repair work. The corrective action is done in the same year the inspection is completed. The following items regarding station yards are inspected:

- Accessibility compromised
- Grade changes that could expose cable

- Leaning or broken "danger" trees in proximity of station
- Growth into line of "climbing" trees
- Vines or brush growth interference (line or fence clearance)
- Bird or animal tests

Station yards are also part of the Substations Preventive Maintenance program. Through this program, preventive maintenance is performed for one station every year, meaning that it is performed on the same substation once every six years. The following actions are taken to complete the preventive maintenance for station yards:

- Station grounding inspection
- Ground resistance test
- Enclosure inspection (to meet ESA requirements)
- Pull major weeds, etc. as required to meet ESA requirements

5.3.3.3 Processes and Tools to Forecast, Prioritize & Optimize System Renewal Spending

5.3.3.3.1 Forecasting

System Renewal projects are discretionary. The project needs for a particular period are supported by a multitude of factors, depending on the information available for each asset type. This could include a combination of asset inspection, individual asset performance, and condition information.

An ACA study was carried out by METSCO to establish the health and condition of distribution and substation assets in service. By considering all relevant information related to the assets' operating condition, the condition of all infrastructure assets was assessed and expressed on a normalized index in the form of an HI. The HI was related to the probability of failure values for each project, using a weighted average approach, as described in detail in Appendix D and each asset was assigned a health indicator expressed as "very good," "good," "fair," "poor," and "very poor." The resulting information from the ACA study was used to help forecast the renewal needs of CWH's assets over the forecast period. Additional details on the inputs and processes used to forecast System Renewal spending are included in sections 5.3.1.2 and 5.3.1.3 of this DSP.

5.3.3.3.2 Prioritization and Optimization

Discretionary System Renewal projects are selected and prioritized based on value and risk assessments for each project. Costs for the scope of work to mitigate risk in each project area are determined, using historical spend as well as factoring in new factors. Through careful evaluation of the risks, projects are prioritized for implementation to mitigate higher-level risks during this DSP implementation period, while deferring the projects with lower-level risks or risks that can be managed through alternative cost-effective mitigation measures.

The prioritized System Renewal investments are paced for implementation based on the funding available for asset renewal and by considering the resources required for project implementation for the type of work predominantly involved (OH, UG, or substations).

The continued performance of assets is also managed through CWH's capital investments and maintenance programs. CWH's inspection, maintenance, and testing practices described previously in section 5.3.3.1. support asset life cycle risk management by rectifying deficiencies to extend the lives of the assets and identifying the assets in the very worst condition for replacement. Information obtained through asset databases, maintenance and inspection records, and outage records is a critical input into prioritizing and optimizing which projects will bring the best value.

5.3.3.3.3 Strategies for Operating within Budget Envelopes

The proposed System Renewal projects over the forecast period were identified to keep power supply reliability from deteriorating below an acceptable level and were paced for implementation based on the funding available for asset renewal and by considering the resources required for project implementation for the type of work predominantly involved. Assets with the highest consequence of failure in service have been prioritized for renewal or rehabilitation during the next five years.

CWH completes investment planning on an annual basis to help inform any necessary budget adjustments for the following year. CWH understands that circumstances may change, and if needed, budgets can be re-prioritized depending on customer and system needs. For example, due to the non-discretionary nature of System Access projects, these projects will take priority if there are competing demands with System Renewal projects. Completing investment planning on an annual basis allows CWH to use the best available information to effectively plan for and manage the highest priority projects and programs over the forecast period while remaining within the approved budget envelopes.

5.3.3.3.4 Risks of Proceeding / Not Proceeding

Risk is factored into the selection and prioritization of capital expenditures during the prioritization process and is ultimately used to determine the prioritized list of capital projects and programs over the forecast period. It is at this stage of the process that CWH considered the risks associated with proceeding versus not proceeding with an individual capital expenditure and decides whether the capital expenditure is required during the forecast period or if it can be deferred.

Assets with unacceptably high-risk scores are monitored closely and plans are included in the project scope to alternatively maintain, refurbish, or replace the assets to reduce the risk to an acceptable level.

5.3.3.4 Important Changes to Life Optimization Policies and Practices since Last DSP Filing

Since its last filing, CWH has produced a formal documented distribution maintenance plan (DMP) it follows which details its annual inspection program of distribution system assets in compliance with Appendix C of the Distribution System Code. The DMP is reviewed and updated periodically by management, with the last update completed in December 2023.

5.3.4 System Capability Assessment for REG & DERs

CWH has no restricted feeders to connect REGs & DERs. CWH does not have any forecasted costs within the DSP timeframe to accommodate the connection of any REG or DER connections.

5.3.5 CDM Activities to Address System Needs

CWH considers CDM as part of its planning process to determine whether CDM can be considered a viable alternative to any of CWH's planned investments over the forecast period. CWH does not currently have any examples of any programs or activities that it will be undertaking in its forecast period. CWH will continue to assess and monitor this.

5.4 Capital Expenditure Plan

5.4.1 Capital Expenditure Summary

The capital expenditure summary provides a snapshot of CWH's capital and System O&M expenditures over the 2018–2029 DSP period. For summary purposes, the entire capital costs of individual projects and programs have been allocated to one of the four OEB investment categories based on the primary driver for the investment:

1. System Access
2. System Renewal
3. System Service
4. General Plant

The breakdown of plan versus actuals over the historical period, broken down by category, is provided in Table 4-1 and the forecast costs broken down by category are provided in Table 4-2.

Table 4-1: Historical Capital Expenditures and System O&M

Category	**Historical**																		**Bridge**		
	2018			**2019**			**2020**			**2021**			**2022**			**2023**			**2024**		
	Plan.	**Act.**	**Var.**	**Plan.**	**Act.**	**Var.**	**Plan.**	**Act.**	**Var.**	**Plan.**	**Act.**	**Var.**	**Plan.**	**Act.**	**Var.**	**Plan.**	**Act.**	**Var.**	**Plan.**	**Act***	**Var.**
	$ '000																				
System Access																					
Gross Capital	275	642	-367	25	333	-308	25	72	-47	26	95	-69	26	58	-32	325	283	42	301	-	-
Capital Contributions	0	-258	258		-9	9		0	0		-22	22		-26	26	-79	-40	-39	-79	-	-
Net Capital	275	383	-109	25	324	-299	25	72	-47	26	73	-47	26	32	-6	246	243	3	222	-	-
System Renewal																					
Gross Capital	513	605	-92	503	1136	-633	527	492	35	539	539	0	1228	385	843	539	556	-17	730	-	-
Capital Contributions			0		-17	17		-40	40		-54	54		-7	7		-7	7		-	-
Net Capital	513	605	-92	503	1120	-617	527	452	75	539	485	54	1228	378	850	539	549	-10	730	-	-
System Service																					
Gross Capital	82	84	-2	65	224	-159	29	38	-9	29	95	-66	29	80	-51	31	126	-95	1046	-	-
Capital Contributions			0			0			0		-15	15			0		-5	5		-	-
Net Capital	82	84	-2	65	224	-159	29	38	-9	29	80	-51	29	80	-51	31	121	-90	1046	-	-
General Plant																					
Gross Capital	250	123	128	157	256	-99	393	69	324	126	39	87	142	194	-52	845	226	619	1003	-	-
Capital Contributions			0			0			0			0			0			0		-	-
Net Capital	250	123	128	157	256	-99	393	69	324	126	39	87	142	194	-52	845	226	619	1003	-	-
Total (Gross)	**1120**	**1453**	**-333**	**750**	**1948**	**-1198**	**974**	**671**	**303**	**720**	**769**	**-49**	**1425**	**717**	**708**	**1740**	**1191**	**549**	**3080**	-	-
Total Capital Contributions	**0**	**-258**	**258**	**0**	**-26**	**26**	**0**	**-40**	**40**	**0**	**-91**	**91**	**0**	**-33**	**33**	**-79**	**-52**	**-27**	**-79**	-	-
Total (Net)	**1120**	**1195**	**-75**	**750**	**1923**	**-1173**	**974**	**631**	**343**	**720**	**678**	**42**	**1425**	**684**	**741**	**1661**	**1139**	**522**	**3001**	-	-
System O&M	685	772	87	720	851	131	757	777	20	771	689	-82	821	888	67	915	899	-16	904		

* All expenditure included in 2024 is forecasted expenditure.

Table 4-2: Forecast Capital Expenditures and System O&M

Category	Forecast				
	2025	2026	2027	2028	2029
	$ '000	$ '000	$ '000	$ '000	$ '000
System Access					
Gross Capital Spend	495	565	72	72	193
Capital Contributions	0	0	0	0	0
Net Capital Expenditures	495	565	72	72	193
System Renewal					
Gross Capital Spend	656	421	753	679	590
Capital Contributions	0	0	0	0	0
Net Capital Expenditures	656	421	753	679	590
System Service					
Gross Capital Spend	25	3407	272	272	272
Capital Contributions	0	0	0	0	0
Net Capital Expenditures	25	3407	272	272	272
General Plant					
Gross Capital Spend	143	41	216	108	768
Capital Contributions	0	0	0	0	0
Net Capital Expenditures	143	41	216	108	768
Total Expenditure, Gross	**1319**	**4434**	**1313**	**1131**	**1823**
Total Capital Contribution	**0**	**0**	**0**	**0**	**0**
Total Expenditure, Net	**1319**	**4434**	**1313**	**1131**	**1823**
System O&M	955	982	1011	1041	1072

5.4.1.1 Plan vs Actual Variances for the Historical Period

Assessing and understanding the variances is an important step for CWH to promote continuous improvements in its estimation and budgeting process. Excluding projects identified as mandatory, CWH creates each project budget based on preliminary designs and historical costs for planning its programs annually. Once detailed designs are complete and ready to be issued for construction, the project estimate is revised to reflect any changes in the design. The revised estimate is used to track against the actual costs, which are reviewed bi-monthly on average. Typically, once capital project work has begun (normally in the summer months), monthly meetings occur until the work is completed (typically November). A detailed review of all capital jobs is completed regularly once the capital projects have started. Typically starting in June, the senior staff review the current expenditure of each capital projected compared to the CWH Board approved capital budget. These are then reviewed monthly to ensure that capital projects are kept on pace and on budget. If variances should arise it is raised with senior staff as soon as possible and this information is then used to assist the future budget process when using historical costs. Customer initiated projects are budgeted using the average from the previous three years. These projects are mostly unplanned and tracked in real-time to balance the total annual budget with other discretionary projects (i.e., CWH may take action to reduce projects in categories to account for increase in System Access to ensure the total annual actual expenditures remain in line with the total annual proposed budget). The breakdown below is provided by each category for each year. Variances that exceed +/- $10,000 are explained. It should be noted the expenditures in this section are all net expenditures.

CWH is a prudent utility, who has managed its five-year capital plan, to ensure that there has been no more than a 2% overspend (on net costs) overall from what was originally planned for the five-year period. CWH five year (2018–2022) forecasted annual net capital costs were $998K compared to an actual net spend of $1.022M. CWH has each year assessed its previous years expenditures, its priority projects are determined through its AM process, and the original planned forecast budgets. It has then ensured it is balancing its expenditure such that there has been minimal increase in expenditure overall.

Table 4-3: Variance Explanations - 2018 Planned Versus Actuals

Category	2018 Plan. ($ '000)	2018 Act. ($ '000)	2018 Var. ($ '000)	2018 Var. (%)	Variance Explanations
System Access, Net	275	383	109	40%	Most of the overspending in system access in 2018 was due to a new connection for the capital project CP33-Wellington Place Service that was originally planned to be an overhead connection. The connection was changed to an underground design which increased all associated costs. Further to the above project, a municipal co-shared road expansion was added to CWH's projects for the year that was not part of the DSP as plans were not available at the time.
System Renewal, Net	513	605	92	18%	A large portion of the overspend in 2018 was due to the purchase of transformers for stock inventory. CWH budgeted $80K in each year of the DSP for transformer inventory and although overspent in 2018 the annualized actual expenditure for the 5-year CoS timeframe will fall within the $80k. A contractor was used for CWH's CP77 capital project and CWH took advantage of the contractor being mobilized in the same area as CWH planned to replace poles the following year (2019).
System Service, Net	82	84	2	2%	N/A
General Plant, Net	250	123	-128	-51%	The main factor in the underspend was the deferral of purchasing three trucks from 2018 to 2019. This was to mitigate overspending in system access and system renewal in the same year.
Total Expenditure, Net	1120	1195	75	7%	See explanations above
Capital Contributions	0	-258	-258	N/A	
Total Expenditure, Gross	1120	1453	333	30%	
System O&M	685	772	86.7	13%	

Table 4-4: Variance Explanations - 2019 Planned Versus Actuals

Category	2019 Plan. ($ '000)	2019 Act. ($ '000)	2019 Var. ($ '000)	2019 Var. (%)	Variance Explanations
System Access, Net	25	333	308	1231%	The overspend in 2019 was due to the CP33-Wellington Place Service being changed to an underground service connection which increased the budget figures, along with an unexpected increase in cable costs. This project was partially completed in 2018 and then become a carry-over project in 2019.
System Renewal, Net	503	1,120	617	123%	The reason for the overspend in 2019 was due to replacing the failed transformer at the Fergus MS-2 station. This transformer was originally planned to be replaced in 2022, but CWH prioritized the investment for 2019 due to the unexpected failure of it.
System Service, Net	65	224	159	244%	The county and municipality completed a project to widen a road and curbs, and CWH was able to participate in a co-share and install an underground circuit loop feed that will increase the reliability in the area. This project was not part of the county/municipality's 10-year plan at the time of completing CWH's DSP. In addition, revenue meter purchases for the year were higher than projected to address the logistics and inventory required for changing meters to be sent for testing, calibration, and resealing.
General Plant, Net	157	256	99	63%	The overspend was due to the purchase of three trucks that were deferred from 2018 spend.
Total Expenditure, Net	750	1932	1182	158%	See explanations above
Capital Contributions	0	-26	-26	N/A	
Total Expenditure, Gross	750	1948	1198	160%	
System O&M	720	851	130.9	18%	

Table 4-5: Variance Explanations - 2020 Planned Versus Actuals

Category	2020 Plan.	2020 Act.	2020 Var.	2020 Var.	Variance Explanations
	$ '000			%	
System Access, Net	25	72	47	188%	The overspend for system access in 2020 was due to a commercial development project (CP108) that was not in the municipalities potential development plans. Therefore, CWH did not have this planned within its DSP capital development plan. Under the DSC, utilities must accommodate these types of projects. CWH allocated resources to deliver the project to meet customer expectations.
System Renewal, Net	527	452	-75	-14%	The underspend was due to a capital project being delayed a year and moved to a WIP. This project (CP102) was completed the following year in 2021.
System Service, Net	29	38	9	31%	N/A
General Plant, Net	393	69	-324	-82%	CWH deferred the purchase of a large truck purchase in 2020 in part to ensure cashflow was not too low due to the higher-than-expected expenditure in 2019 to replace the failed substation transformer at the Fergus MS-2. The truck was not experiencing increased maintenance costs and or presenting any undue safety hazard or risk at the time of this decision.
Total Expenditure, Net	974	631	-343	-35%	See explanations above
Capital Contributions	0	-40	-40	N/A	
Total Expenditure, Gross	974	671	-303	-31%	
System O&M	757	777	20	3%	

Table 4-6: Variance Explanations - 2021 Planned Versus Actuals

Category	2021				Variance Explanations
	Plan.	Act.	Var.	Var.	
	$ '000			%	
System Access, Net	26	73	47	183%	The overspend for system access investments in 2021 was due to a residential development (CP99) requiring new connections. In addition, as in previous years, there was a continual increase in infill lot connections beyond what was originally forecasted.
System Renewal, Net	539	485	-54	-10%	The underspend for System Renewal in 2021 is due to capital contributions received that were not in the original plan, capital contributions for System Renewal was $54K.
System Service, Net	29	80	51	174%	The CP8 (underground primary conductor enhancement) project was not accounted for in the original DSP – the project was to improve the underground primary conductor and connections to improve outage times for both planned and unplanned outages in downtown Elora. This project has enabled better service and response to CWH customers.
General Plant, Net	126	39	-87	-69%	In the original DSP, it was projected that the replacement of gatekeepers and the replacement of the Foreman's truck would be carried out in 2021, but this did not happen. Instead, the replacement of the Foreman's truck replacement was moved to 2022.
Total Expenditure, Net	720	678	-42	-6%	See explanations above
Capital Contributions	0	-91	-91	N/A	
Total Expenditure, Gross	720	769	49	7%	
System O&M	771	689	-82	-11%	

Table 4-7: Variance Explanations - 2022 Planned Versus Budget

Category	2022 Plan.	2022 Act.	2022 Var.	2022 Var.	Variance Explanations
	$ '000			%	
System Access, Net	26	32	6	24%	N/A
System Renewal, Net	1,228	378	-850	-69%	The underspend in 2022 was due to the high-cost station transformer replacement at the Queen St. FMS-2 (CP98) being completed in 2019. The project was originally planned to take place in 2022, but was brought forward to 2019, due to the transformer failing. To accommodate the year-to-year swings in System Renewal investments, CWH adjusted their budget to ensure that overall, across the five years its invested expenditure is within its five-year original forecasted budget. This has resulted in only a 3% underspend in system renewal investment for the five-year period.
System Service, Net	29	80	51	174%	In 2022 the overspend is strictly due to an increase in purchasing revenue meters.
General Plant, Net	142	194	52	37%	A financial system upgrade was not in the DSP but was completed in 2022. The system was needing updates and patches that would no longer be available for the version CWH uses, and therefore an upgrade was required. Other items that were in the DSP but did not go ahead were Green Button (completed in 2023) and the replacement of the Foreman's truck (the truck was ordered but not delivered until 2023)
Total Expenditure, Net	1425	684	-741	-52%	See explanations above
Capital Contributions	0	-33	-33	N/A	
Total Expenditure, Gross	1425	717	-708	-50%	
System O&M	821	888	67	8%	

Table 4-8: Variance Explanations - 2023 Planned Versus Budget

Category	2023 Plan.	2023 Act.	2023 Var.	2023 Var.	Variance Explanations
	$ '000			%	
System Access, Net	246	243	-3	-1%	N/A
System Renewal, Net	539	549	10	2%	N/A
System Service, Net	31	121	90	291%	Due to an unexpected failure at Elora MS-1, two reclosers were purchased to replace a failed unit at Elora MS-1 and the other is in CWH's yard as a spare unit. The replacement unit was necessary because of an in service unit unexpectedly failing and the spare was purchased in order to minimize downtime if future equipment failures are experienced. Furthermore, the spare unit can be used at five of the corporation's six sub-station because of CWHs sub-station equipment being standardized. In 2023 the time between equipment order and delivery was nine months, by having a spare on-hand the system reliable risk related to equipment delivery lead-times will be mitigated.
General Plant, Net	845	226	-619	-73%	A replacement Digger truck was ordered in 2022, with delivery due in 2023, but this has not materialised.
Total Expenditure, Net	1661	1039	-522	-31%	See explanations above
Capital Contributions	-79	-52	27	-34%	
Total Expenditure, Gross	1740	1091	-549	-32%	
System O&M	915	899	-15.715	-2%	

<u>2024 Variance Summary</u>
As 2024 is still ongoing, no variance analysis has been carried out.

5.4.1.2 Forecast Expenditures

CWH has developed a prudent capital budgeting process combined with a system of capital project prioritization that considers customer preferences, business performance and accountability. This system reflects its long-term strategy and addresses the need for CWH to remain flexible enough to respond to priority shifts as they occur. The capital budget process considers the relative priorities of the proposed investments including both non-discretionary and discretionary budget items.

Non-Discretionary items include:

- Projects that accommodate the company's obligation to connect including new customers as well as load growth.
- Projects to accommodate municipal, regional and Ministry requirements.
- Projects or expenditures to satisfy regulatory initiatives, environmental or health & safety risks and the company's conditions of service.

Discretionary Items include:

- System Renewal Projects
- Information Technology
- Fleet/Tools
- Facilities/Buildings

The key drivers for all investments in this plan are derived from CWH's strategic objectives within the business plan to invest prudently to continually provide a safe, sustainable, reliable system and capitalize on technology to do so. This is worked into CWH's asset management plan objectives as outlined in section 5.3 of this plan that identifies the following key drivers:

- Safety: "Maintaining public and employee safety"
- Reliability: "commensurate with customer needs"
- Customer service: "customer service quality to satisfy customer needs"
- Cost control: "minimizing asset life cycle costs"
- Minimizing risk: "minimize risk of in-service failures"
- Minimizing environmental risks
- Aligning the DSP with regional planning objectives
- Facilitating new renewable generation connections
- Facilitating the smart grid development

CWH tracks relative scores and their trends as seen in the historical OEB scorecard results to ensure that key performance indicators and their targets are being met year over year. If any targets are missed, CWH undertakes a detailed review and initiates actions to ensure future targets are met.

The following table summarizes the planned capital expenditures, by investment category, throughout the DSP forecast timeline. CWH plans to invest an average of $2.0M, including the new MS-5 station, in capital expenditures per year across all four investment categories. Removing the MS-5 station expenditure, this would result in an average of $1.3M. As in previous years, CWH will reforecast its expenditure each year, to ensure the latest set of information is informing the priority of projects required. Table 4-9 illustrates the forecast capital expenditures including the new MS-5 station. Table 4-10 illustrates the forecast capital expenditure excluding the new MS-5 station.

Table 4-9: Forecast Net Capital Expenditures (including new MS-5 Station)

Investment Category	Forecast ($'000)					Total ($ '000)	Percent of Total
	2025	2026	2027	2028	2029		
System Access (net)	495	565	72	72	193	1,397	14%
System Renewal (net)	656	421	753	679	590	3,099	31%
System Service (net)	25	3406	272	272	272	4,247	42%
General Plant (net)	143	41	217	108	769	1,278	13%
Total Capital (net)	**1,319**	**4,433**	**1,314**	**1,131**	**1,824**	**10,021**	**100%**

Table 4-10: Forecast Net Capital Expenditures (excluding new MS-5 Station)

Investment Category	Forecast ($'000)					Total ($ '000)	Percent of Total
	2025	2026	2027	2028	2029		
System Access (net)	495	565	72	72	193	1,397	21%
System Renewal (net)	656	421	753	679	590	3,099	47%
System Service (net)	25	51	272	272	272	892	13%
General Plant (net)	143	41	217	108	769	1,278	19%
Total Capital (net)	**1,319**	**1,078**	**1,314**	**1,131**	**1,824**	**6,666**	**100%**

5.4.1.2.1 System Access

Expenditures in this category are driven by external requirements such as servicing new customer loads and relocating distribution plants to suit road authorities. The timing of investment is driven by the needs of the external parties. These expenditures are mandatory. Specific project scopes are rarely known at the time that the budget is set, and total expenditures can vary from year to year. Most of the forecasted investments in this category are based on historical requirements. Specific projects such as relocations are budgeted based on CWH's estimates and historical averages, in conjunction with information from the municipalities and developers of the work required over the project life cycle. CWH's proposed 2025 – 2029 System Access forecast investments are found in the table and figure below.

Table 4-11: Forecast Net System Access Expenditures

Category	Forecast					Total ($ '000)	% of Total
	2025	2026	2027	2028	2029		
	$ '000	$ '000	$ '000	$ '000	$ '000		
CP 1 New Services	72	72	72	72	72	359	26%
Gartshore Extension	423	0	0	0	0	423	30%
Carleton	0	353	0	0	0	353	25%
McQueen	0	140	0	0	0	140	10%
Glengary Cres	0	0	0	0	121	121	9%
Total Expenditure, Net	**495**	**565**	**72**	**72**	**193**	**1,396**	**100%**

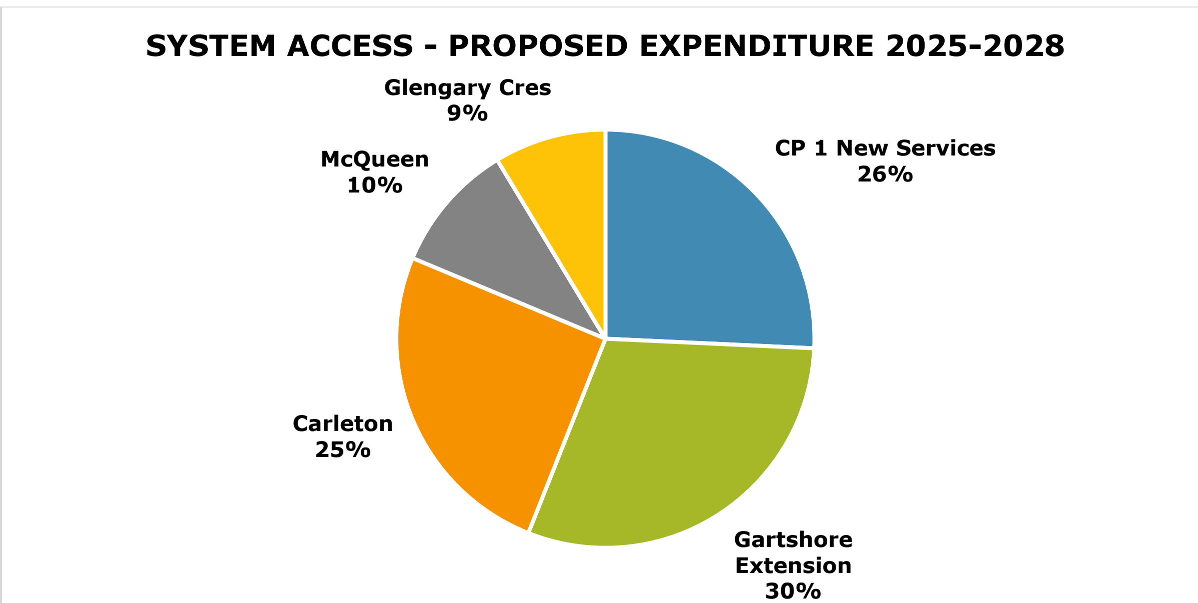


Figure 4-1: Forecast Net System Access Expenditures by Category

5.4.1.2.2 System Renewal

Expenditures within the System Renewal category are largely driven by the condition of distribution system assets and play a crucial role in the overall reliability, safety, and sustainment of the distribution system. The asset management process outlines the strategy used to determine the criteria for asset replacement. The output of the asset management process drives the development of the capital expenditure plan and prioritization for System Renewal. CWH's proposed 2025 – 2029 System Renewal forecast investments are found in the table and figure below.

System Renewal investments comprise of three main asset renewal programs: the Pole Replacement program, the distribution transformer replacement program, and the pole line-rebuild program. The Pole Replacement program focuses on replacing wooden poles which exhibit signs of deterioration consistent with EOL criteria. Older, deteriorated poles that lose their structural integrity pose a safety risk to the employees servicing them and the public. Moreover, in-field failures of deteriorated poles can affect system reliability performance, potentially resulting in outages that would be longer and can cost more under a reactive replacement than under a proactive replacement approach. CWH's Pole-line rebuild project represents the most expenditure of CWH's capital asset management objectives. The main goal of rebuilding pole-lines is to achieve a sustainable replacement rate that results in proactive replacement of poles, hardware, conductor etc., near end of life and/or in poor and very poor condition. To achieve optimal timing of replacing overhead infrastructure, factors such as age, health and performance are monitored, and assets are planned for replacement at near end of life but prior to failure. If assets are left in service too long the cost of replacement under reactive scenarios can be greater, and reliability and safety can become a risk.

In addition, CWH is planning in 2024, to take advantage of a planned project by the Township that involved the road reconstruction along St David St North in Fergus. CWH will replace existing poles in poor condition and of non-standard design, as well as having significant lean.

Table 4-12: Forecast Net System Renewal Expenditures

Category	Forecast					Total ($ '000)	% of Total
	2025	2026	2027	2028	2029		
	$ '000	$ '000	$ '000	$ '000	$ '000		
CP7 Annual Pole Replacement	115	115	115	115	115	575	19%
CP9 Transformers purchased for Replacement	306	306	306	306	306	1,530	49%
CP10 Annual Pole Line Rebuild Program	121	-	332	258	169	880	28%
CP122 St David St N Reconstruction connecting link	114	-	-	-	-	114	4%
Total Expenditure, Net	**656**	**421**	**753**	**679**	**590**	**3,099**	**100%**

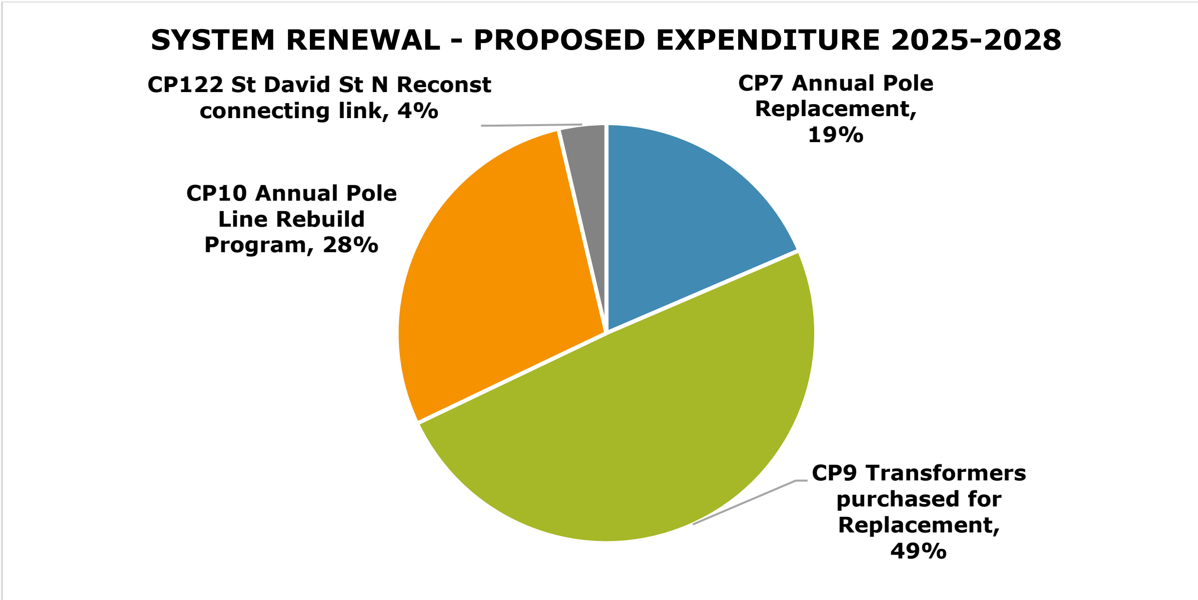


Figure 4-2: Forecast Net System Renewal Expenditures by Category

5.4.1.2.3 System Service

CWH's System Service expenditure is associated with its revenue meters, which includes purchasing new meters for inventory to enable changing meters to be sent for testing, calibration, and resealing.

CWH's most significant investment involves the building of a new station in Fergus (MS-5). The new station will increase CWH's ability to switch load throughout the system for regular planned operations and maintenance activities as well as responding to outages. The Fergus MS-5 station will also increase the capacity CWH will need to service new growth load that is anticipated in the Township of Centre Wellington, as well as load growth associated with the increase in electrification that Ontario is seeing, due to increase EV's and heating electrification.

CWH's proposed 2025 – 2029 System Service forecast investments are found in the table and figure below.

Table 4-13: Forecast Net System Service Expenditures

Category	Forecast					Total ($ '000)	% of Total
	2025	2026	2027	2028	2029		
	$ '000	$ '000	$ '000	$ '000	$ '000		
CP 13 Meters	25	51	272	272	272	892	21%
Fergus MS-5 New (Tx in 2024)	-	3,355	-	-	-	3,355	79%
Total Expenditure, Net	**25**	**3406**	**272**	**272**	**272**	**4,247**	**100%**

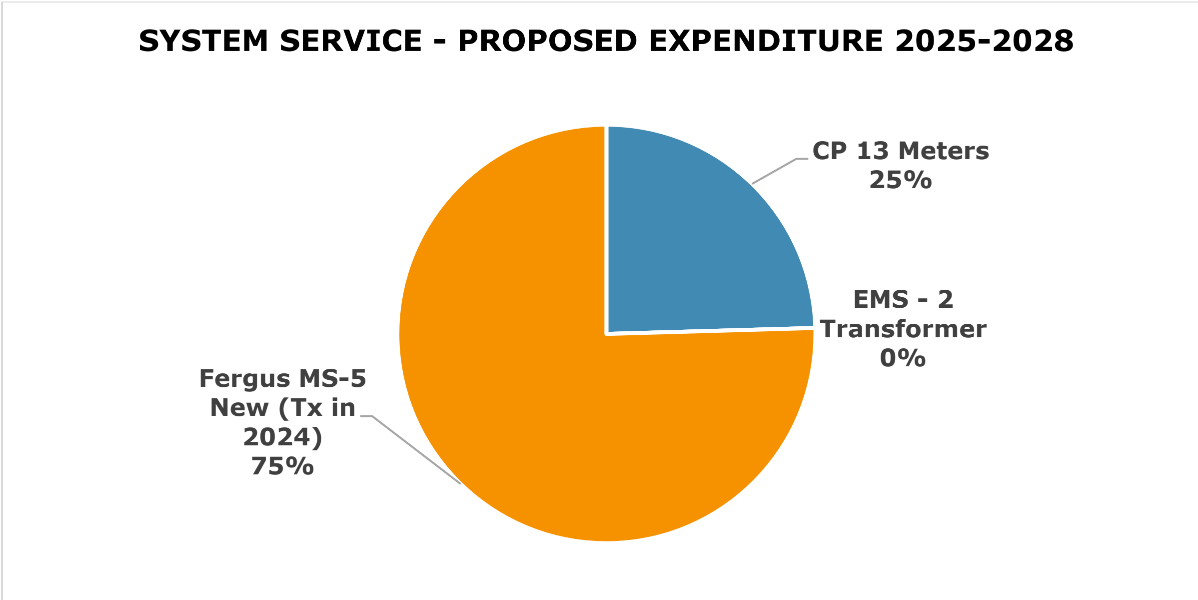


Figure 4-3: Forecast Net System Service Expenditures by Category

5.4.1.2.4 General Plant

Expenditures in this category are driven by the need to modify, replace or add to assets that are not part of the distribution system but support the utility's everyday operations (i.e., land, buildings, tools and equipment; rolling stock and electronic devices and software used to support day to day business and operations activities). CWH has assessed their fleet and has determined that fleet investment will be required in 2028 and 2029. In addition, CWH needs to invest in its buildings within the next period, replacing two bay doors and repairs to the parking lot. CWH is continuing with its usual IT hardware and software investments as well as tools to enable its operational activity.

CWH's 2025 – 2029 General Plant forecast investments are found in the table and figure below.

Table 4-14: Forecast Net General Plant Expenditures

Category	Forecast					Total ($ '000)	% of Total
	2025	2026	2027	2028	2029		
	$ '000	$ '000	$ '000	$ '000	$ '000		
CG1611 Computer Software	-	-	200	-	-	200	16%
CG 1908 Building Fixture	72	9	-	-	-	81	6%
CG 1920 Computer Hardware	57	25	10	21	12	125	10%
CG1930 Transportation	-	-	-	80	750	830	65%
CG1940 Tools	12	5	5	5	5	32	3%
CG1945 Measurement	2	2	2	2	2	10	1%
Total Expenditure, Net	**143**	**41**	**217**	**108**	**769**	**1,278**	**100%**

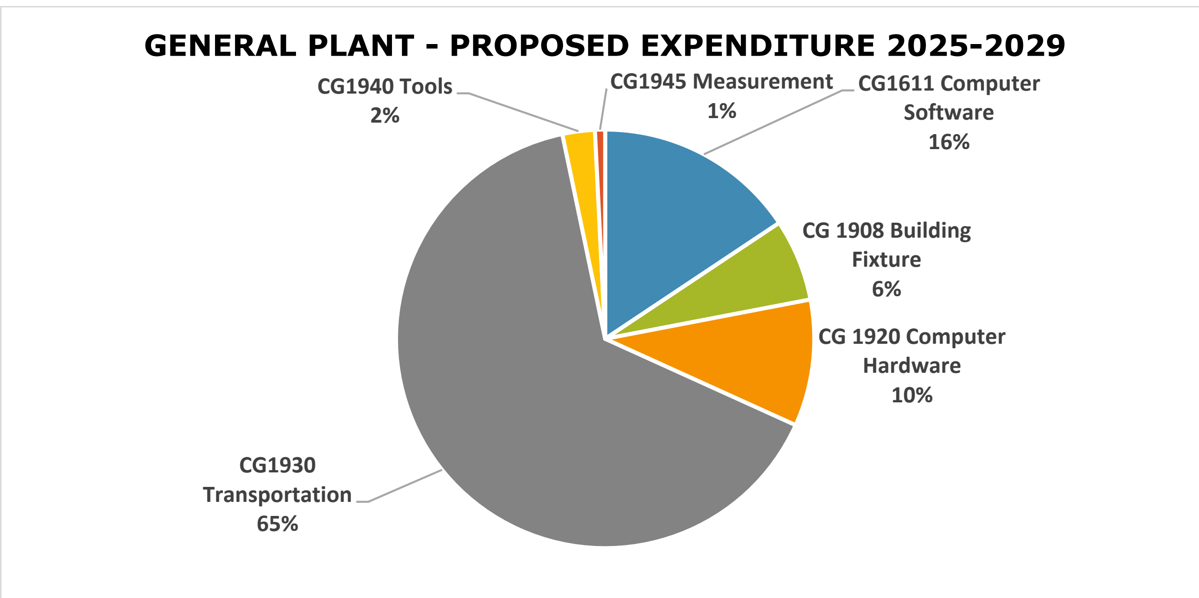


Figure 4-4: Forecast Net General Plant Expenditures by Category

5.4.1.2.5 Investments with Project Lifecycle Greater than One Year

CWH's only project that has a project lifecycle of greater than one year is the building of the new MS-5 Substation in Fergus. All costs will only be capitalized into rate base in the year of commissioning and in service.

5.4.1.3 Comparison of Forecast and Historical Expenditures

5.4.1.3.1 Overall Capital Expenditures

Capital expenditure trends over the 2019 to 2029 period, for net capital expenditures and underlying investment categories, are shown in Figure 4-5 below. If a capital project is not complete at year end, December 31, the costs up to December 31 for that particular job are transferred to a Work in Progress (WIP) account and not capitalized until the work is complete. Capital expenditures in each year are only for completed jobs within that year. WIP is not included in the annual capitalized amounts.

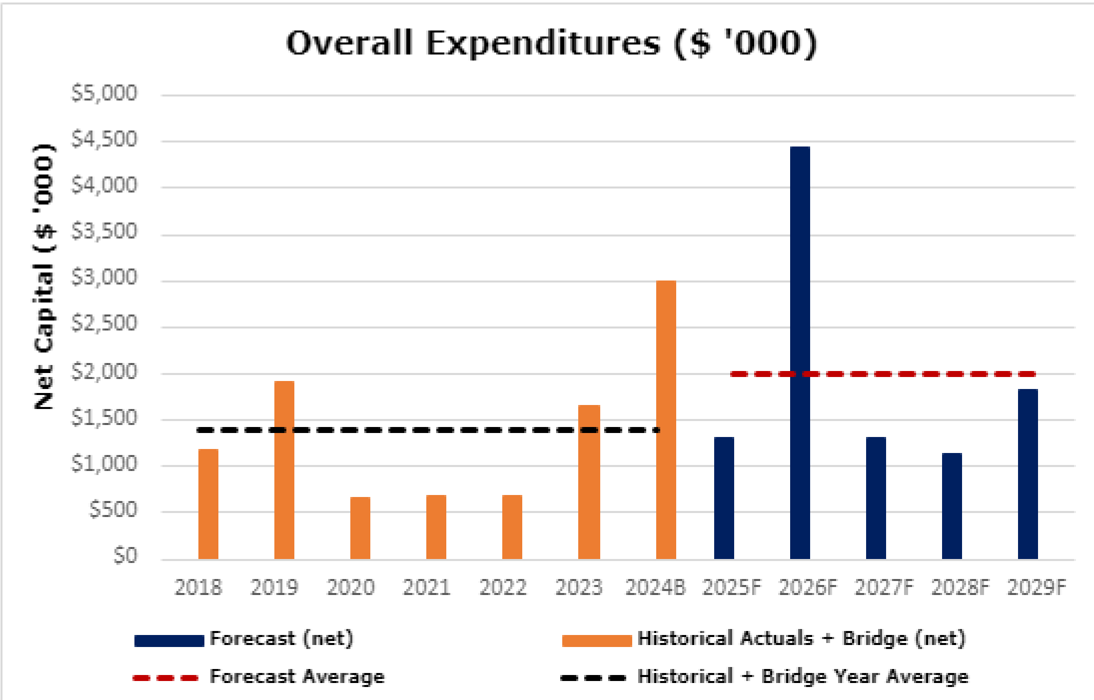


Figure 4-5: Overall Capital Expenditure Trends from 2018-2029

As detailed in Section 5.4.1.3, the overall increase relative to historical is driven by an increase in System Access to accommodate known customer growth areas in CWH service territory, continued investments in System Renewal to maintain and upgrade equipment to ensure a safe and reliable electricity supply, increase in System Service to address rehabilitation works needed to accommodate increased capacity needs and costs to replace/rehabilitate EOL equipment such as power transformers, and an increase in General Plant to maintain and upgrade CWH fleet, IT, buildings, tools and equipment in order to continue serving CWH growing customer base. This includes a major investment in 2026 to build a new substation that will increase CWH's ability to switch load throughout the system for regular planned operations and maintenance activities as well as responding to outages. The Fergus MS-5 station will also increase the capacity CWH will need to service new growth load that is anticipated in the Township of Centre Wellington, as well as load growth associated with the increase in electrification that Ontario is seeing, due to increase EV's and heating electrification.

Over the forecast period, CWH capital expenditures are designed to achieve the four performance outcomes established by the OEB, while also adhering to CWH established AM Objectives set out in Section 5.3.1.1. This includes continuing to deliver safe, reliable, and affordable power, while also accommodating the expected load growth in CWH service territory.

5.4.1.3.2 System Access

The historical trend with System Access was significantly variable year over year due to changing customer service requests. As shown in Figure 4-6, the forecast average is 45% higher than the historical average. CWH System Access expenditure is about 14% of its overall five-year capital expenditure plan.

Alongside its typical new services program, CWH has identified three key projects occurring in 2025 and 2026. These have all been triggered by the Township and require CWH to move and invest in new and existing assets. These account for the increase in forecasted expenditure during the forecast period.

Based on the current information available, CWH anticipates no significant change in anticipated number of new services required within the five-year period from those in the recent previous years. Most of these new services/upgrades will require a single new or modified connection, which could require pole replacements, reframing or upgrades to service the infill lots with underground in order to meet the requirements of Ontario Regulation 22/04. CWH anticipates minimal commercial and industrial connections within its service area. However, System Access projects are difficult to forecast with high accuracy and may still change as these are dependent on developers and city plans. These types of connections/projects are considered non-discretionary (mandatory). CWH, as per its AM and Capital planning process, will reforecast its budget each year to account for the latest information from developers and municipal governments.

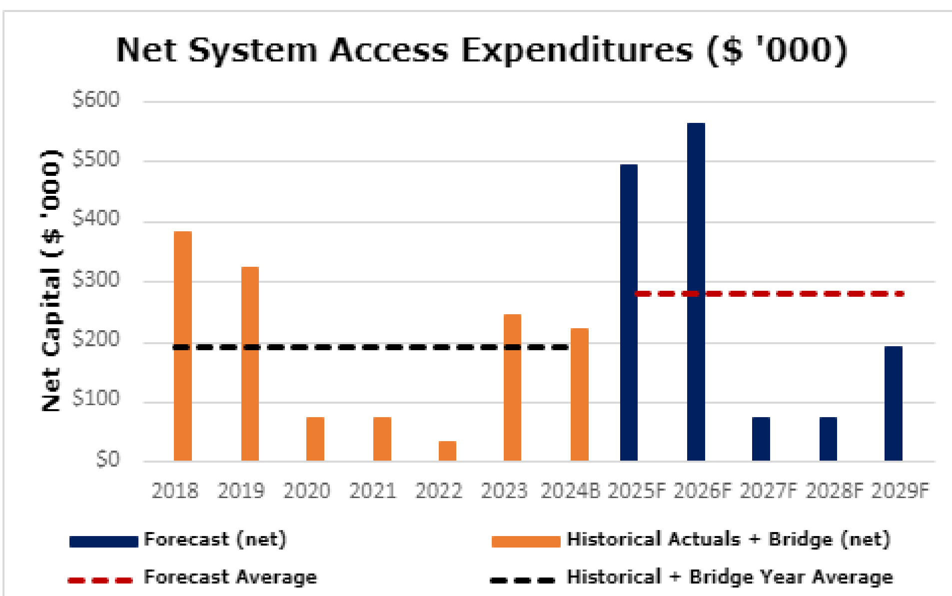


Figure 4-6: System Access Expenditures 2018-2029

5.4.1.3.3 System Renewal

As shown in Figure 4-7, the forecast average is only 1% more than the historical average. CWH has forecasted to spend $3.1M(net) over the five-year period. CWH System Renewal expenditure is about 31% of its overall five-year capital expenditure plan. As indicated in its asset condition assessment, CWH has a number of assets that are aging and in poor and very poor condition, along with a significant amount in fair condition. Through its AM process, CWH has developed an extensive System Renewal program. This includes three significant five-year programs: annual pole replacement program, a distribution transformer replacement program, and a pole line rebuild program. These programs account for approximately 96% of the System Renewal spend. As was the case in the previous five years, CWH will annually review their proposed programs and spend and adjust it as required. For example, if there is a significant increase in System Access projects which are non-discretionary, then CWH will consider reducing spend in System Renewal or other categories to accommodate these increases. Investments in this category are crucial in allowing CWH to continue to maintain the high-level of reliability customers expect, as well as ensure the network remains safe to its employees and the public.

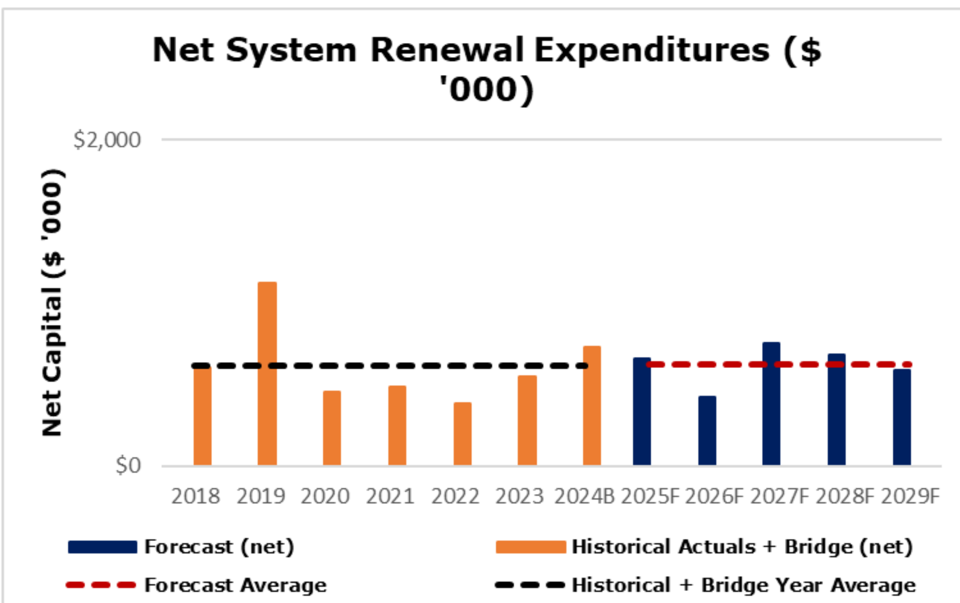


Figure 4-7: System Renewal Expenditures 2018-2029

5.4.1.3.4 System Service

As shown in Figure 4-8, the forecast average is about 256% higher than the historical average. CWH has forecasted to spend $4.2M(net) over the five-year period. CWH System Service expenditure is about 42% of its overall five-year capital expenditure plan. The increase is attributed to a major planned investment into System Service of a new Distribution Station, "Fergus MS-5" which is planned for commissioning in Q1 of 2026. The new station will increase the capacity CWH needs for new growth load anticipated in the Township of Centre Wellington. For context, removing the cost of the new MS-5 station would result in the average spend being in line with historical levels.

CWH System Service spend is also associated with its revenue meters, which includes purchases of new meter inventory to enable changing meters to be sent for testing, calibration, and resealing. Since majority of active meters were changed to smart meters in 2009 and 2010, the meters will require sealing in 2027. CWH plans its investment based on the number of revenue meters due to be reverified, tested, calibrated, and replaced. Like many inventoried items and equipment, the lead time for ordering and shipment of material is becoming longer, and it is therefore prudent that CWH order these items in a timely manner to ensure there is minimal downtime if a meter requires replacing.

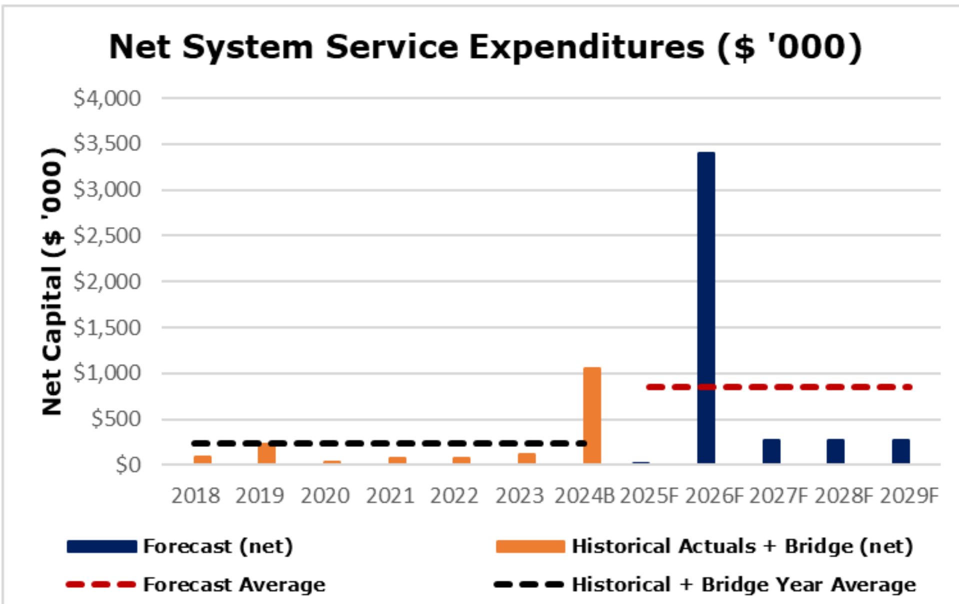


Figure 4-8: System Service Expenditures 2018-2029

5.4.1.3.5 General Plant

As shown in Figure 4-9, the forecast average is 6% less than the historical average. CWH has forecasted to spend $1.3M(net) over the five-year period. CWH General Plant expenditure is about 13% of its overall five-year capital expenditure plan. The historical expenditures had minimal spending in the General Plant category, addressing only critical items that were needed to maintain and continue operations at CWH. CWH continues to use the same framework moving forward to address only the critical issues needed to maintain the existing facilities, fleet, and IT assets. In the forecast five-year period, CWH intends to renew some of its fleet, which are needed to continue operations and execute CWH's planned projects and operations. CWH fleet strategy sees that small vehicles are replaced every 8 years and large trucks every 12 years, depending on usage and maintenance costs. If usage and maintenance costs start increasing significantly before the replacement date, CWH will consider replacing them early. Similarly, if the vehicles are still functioning and are not incurring huge maintenance cost, CWH also considers extending the life of the vehicles beyond the 8-year and 12-year timeframes. In addition, CWH is looking to reduce its fleet emissions by looking at alternatives such as electric vehicles. CWH plans to replace one of its vehicles in the 5-year forecast with an electric vehicle alternative. CWH will continue to consider electric vehicles as part of all future vehicle replacements. This is assessed on a case-by-case basis. Removing the investment of replacing the fleet vehicles, the forecast average is 25% lower than the historical average.

In addition, CWH is looking at other ways it can reduce its own emissions as well as operating costs. This has led CWH to install a net-metering solar generator at its Fergus office in 2023. This will not only enable CWH to reduce some of its energy purchases, but also enable it to reduce its carbon emissions.

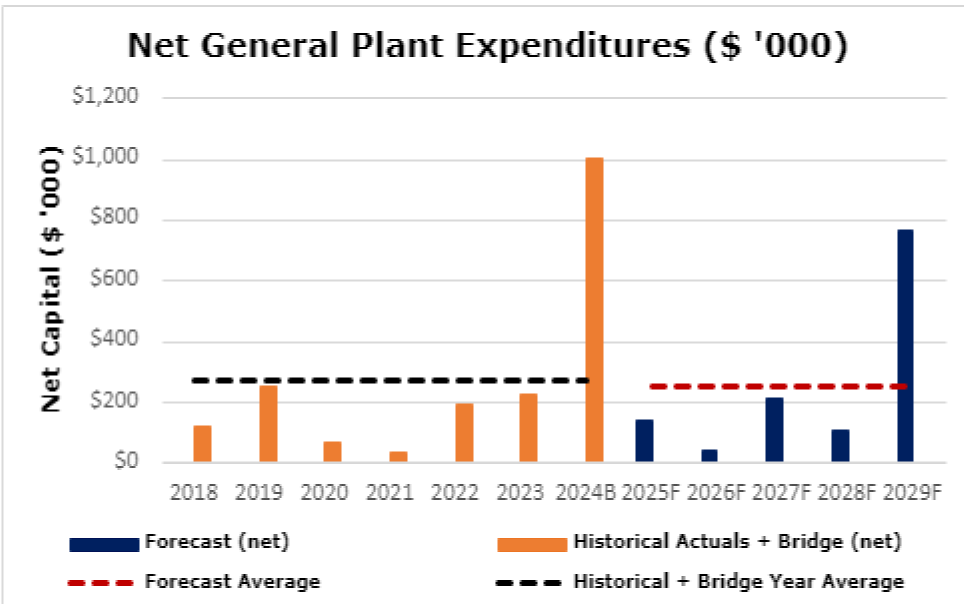


Figure 4-9: General Plant Expenditures 2018-2029

5.4.1.4 Important Modifications to Capital Programs Since Last DSP

CWH is carrying on with the same typical capital programs it has carried out during the last DSP.

5.4.1.5 Forecast Impact of System Investments on System O&M Costs

CWH anticipates the impact of capital investments on system O&M costs will vary from project to project. It is expected that pro-active O&M expenses such as pole testing, infrared testing, and tree trimming will not be impacted by capital investment, as these are standard ongoing tests that CWH has included in its strategy for many years.

Some of the specific projects focus on replacing and upgrading end of life assets and assets that are in poor and very poor condition, such as the pole-line rebuild programs. This project target will have a positive impact on reactive O&M costs, which tend to be higher than proactive O&M costs, as vintage connections on secondary and primary conductor will be replaced and the overall structures and associated apparatus will be in new condition mitigating any potential failures.

In some cases, System Access projects can provide opportunities to make investments that reduce future system O&M costs. While completing customer-initiated projects, CWH has the opportunity to upgrade parts of its distribution system in relation to the customer's work (ex. replacing poles, conductor and equipment). This will reduce the potential for failures resulting in unplanned power interruptions thereby reducing future O&M costs.

Below are the forecast O&M costs for 2025-2029, with an average of $1.0M of operations and maintenance expenses:

The maintenance cost is an increase when compared to the historical average of $47K. The operations expense is an increase (30%) when compared to the historical average of $375K. The majority of these increases take into account inflation increases.

Table 4-15: Forecast System O&M Expenditures

Category	Forecast ($ '000)				
	2025	2026	2027	2028	2029
System O&M	955	982	1,011	1,041	1,072

5.4.1.6 Non-Distribution Activities

CWH confirms that there are no expenditures for non-distribution activities in the applicant's budget.

5.4.2 Justifying Capital Expenditures

Customer Value

Delivering value to customers and other stakeholders is of critical importance to CWH, as highlighted by CWH's mission and vision statements:

- CWH's mission statement is *"to provide safe, reliable, efficient delivery of electrical energy within the Township of Centre Wellington while being accountable to our shareholders… the citizens of Centre Wellington."*
- CWH's vision is *"to be a sustainable Local Distribution Company for our customers and shareholder equally by being dedicated and responsible to their needs and adaptable within the electrical sector."*

As previously discussed in Section 5.2.2.1, CWH regularly engages with its customers to share information, educate customers, and to gather their opinions and insights on its services and on key priorities. Customer needs, preferences, priorities and expected level of service are key inputs considered when developing capital plans.

CWH's AM objectives, which drive planning and decision making, include ensuring public and worker safety, maintaining system reliability and resiliency, managing costs, accommodating organic load growth, and mitigating environmental risks, all of which deliver value to customers.

By prioritizing System Access projects such as new customer connections, service requests, new subdivisions, municipality expansions and MTO projects, CWH ensures that customer needs and requests are being met.

The scope of capital investments planned in the System Renewal category has also been determined with the objective of keeping power supply reliability from deteriorating below an acceptable level while also keeping the overall investment envelope for this DSP within a range that would not result in retail rates escalations beyond the affordability of CWH's customer base. This is in alignment with the top two customer priorities identified in a recent survey, which corresponds to "*Proactive replacement of assets to maintain current levels of reliability, with minimal increases to rates.*"

The proposed System Service investments deliver value to customers by accommodating expected load growth and improving grid operation performance. By developing and investing in projects such as the new Distribution station Fergus MS-5, CWH is ensuring that customer needs, and growth will be met over the forecast period and beyond. The new station will increase CWH's ability to switch load throughout the system for regular planned operations and maintenance activities as well as responding to outages. The Fergus MS-5 station will also increase the capacity CWH will need to service new growth load anticipated in the Township of Centre Wellington. These investments will help to reduce the size and duration of outages and improve response times, which is consistent with customer's desire for a reliable electricity supply and improved outage response times.

CWH's General Plant investments are also selected and prioritized such that CWH can continue to operate safely, efficiently and support other work. Recent and planned IT-related upgrades will allow CWH to make faster decisions to troubleshoot and improve its system reliability and continue to make prudent decisions into asset maintenance and replacement to keep costs down for customers. These investments in various assets not directly related to the distribution system can indirectly benefit customers by improving operational efficiency, enhancing service quality, expanding capacity, and adopting technologies that contribute to a better overall customer experience.

To align CWH's overall capital budget envelope with customer expectations, CWH has prioritized and optimized its proposed capital investments such that the most critical projects and programs have been budgeted over the forecast, while a number of lower priority, less critical scoped projects and programs have been either deferred, reduced, or eliminated from the budget envelope.

<u>Technological Changes and Innovation</u>

<u>System Modernization</u>
CWH plans to modernize its grid by replacing assets that no longer meet CWH's design standards with assets that meet the latest standards. CWH, assess the use of new technologies on a project-by-project basis to determine if it is value for money. As CWH

is a small utility, there are some solutions that other utilities use, such as automated switching, that are not appropriate for CWH to use currently. CWH has previously looked at this and determined that the costs of implementing outweigh the benefits, due to the small service area CWH crews must cover. CWH continues to assess these types of options, but system modernization depends on multiple factors and limits and is evaluated on a project-by-project basis.

Grid Modernization, Energy Resource, and Climate Change Adaptation

All CWH customer connections for revenue metering is operated through CWH's Automated Metering Infrastructure ("AMI") network. The network is used for collecting billing quantity data and operational data which is used to monitor outages and voltage quality issues. CWH will continue to look to capitalize on potential outage monitoring improvements as they become available. CWH completed major distribution station rehabilitations from 2013 to 2016, implementing automated reclosers and monitoring equipment that will be the foundation for modernizing grid connected devices downstream when appropriate and prudent to do so. Along with the station rebuilds CWH implemented a Survalent SCADA system (SmartVu) using the Worldview application platform. CWH plans to migrate to the SmartVu application in Q1 of 2022. CWH will continue to investigate grid modernization technologies and weigh the appropriateness of these technologies for its Distribution System characteristics, along with cost and overall benefit to customers and potential for connecting renewable energy resources.

Adapting to climate change and addressing the need to take positive action is important to CWH. Establishing a reliable distribution system that can accommodate REG's is one way to proactively effect positive change. The adoption of EV's is a positive step to fighting climate change and CWH is encouraging the use of EV's by installing chargers in both its service areas, Fergus and Elora. CWH has installed 3 chargers in its service territory to date, which are currently free of charge to users. CWH is collecting data on the usage and habits of users and will consider installing more in the future, if deemed appropriate and cost effective.

Realized Efficiencies due to Smart Meters

CWH, like other Ontario utilities, has installed smart meters across its region which has enabled improvements to the services customers receive. An example of taking advantage of the technological improvements in CWH's system occurred in 2019 with a scenario that started as a power quality issue. Operations staff picked up on voltage abnormalities in pockets of the Fergus region while monitoring CWH's smart meter networks Outage Management System, from the Operational Data Storage (ODS) provider. Through the smart meters AMI system's operational data, staff identified a situation where all customers that were connected to the 'Red' phase on all three feeders from this station were abnormally high and outside of the ESA's normal operating conditions. CWH staff was able to pinpoint the cause being a faulting distribution station transformer that had the potential to catastrophically fail in the field under existing load if the fault continued. This transformer located at the Fergus MS-2 station on Queen St was scheduled to be replaced in 2022 and was a major project within CWH's Distribution System Plan for that year. Due to this issue being identified in 2019, the project was prioritized and moved ahead to 2019, and the transformer was replaced without adversely affecting any customers. Of note, distribution transformers in CWH's six stations that step voltage down from 44kV to 4.16kV have the highest value of any CWH single piece of equipment/asset in the field. This example highlights the strategic planning of capitalizing on technological advancements to effectively manage and maintain a reliable grid and prudently plan capital projects.

Consideration of Traditional Planning Needs

As previously explained in Section 5.3.1, traditional planning needs, including load growth, asset condition, and reliability are key inputs considered as part of CWH's AM processes.

CWH undertakes load studies to identify areas that may require investments to accommodate required capacity. Load growth is a direct input into CWH's planning for System Access and System Service type projects. Load growth is also a key input into the regional planning process (detailed in Section 5.2.2.4) which helps to identify future requirements (both wires and non-wires) to accommodate load growth. As noted previously in Section 5.3.2.1, CWH has experienced a moderate level of growth over the historical period and this trend is expected to continue over the forecast period and beyond.

Asset condition and reliability data are key inputs considered by CWH when identifying, selecting, and prioritizing System Renewal expenditures. Through a recently completed ACA exercise, a number of critical power supply infrastructure components employed at DS, OH lines and UG distribution system have been determined to be in "fair," "poor," or "very poor" operating condition. In the absence of investments into asset renewal, the existing infrastructure presents high risk of failure in service, affecting supply system reliability and public safety. Investments in this category are crucial in allowing CWH to continue to maintain the high-level of reliability customers expect, as well as ensure the network remains safe to its employees and the public.

Overall Capital Expenditures

The capital investments proposed in this distribution plan include investments into each of the four OEB categories: (1) system access; (2) system renewal; (3) system service and (4) general plant. The scope and timing of the investments in each category has been determined by considering all information available at the time of preparation of the distribution plan.

CWH's Distribution System Plan is designed to support the achievement of the four key OEB established performance outcomes:

- Customer focus
- Operational effectiveness
- Public policy responsiveness
- Financial performance

Key Benefits of Investments:

The capital investments proposed for the 2025 to 2029 period are expected to yield the following benefits:

1. The investments into system access category would allow CWH to meet its obligations to serve new customers and relocate lines (where driven a third party driven request) in public rights-of-way to comply with the requirements of the Distribution Code.
2. The investments into system renewal are aimed at reducing the risk of critical assets' failure in service and help sustain the reliability and safety at acceptable levels. This includes ensuring any assets replaced are updated to the latest USF and construction standards. These investments will also help avoid significant increases in operating costs by eliminating the increase in extent of emergency repairs upon asset failures.
3. The investments into system service are aimed at developing and maintaining smart grid features of the distribution grid, with adequate supply of smart meters compliant with Measurement Canada regulations. This includes ensuring CWH has the ability and enough inventory to replace meters when they fail with minimal downtime to the customer. By investing in a new station in Fergus, this will provide further resiliency and flexibility as well as the ability to meet future capacity needs.
4. Investments into General Plant are aimed at improving employee safety and worker productivity by providing safe work environment and modern tools and equipment, as well as maintaining fast response times and high customer service levels. This includes investment in new vehicles to ensure they are fit for purpose, safe for staff to use, and allows CWH staff to respond in a timely manner to any emergencies across its two service areas. Investment in IT hardware and software will be carried out to enable CWH to continue deliver its 24/7 activities.

CWH has previously stated its objective is to meet all regulated requirements and manage its assets in a manner that minimizes the cost to its customers and ratepayers. CWH delivers value to customers by controlling costs concerning its proposed investments through appropriate optimization prioritization and pacing of capital-related expenditures. Each year CWH revisits its budgets, with this objective in mind, and adjusts its forecast spend to ensure it still meets its customer requirements of minimizing costs whilst maintaining reliability.

CWH has been carefully examining and monitoring its distribution system through the historical period in addition to understanding industry trends and practices to identify appropriate technologies and opportunities for integration. Based on the condition assessments that have been performed, it is evident that some of CWH's asset base is ageing and requires maintenance, refurbishment and potentially replacement of assets in a timely, planned, and controlled manner. Continuing to operate and maintain the existing system indefinitely would mean a progressively more expensive maintenance program with increasing difficulty in finding parts with the risk of failing equipment due to age and service life. In addition, continuing without a planned and controlled maintenance program could result in diminished reliability standards and progressively more incidents resulting in potential hazards to both staff and the public. Operating the system without performing maintenance would result in an inability to meet customer needs and expectations.

CWH's proposed plan that will be implemented, involves a strategic, measured, and planned upgrade, replacement, and refurbishment of the distribution system. This also includes investment in its facilities, fleet, and tools that allow CWH to carry out this work efficiently and effectively.

5.4.2.1 Material Investments

The focus of this section is on projects/activities that meet the materiality threshold, $10,000, set out in Chapter 2 of the Filing Requirements. The following table highlights the material projects for test year, 2025:

Table 4-16: Proposed Capital Investments during Test Year - Projects over Materiality

Category	Project Description	Priority Rank	2025 Planned Expenditure ($ '000)
System Access	CP 1 New Services	1	72
	Gartshore Extension	1	423
System Renewal	CP7 Annual Pole Replacement	2	115
	CP10 Pole Line Rebuild	2	121
	CP9 Transformers Purchased for replacement	3	306
	St David St N Reconst connection link	2	114
System Service	CP13 Meters	1	25
General Plant	CG1908 Building Fixtures	4	72
	CG1920 Computer Hardware	4	57
	CG1940 Tools	5	12
Total Expenditure on Material Projects During Test Year			1,317
Total Expenditure on Capital During Test Year (All Investment Categories)			1,318

Appendix A

Material Investment Narratives

A. General Information on the Project/Program

1. Overview

This program entails general repairs, replacements, and upgrades within CWH's facilities. This includes improvements to its bay doors, construction work in its parking lot, and other incidental maintenance work as necessary. Without investments in CWH's facilities, there will a be detrimental impact on CWH's 24/7 operations that could affect both the safety of staff, as well as have an indirect impact on the reliability of the system and the ability to deliver services cost effectively.

The work planned for 2025 predominantly involves a bay doors and parking upgrades with the remaining budget allocated towards other general repairs, replacements, and upgrades within the facility in accordance with CWH's preventative maintenance and inspection programs.

- **Bay Door Replacement:** Investments to replace two of CWH's bay doors will positively impact CWH's operations. The new bay doors will be built using modern materials which will improve insulation and provide security for CWH's assets and personnel operating at its facilities.
- **Parking Lot / Yard Enhancements:** CWH is planning to upgrade its parking lot infrastructure, which will involve asphalt enhancements to optimize on-site drainage and the creation of a dedicated storage area for transformers. These improvements will incorporate measures for oil containment, effectively minimizing the potential for oil spills in the future.
- **Other General Replacements, Repairs and Upgrades:** The remaining budget is allocated towards ad-hoc work needed to support the safe and reliable continuation of CWH's operations. This can include a variety of works, such as building improvements to accommodate increased staffing needs (e.g., building extension, additional locker spaces, etc.), general asset repairs, replacements and upgrades (e.g., plumbing, windows, gate, generator, heating and cooling, etc.) as identified by CWH's preventative inspection and maintenance activities, reactive replacements due to premature failure of any building assets, and addressing any other on-going requirements to maintain the upkeep and safe working condition at CWH's facilities.

Investments under this program vary year to year based on specific needs identified. For the 2025-2029 period, a total $81,300 will be incurred.

2. Timing

i. Start Date: 2025
ii. In-Service Date: 2025-2029
iii. Key factors that may affect timing: The below listed factors can impact the timing of the proposed investments:
   - Resource constraints;
   - Supply chain issues;
   - Project prioritization; and

- Overall budget constraints.

3. Historical and Future Capital Expenditures

	Historical Costs ($ '000)						Bridge Year	Test Year	Future Costs ($ '000)			
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital (Gross)	41.0	7.5	0	0	0	17	45	72.3	9	0	0	0
Contributions	0	0	0	0	0	0	0	0	0	0	0	0
Capital (Net)	41.0	7.5	0	0	0	17	45	72.3	9	0	0	0

4. Economic Evaluation (Expansion Projects)

This is not applicable.

5. Comparative Historical Expenditure

Historical costs have varied year over year in accordance with specific needs identified and works undertaken. Due to the nature of the projects within this program and the fact that works are completed on an as-needed basis depending on the need, there are no good cost comparators available, and a comparison of historical projects and future projects is not indicative of any particular trend.

6. Investment Priority

This is a relatively low priority investment. Direct impacts in the areas of customer outages and customer service levels would be minimal relative to other projects, and most of the needs identified to not constitute an immediate material safety risk. However, if left unaddressed for too long, there would a be detrimental impact on CWH's operations that could affect both the safety of staff, as well as have an indirect impact on the reliability of the system and the ability to effectively deliver services. Investment deferral could lead to much more costly remedial solutions in the long term.

The project is ranked 4th using CWH prioritization process that is outlined in the DSP.

7. Alternatives Analysis

The following options have been considered by CWH:

i. **Do nothing:** Doing nothing is not a viable option. Without investing in the ongoing repair, replacement, and upgrades of CWH's building and yard facilities, there is a risk that these facilities will not be fit for CWH staff to carry out their jobs safely and efficiently.

ii. **Carry out the proposed pacing of investments:** This is the preferred option as it allows CWH to continue investing in its operations building and yard facilities in order to support 24/7 operations. CWH evaluates the identified needs to determine which are most critical to undertake and which can be monitored and pushed out to later years. Project-specific alternatives (e.g., run to fail vs. repair vs. replace like-for-like vs. upgrade with additional functionality) are considered on a case-by-case basis depending on the identified need.

8. Innovative Nature of the Project

This is not applicable.

9. Leave to Construct Approval

This is not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	By investing in its facilities to keep them up to date, clean, safe, and secure, CWH will ensure that staff can continue to work in a safe and comfortable environment which will enable the staff to maintain operational efficiency and support 24/7 operations.
Customer Value	An up to date, clean, and safe environment ensures that staff can undertake their work effectively and efficiently and deliver what customers need.
Reliability	Through these investments, there is no direct impact on reliability of the network in terms of planned outages. However, these facilities are crucial to support continued 24/7 operation and they also house equipment and materials that are used daily to help maintain the reliability of the system.
Safety	The repair, replacement, and upgrade of damaged, obsolete or end of life building assets help mitigate any catastrophic failure which may compromise the safety of employees and the public. This work also ensures that CWH has a safe workspace and functioning building assets that meet the latest health and safety standards

	and regulations keeping its staff safe while carrying out their work activities.

2. Investment Need

i. Main Driver*: Non-System Physical Plant* - The primary driver for this program is to renew and invest in CWH's non-system physical plant. Within the context of this program, it is to invest in CWH's facilities that house in-office & operations staff and equipment that is used for maintenance and operations.

ii. Secondary Drivers: *System Maintenance Support* – CWH's main operations building, and yard also houses maintenance equipment and vehicles and provides space for the field staff to undertake repair. By investing in these facilities and ensuring they are fit for purpose, CWH is protecting the equipment stored which helps to ensure that they will work when needed.

iii. Information Used to Justify the Investment: CWH tracks its building assets (e.g., plumbing and air, garage doors and windows, security system, gate, generator, heating, and cooling) through its preventative inspections and maintenance activities to identify and prioritize repairs, replacements and upgrades needed throughout the year. This information helps facilitate the general upkeep and adaptation of the existing buildings to improve safety, growth, and general use of the building.

3. Investment Justification

i. Demonstrating Accepted Utility Practice*:* To ensure that CWH can deliver safe, reliable, and efficient service, it is fundamental that CWH has the necessary foundations in place. It is accepted industry practice that utilities have office space to house staff from engineering to accounting to operations so customer needs can be met. In addition, it is important that field staff have the resources, tools, equipment, and space to carry out maintenance and capital projects. It is good practice for utilities to incur costs each year to maintain its operations building, yard, and storage areas. CWH has carefully reviewed and planned what is required to be carried out to ensure it can still operate and delivery safe, reliable, and efficient service to its customers.

ii. Cost-Benefit Analysis: CWH issues tender calls to receive quotes for CWH's preventative maintenance programs to lock in rates and contractual terms. For any service required without a contract, CWH gathers three (3) quotes to ensure the best value is obtained in terms of cost and delivery time. Project-specific alternatives are also evaluated on a case-by-case basis depending on the identified need, and cost analysis is considered following CWH's corporate purchasing policies.

iii. Historical Investments & Outcomes Observed: Historical costs are indicated in Sections A3 and A5 of this document. Historical investments in buildings and fixtures have supported the 24/7 operations and have enabled CWH field crews to carry-out maintenance activities in a safe, efficient, and cost-effective manner. Historical investments in this program have resulted in the ability for CWH staff to continue to perform all its critical services, as well as investing in the upkeep of the building, and addressing health and safety defects that were identified. This has ensured the continued ability to operate 24/7 and deliver safe and reliable electricity supply to its customers.

iv. Substantially Exceeding Materiality Threshold: This is not applicable.

4. Conservation and Demand Management

This is not applicable.

5. Innovation

This is not applicable.

A. General Information on the Project/Program

1. Overview

This program focusses on CWH IT Hardware replacement. CWH had a separate category for IT software replacements. In recent years there have been significant advancements in IT and cybersecurity. To protect CWH's business and customer privacy, and its systems and operations CWH will continue to invest in technology and staff training that enables the reduction of cybersecurity risk and threats. CWH is committed to meeting the Ontario Cyber security framework and plans on completing penetration to assist with this in 2023.

Companies need to keep pace with the fast-changing IT landscape to ensure business viability is maintained and customers information is secure. Replacing IT hardware at or prior to warranty expiry is a must and upgrading application software is equally important for the same reasons. Unplanned failures of equipment and applications have a negative effect on staff's ability to accommodate customers needs in an efficient and safe manner. When possible, CWH utilizes virtual servers that are not linked to physical infrastructure to reduce computer hardware costs.

This programs budget planning includes all annual replacements of individual workstations, networked servers, hardware equipment such as switches and on-site security protection devises, as well as new application software requirements.

The main projects within this program for the 5-year plan consist of:

- Staff computers replaced based on a 3-year rotation to align with the warranty at time of purchase and ensure all systems are running on the same operating system, which helps with improved IT security. The computers are on a rolling schedule which allows for three to five computers to be replaced each year.
- Replace existing network server in 2025 at a budget price of $30,000. The server will be at end of life in 2025 and require an upgrade replacement.

Further to the above bigger spends, CWH has budgeted for the replacement of hardware switches, printers, wireless equipment, security cameras, and miscellaneous equipment throughout the 5-year plan in the relevant years.

2. Timing

i. Start Date: 2025
ii. In-Service Date:2025-2029
iii. Key factors that may affect timing are:

- equipment failure,
- regulatory requirements,
- staff availability,

- other projects taking higher priority,
- supply chain constraints with respect to availability of IT equipment, and
- ongoing cyber security requirements.

3. Historical and Future Capital Expenditures

	Historical Costs ($ '000)						Bridge Year	Test Year	Future Costs ($ '000)			
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital (Gross)	15.6	16.2	27.5	8	29.2	13.2	65.2	57.4	24.9	9.6	21.4	11.8
Contributions	0	0	0	0	0	0	0	0	0	0	0	0
Capital (Net)	15.6	16.2	27.5	8	29.2	13.2	65.2	57.4	24.9	9.6	21.4	11.8

4. Economic Evaluation (Expansion Projects)

Not applicable.

5. Comparative Historical Expenditure

Ongoing investments are made into CWH's IT hardware program to support the efficient and effective operation of CWH's IT infrastructure network 24/7. Historical costs for the 2018-2023 period are reflected in Section A3. Investments in IT hardware compared to historical expenditure are expected to increase due to the need to keep up with increased technological and cyber security threats in an evolving space, as well as an increased number of assets reaching end of life and an increase in the number of new employees. Procurement costs for key components associated with IT hardware have also increased leading to higher estimates by CWH for this program when compared to historical expenditures.

6. Investment Priority

CWH's IT Hardware program is ranked as priority 4 based on CWH prioritization process. Prioritization for the selection of assets is based on specific business needs for each project or to meet the needs of each individual employee. Investments in this program ensure that the upgrades keep up with the technology and cyber security trends. These investments will maintain robust IT systems and cyber security protocols which ultimately contribute to overall reliability. The evolution of a hybrid work environment has led to shifting priorities for the deployment of IT hardware to support CWH's operations and is a key factor in prioritizing hardware assets for replacement or upgrade.

This project is ranked 4th using CWH prioritization process outlined in the DSP.

7. Alternatives Analysis

CHW considered the following alternatives:

i. **Do nothing:** Doing nothing subjects CWH to a risk of cybersecurity incidents and having unsupported obsolete hardware which would ultimately impact company operations and disaster recovery, making this option not viable.

ii. **Carry out the proposed pacing of investments:** This option allows CWH to implement more viable redundancies for disaster recovery. This option also entails the upgrading of the network infrastructure to replace outdated devices to ensure continued reliability while replacing outdated devices to improve cyber security and overall productivity. Hence, this is the preferred option.

8. Innovative Nature of the Project

Not applicable.

9. Leave to Construct Approval

Not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	This program directly effects CWH's ability to efficiently serve our customers needs, operate a reliable distribution system with visibility and accuracy, and responsibly account for the corporations' financial requirements. IT hardware is used by every department including Customer Service, Operations, and Finance and Admin. Replacing hardware at a pace that ensures warranties and service level agreements are up to date is a must.
Customer Value	This program directly effects CWH's ability to efficiently serve our customers needs, operate a reliable distribution system with visibility and accuracy, and responsibly account for the corporations' financial requirements.
Reliability	Maintaining robust IT hardware and cyber security protocols will contribute to reliability.
Safety	Maintaining IT hardware is crucial to the safety of public and employees. Continued improvements to these systems are prudent in maintaining safety

	through the use of remote administration and visibility of the distribution systems.

2. Investment Need

i. Main Driver*:* Operational effectiveness and efficiency - By upgrading/replacing its IT infrastructure network and associated hardware accessories, CWH will be able to carry out its operations as efficiently and safely as possible, catering to customer expectations. CWH ensures that cost controls are in place to limit rate increases on ratepayers.

ii. Secondary Drivers*:* New Technology and Cyber Security - remaining up to date with new technologies and cyber security requirements is critical in ensuring CWH maintains safe and reliable hardware for staff and contractors to perform their jobs competently.

iii. Information Used to Justify the Investment*:* CWH's IT hardware refresh policy is for a three to five year lifecycle refresh, depending on the actual devices. For example, printers and servers are refreshed every 5 years. CWH tracks hardware assets to facilitate replacements as required to maintain the defined lifecycle. Additionally, CWH monitors and tracks the latest cyber security requirements, and identifies investments required to enable it to comply with these requirements in a timely manner.

3. Investment Justification

i. Demonstrating Accepted Utility Practice: CWH is committed to investments in technology to replace unsupported systems and meet cyber related regulatory requirements. Operating a secure and reliable network of systems and applications is the backbone of a utilities core business processes, that are typical within the industry.

ii. Cost-Benefit Analysis: Cost analysis is considered for all hardware purchases following corporate purchasing policies. CWH's current IT replacement program will take in to account any potential for environmental benefits.

i. *Historical Investments & Outcomes Observed:* Historical costs are reflected in Section A3 of this document. Historical investments in IT hardware have supported 24/7 operations and have minimized the impact of Cyber incidents. Historical investments in this program have also enhanced customer experience, increased connectivity speed, and enabled a smooth transition to a hybrid work setting.

iii. Substantially Exceeding Materiality Threshold: This is not applicable.

4. Conservation and Demand Management

Not applicable.

5. Innovation

There is nothing innovative being proposed as part of this program.

A. General Information on the Project/Program

1. Overview

This program includes the purchase of various tools and small equipment to enable CWH staff to complete tasks safely and efficiently at its service centre. Tools proposed for replacement include, but are not limited, to:

- Road traffic control signage
- Hydraulic shop tools
- Tree-trimming hydraulic tools, and
- Locator Device

The program budget allows for the replacement of tools and equipment that have reached their end of typical useful life (e.g., due to deterioration, substandard performance, and/or functional inefficiencies), for the purchase of additional tools and equipment needed to maintain the distribution system, as well as for unplanned replacements of tools and equipment due to premature failure. Investments under this program vary year to year based on specific needs. Tools, shop equipment, and garage equipment are depreciated over 10 years.

Major expenditures planned for 2025 predominantly constitute general tool replacements that are broken, failing, or reached their end of typical useful life. CWH is planning on $11,600 in the 2025 test year, with expected expenditures totalling $32,000 between 2025 and 2029.

2. Timing

i. Start Date: January 2025
ii. In-Service Date: 2025-2029
iii. Key factors that may affect timing: Key factors that influence the timing of these investments include:

- Supply chain issues;
- project prioritization, and
- overall budget constraints.

3. Historical and Future Capital Expenditures

	Historical Costs ($ '000)						Bridge Year	Future Costs ($ '000)				
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital (Gross)	6.4	2.6	2.6	5.9	2.0	3.1	5.1	11.6	5.1	5.1	5.1	5.1
Contributions	0	0	0	0	0	0	0	0	0	0	0	0
Capital (Net)	6.4	2.6	2.6	5.9	2.0	3.1	5.1	11.6	5.1	5.1	5.1	5.1

The total cost of tool and equipment purchases from 2025-2029 are anticipated to be $32,000, with an average of $6,400 per year.

4. Economic Evaluation (Expansion Projects)

This is not applicable.

5. Comparative Historical Expenditure

On average, historically CWH has spent $5k per year in tools and equipment. As investments under this program vary from year to year, an accurate comparison of volume of work and type of tools and equipment purchased historically is not representative.

6. Investment Priority

This investment program is classed as the lowest priority. The project is ranked 5th using CWH prioritization process that is outlined in the DSP.

The proposed tool and equipment purchases are critical to CWH being able to carry out its operations and maintenance activities. While a deferral of investment may not have immediate financial or reliability consequences, the negative impact of deferral on CWH's systems is expected to increase over time. It is therefore still important that CWH continues to invest in these items to maintain the current status quo.

7. Alternatives Analysis

The following alternatives were considered for this program:

- **Option 1 – Do Nothing:** Doing nothing is not a viable option. This would impede CWH's ability to carry out the necessary operations and maintenance activities of its distribution system. Furthermore, it would put assets at risk of failure and expose customers to longer and more frequent outages in the event of preventable failures.

- **Option 2 – Invest in Required Tools and Equipment:** This is the preferred option as it allows CWH to invest in the tools and equipment necessary to carry out its operations and maintenance activities. These investments will also enable improved operational efficiency of field crews, lower operational costs, and reduce potential safety risks. Project specific alternatives (e.g., do not replace vs. like-for-like replacement vs. upgrade with additional functionality) are considered on a case-by-case basis depending on the identified need.

8. Innovative Nature of the Project

CWH is not proposing any innovative solutions for delivering this program at this time. CWH will continue to assess any new innovations as they arise.

9. Leave to Construct Approval

This is not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	Having access to the proper tools and equipment in good working order enables field crews to perform their tasks in the most timely and efficient manner.
Customer Value	By investing in various tools and equipment, CWH can improve its maintenance and operations processes. This enables CWH to address the most critical areas on its distribution system, thereby reducing the risk of outages.
Reliability	Continued investment in the proper tools and equipment ensures that the reliability of CWH's system is maintained. Having access to the proper tools and equipment in good working order allows crews to perform their tasks in the most efficient manner including assessing the condition of CWH's assets and performing preventative maintenance on assets to eliminate or reduce the duration of the system interruptions.
Safety	The purchase of proper tools and equipment help to reduce potential safety risks to CWH's staff.

2. Investment Need

i. Main Driver*:* System Maintenance Support - The primary driver for this program is to improve its system maintenance support. The continued investment in various tools and equipment will ensure the continued safe, reliable, and efficient operation of the grid and enable field crews to carry-out maintenance activities in the most efficient manner.

ii. Secondary Drivers*:* There are no secondary drivers for this program.

iii. Information Used to Justify the Investment*:* A range of factors including observations made during ongoing inspections and maintenance activities, input from staff, utility best practice, regulation, and recommendations from manufacturers are considered when identifying and justifying the need for investments under this program. Project specific alternatives are considered on a case-by-case basis.

3. Investment Justification

i. Demonstrating Accepted Utility Practice: It is accepted industry practice that utilities invest in proper tools and equipment necessary to carry out operations and maintenance activities in a safe, efficient, and cost-effective manner. Continuous investment in proper tools and equipment is also required to avoid tool failure which would not allow crews to maintain the distribution system in a timely manner. Through investment in the proposed tools and equipment over the forecast period, CWH will ensure that field crews have what they need to support daily operations and maintenance activities to better serve the customers, as well as plan and execute its technology program to comply with industry standards.

ii. Cost-Benefit Analysis: On a case-by-case basis, CWH carefully weighs the pros and cons of purchasing tools and equipment to determine the best value approach. CWH generally evaluates the benefit of either repairing or replacing the tools and equipment on a case-by case basis.

iii. Historical Investments & Outcomes Observed: While direct comparisons to previous expenditures for tools and equipment are not representative of the level of investment needed over the planning horizon, the program has historically provided value. Investments in proper tools and equipment have supported daily operations and have enabled CWH's field crews to carry-out maintenance activities in a safe, efficient, and cost-effective manner.

iv. Substantially Exceeding Materiality Threshold: This is not applicable.

4. Conservation and Demand Management

This is not applicable.

5. Innovation

For this program, CWH has not identified any innovative solutions.

A. General Information on the Project/Program

1. Overview

The Township is building a new Operations Centre at the north-end of Gartshore Street in Fergus. To the west of the proposed Operations Centre is developable residential lands. This project will extend the 4/44kV north to service the new Operations Centre as well as provide flexibility for future commercial-industrial-residential land servicing.

The Township Operations Centre will require a 44kV service and development lands will require additional 4kV circuits. There are 23 new commercial/light industrial customers in the area that will require three phase electrical services. To accommodate this CWH will need to extend its 4/44kV and 4kV feeders north of Gartshore Street. In addition, the extension will allow for load sharing between feeder 3, 6 and 9, providing additional flexibility.

Specifically, the scope of this project is to extend the F6 poleline out 11 spans (9 pole replacements) and the 44kV 17 spans (6 additional pole replacements). The project will cost $423k and will be carried out in 2025.

2. Timing

i. Start Date: May 2025
ii. In-Service Date: December 2025
iii. Key factors that may affect timing: Permits, supply chain etc

3. Historical and Future Capital Expenditures

	Historical Costs ($ '000)						Bridge Year	Test Year	Future Costs ($ '000)			
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital (Gross)	0	0	0	0	0	0	0	423	0	0	0	0
Contributions	0	0	0	0	0	0	0	0	0	0	0	0
Capital (Net)	0	0	0	0	0	0	0	423	0	0	0	0

4. Economic Evaluation (Expansion Projects)

Please provide an economic evaluation as per section 3.2 of the distribution system code if applicable.

CWH will complete an Economic Evaluation and the potential capital contribution of the development when anticipated loading for the connection is available. Design of the development is currently being completed but not yet available.

5. Comparative Historical Expenditure

This project is a unique project and no historical comparable expenditure is available.

6. Investment Priority

This investment program is classed as a high priority since it is a non-discretionary program driven by third party requests and regulatory compliance. When mandatory projects are undertaken CWH ensures alignment to its project prioritization processes.

When infrastructure relocation / replacement requests are initiated under this program, they will be balanced with other mandatory System Access projects but take priority over other system undertakings and plans.

The project has been ranked 1st as it is a mandatory program.

7. Alternatives Analysis

This investment program is classed as a high priority since it is a non-discretionary program driven by third party requests and regulatory compliance.

8. Innovative Nature of the Project

This is not applicable.

9. Leave to Construct Approval

This is not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	All new installations are designed and constructed as per CWH's latest standards, specifications, and system requirements in order to serve customers in the most efficient and cost-effective manner while providing system flexibility under normal and emergency conditions.
Customer Value	The extension and installation of additional poleline will result in CWH's ability to meet the requirements of the Townships new operation centre, as well as provide flexibility for future growth on industrial and residential lands. In addition, it gives CWH increased ability for

	load transfers allowing for the maintaining of the levels of reliability.
Reliability	This project is not intended for reliability improvements; however, all new construction is in accordance with CWH's current standards and specifications, which lend themselves to more reliable performance reducing the frequency of outages and providing more flexibility with increased load transfer capabilities. Construction is coordinated and performed with minimum interruption to existing customers.
Safety	This project is not intended to address safety concerns with the distribution system; however, they are designed and constructed in accordance with CWH and USF established standards and specifications, in order to provide the highest level of both public and operational personnel safety.

2. Investment Need

i. Main Driver*:* Customer Service Request – CWH is mandated to enable the connection of new services to is grid.
ii. Secondary Drivers*:* Mandated service obligation
iii. Information Used to Justify the Investment*:* CWH has been engaged with the Township of Centre Wellington to understand the scope of its requirements and related timings. IN addition, CWH engages with developers and landowners to understand any potential plans that may require CWH to make adjustments to its own infrastructure.

3. Investment Justification

i. Demonstrating Accepted Utility Practice: CWH uses established standards and construction practices, as well as preapproved standard materials for a cost-effective installation. If alternatives are requested by the customer, CWH evaluates the cost and benefits of the proposal. CWH approves designs and installations as per the latest CSA, USF and/or CWH standards which are in line with industry standards allowing third parties reasonable access.

iv. *Cost-Benefit Analysis:* All new installations are designed and constructed as per *CWH*'s latest standards, specifications, and system requirements in order to serve customers in the most efficient and cost-effective manner while providing system flexibility under normal and emergency conditions. If applicable*, CWH* collects contributed capital as per the Economic Evaluation in accordance with the Distribution System Code and Subdivision Agreement. All assets installed under this project are fully owned by CWH.

v. *Historical Investments & Outcomes Observed:* This is not applicable.

vi. Substantially Exceeding Materiality Threshold: This is not applicable.

4. Conservation and Demand Management

This is not applicable.

5. Innovation

This is not applicable.

A. GENERAL INFORMATION ON THE PROJECT/PROGRAM

1. OVERVIEW

This Capital expenditure is required to collect all costs for the installation and replacement of CWH plant that is driven by customer requests for new services or service upgrades. Over the past 5 years, CWH has experienced a stable customer-base with the number of metered customer accounts increasing at an average rate of 2% per year. A modest number of requests are received each year for newly constructed homes. As demonstrated by the LDC's service quality statistics, CWH's performance in connecting new services is above the minimum target set by the regulator.

CWH anticipates a combination of residential multi, single-customer new service requests within new subdivisions, along with individual in-fill connections and service upgrades to existing residences. Development of new subdivisions is limited and within CWH's service territory the municipalities residential development potential plans indicate approximately 200 new residences within the 5-year timeframe. Consequently, most new services or service upgrades require a single new or modified connection to existing CWH plant which in most cases requires pole replacements, reframing, or upgrades to service the infill lots with underground in order to meet the requirements of Ontario Regulation 22/04.

Minimal new Commercial and Industrial GS>50kW connections are anticipated with CWH's service territory as these will generally be developed in in-fill areas within the boundaries of the town of Fergus and Elora.

2. TIMING

i. Start Date: 2024 - 2029
ii. In-Service Date:2024- 2029
iii. Key factors that may affect timing:

- funding and preliminary payments from customers,
- procurement and sourcing of materials, and
- labour delays.

3. HISTORICAL AND FUTURE CAPITAL EXPENDITURES

	Historical Costs ($ '000)							Future Costs ('$000)				
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital	48.5	57.9	51.4	74.2	21.4	96	63	72	72	72	72	72
Contributions	7	9	0	22	0	29	0	0	0	0	0	0
Capital (Net)	41.5	48.9	51.4	52.2	21.4	67	63	72	72	72	72	72

4. Economic Evaluation (Expansion Projects)

Please provide an economic evaluation as per section 3.2 of the distribution system code if applicable.

Once customer requests are received economic evaluations are completed for multi residential subdivision plans and new commercial industrial developments. Customers are supplied with an offer to connect outlining all associated costing and responsibilities for each party and the timing of completing work.

5. Comparative Historical Expenditure

Where available, comparative information on expenditures for equivalent projects/programs over the historical period (e.g. cost per km of line, cost per pole).

The historical costs associated with service upgrades are shown in Section 3 above. Table 3 highlights the number of new service upgrades performed in previous years. CWH considers historical spend (typically a three-year rolling cost) and factors such as inflation, supply chain, and material costs to generate forecast costs under this program.

Table 1: Comparative Historical Number of Upgrades

	2018	2019	2020	2021	2022
Number of Service Upgrades	213	209	218	198	166

6. Investment Priority

This investment program is classed as a high priority since it is a mandatory, non-discretionary program driven by customer service requests and regulatory compliance. This program is ranked 1st due to it being a mandatory program.

7. Alternatives Analysis

Given the regulatory requirements to process these customer-driven requests as well as the requirements of Ontario Regulation 22/04 in relation to new or modified connections to CWH's system, few alternatives exist for this activity. For each individual connection however, CWH does consider whether the connection or upgrade can be accommodated with a minimal scope of work (e.g., connection to existing Secondary Bus without anchoring or pole changes), while meeting the applicable safety requirements.

8. Innovative Nature of the Project

Not applicable

9. Leave to Construct Approval

Not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	CWH considers options when services upgraded on a case-by-case basis to provide the most cost-effective solution for all parties. Where appropriate, CWH might also revise timing of other planned projects within similar areas to gain overall economic efficiencies. In addition, once design plans are complete, CWH applies for road occupancy permits from the Municipality and County and reviews plans with them to identify any conflicts with their planning and any potential synergies, i.e. common trenching.
Customer Value	New services provide customers safe and reliable access to electricity. By assuring sustainable, reliable, cost-effective electrical services to customers in CWH's service territory, this program contributes towards economic development in the region as well.
Reliability	CWH completes new service to meet consistent reliability practices. Any service upgrades should result in less long-term outages for the individual customer.
Safety	The design and construction of new or modified service connections is completed in accordance with USF Standards to meet the requirements of Ontario Regulation 22/04 and to ensure that no undue safety hazards exist.

2. Investment Need

i. Main Driver*:* Mandated Service Obligations - This program is driven by customer requests and regulatory compliance. This program enables CWH to satisfy its' asset management objective (and corporate objectives) of meeting the needs of its' customers as well as fulfilling regulatory obligations as per the Distribution System Code.

ii. Secondary Drivers*:* Customer Relations - Since this is a customer driven project, it is important for CWH to meets its service obligations and maintain good relationship with its customers. In fact, Customer Focus is one of CWH's core values. As such, this project provides an opportunity to CWH to maintain and improve customer relations.

iii. Information Used to Justify the Investment*:* System Access projects, such as new service upgrades, are driven by third-party customer requests and are mandated by the OEB to be completed under the DSC. CWH has used historical data and information from developers and third-parties to help forecast the potential number of new services required during the forecast period.

3. Investment Justification

i. Demonstrating Accepted Utility Practice:
CWH is a member of the Utilities Standard Form (USF) and, like many other LDCs in the province, uses USF engineering standards when designing and implementing the work carried out within this program.

ii. Cost-Benefit Analysis:
As the new services projects are customer driven, the alternatives considered are presented to meet the requirements of the customer. For each individual connection however, CWH does consider whether the connection or upgrade can be accommodated with a minimal scope of work (e.g., connection to existing Secondary Bus without anchoring or pole changes), while meeting the applicable safety requirements.

iii. Historical Investments & Outcomes Observed:
New services are annual expenditures for CWH. CWH routinely accommodates new services within its service territory. As demonstrated by the LDC's service quality statistics, CWH's performance in connecting new services is above the minimum target set by the regulator.

iv. Substantially Exceeding Materiality Threshold: This is not applicable.

4. Conservation and Demand Management

Not applicable.

5. Innovation

There is nothing innovative being proposed as part of this program.

A. General Information on the Project/Program

1. Overview

Over head Pole-line infrastructure makes up a large portion of CWH's total asset base and Distribution System in general. As such pole-line rebuild projects are a critical part of an overall sustaining proactive replacement strategy that optimizes the overall lifecycle management of the utility's assets. A minimum number of overall replacements are required over the course of the 5-year plan to sustain asset performance at current levels. Though age is not the only factor influencing the pole-line rebuilds, there is often a strong relationship between the age of a pole and the overall condition of all the associated assets within sections of pole-lines.

CWH's asset management of pole assets are described in Section 5.3.2.2.2 of the DSP. Regular inspections and testing programs are designed to identify high-risk poles with attachments, connections, and transformers, for proactive replacement prior to failure. Any reduction in the overall replacement targets associated with this program may potentially increase one-off replacements at higher costs.

Below is a list of pole-line rebuild project with approx. costs for 2025 test year.

Pole-line Rebuild Projects

2025 Pole-line Rebuild Projects	
Project Description	**Est. Cost**
Forfar St & St David St	$121,300

The majority of the pole-line rebuild projects focus on rebuilding lines with pole assets that were installed circa 1980 and are approaching the end of their life. These poles will typically be replaced with Class 3 poles with an appropriate height to meet current construction and safety standards. Conductors, insulators, switches and other associated equipment and devises will be replaced as required.

CWH has consistently completed similar line rebuild work in recent years and does not anticipate significant risks in achieving the annual targets included in the 5-year plan. The priority associated with any given pole or line section within this project is dependent on a number of considerations, including the condition, age and health index scores of in-service poles, and opportunities to create efficiencies between CWH's planned pole rebuild projects and other third-party projects (e.g. road/sidewalk re-surfacing by the Township).

The planned and proactive replacement of assets with high failure and/or performance risk is inherently safer than reactive replacement as the working conditions can be controlled, and the optimal replacement plans can be determined in advance.

Once design plans are complete, CWH applies for road occupancy permits from the Municipality and County and reviews plans with them to identify any conflicts with their planning and any potential synergies. CWH is an embedded distributor with HONI and when planning pole-line rebuilds on joint use poles coordination and planning is communicated reciprocally.

2. TIMING

i. Start Date: 2025
ii. In-Service Date:2025-2029
iii. Key factors that may affect timing:

3. HISTORICAL AND FUTURE CAPITAL EXPENDITURES

	Historical Costs ($ '000)						Bridge	Future Costs ($ '000)				
	201	201	202	202	202	202	2024	202	202	202	202	202
Capital	348	148	220	373	175	274	366	121	0	332	258	169
Contributions	0	0	0	0	0	0	0	0	0	0	0	0
Capital	348	148	220	373	175	274	366	121	0	332	258	169

Table 1: Historical & Future Capital Expenditures

4. ECONOMIC EVALUATION (EXPANSION PROJECTS)

Not applicable.

5. COMPARATIVE HISTORICAL EXPENDITURE

To date, CWH has completed 18 pole-line rebuilds within its 2018 to 2022 plan, and has seen 115 poles being replaced, and the removal of all solid copper that was identified in the 2015 DSP as being in poor condition. The annualized expenditures for these projects over the 2018 to 2022 timeframe is approximately $253K. The table below shows the number of pole-line rebuilds completed over the historical period.

Table 2: Historical Pole Replacement and Costs

Year	# of Pole-line rebuilds completed
2018	4
2019	2

2020	4
2021	4
2022	4

6. Investment Priority

This program has a high priority and is rankled 2nd using CWH prioritization process as outlined in the DSP.

The health condition and age profile of CWH's current pole-lines are currently at a manageable point where CWH can viably replace sections of pole-lines (approximately 35 to 45 poles total) per year within the pole-line rebuild project, before the number of poles and sections of pole-line reach a poor condition and become unmanageable. Overhead pole-lines are one of the most common assets that both employees and the general public come in to contact or close proximity to and as such require a focused attention and priority to proactively maintain and replace. Replacing pole-lines ensures they stay in good condition, do not fail, or cause forced unplanned outages so that reliability is maintained.

7. Alternatives Analysis

CWH has considered alternatives such as increasing or decreasing the annual pole-line replacement targets, based on the number of overall pole changes required due to health indices, along with conductor and apparatus replacement needs expected over the next five-year capital plans. Using the projected pole-line rebuild replacement figures at approximately 35 to 45 pole lengths, CWH expects little change in the number of near end of life pole-lines upon completion of the 5-year plan.

The following options have been considered:

i. **Do nothing and run to fail**: CWH does consider reactive replacement for some pole-lines. While this can be employed for unplanned and unexpected failure of pole lines and associated equipment, it is not sustainable to carry out for all replacements. Customers would experience longer and increased unexpected outages. In addition, rebuilding pole-lines reactively generally incurs a premium as they are unplanned and inevitably are replaced outside normal hours and therefore resource costs increase. This ultimately would increase reactive renewal costs. Typically, these poles are addressed in the Cap Trouble Call program.

i. **Proposed Pacing**: This is the recommended approach when inspection and ACA data indicates that a pole-line needs rebuilding. All poles, conductor and associated equipment are replaced with the latest standard design. The proposed proactive replacement will ensure that the number of unplanned outages remains minimal by avoiding asset failures, so that the customers have access to reliable electricity for their needs. Costs will also be reduced when compared with completing all poles under a reactive program.

ii. **Accelerated Pacing:** CWH has considered this option but based on the number of assets identified as in need of replacement, and the observed outcomes from the historical pacing, CWH does not see the need to increase pacing of this program. A similar number of assets will be replaced as historically, as per the proposed pacing option, which will enable CWH to maintain reliability levels.

iii. **Decreased Pacing:** Decreasing the planned annual pole-line rebuild targeted quantity would increase the potential for poles and hardware to fail while in-service, causing an increase in unplanned forced outages. This could lead to a cycle where the increased reactive rebuild costs due to more frequent unexpected overhead failures and a greater number of deficiencies identified during patrols, leading to less budget capacity to fund the proactive rebuilds, which further decreases the annual proactive replacements and rebuilds. Furthermore, adopting this approach over a 5-year period could result in a surge of future replacements, requiring both increased capital and O&M budgets at the time of CWH's next Cost of Service application.

8. Innovative Nature of the Project

Not applicable.

9. Leave to Construct Approval

Not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	The infrastructure will undergo an upgrade to align with the latest CWH specifications and adhere to the design standards set by the CSA and USF design standards. This strategic enhancement is poised to significantly elevate the reliability of the existing infrastructure, ensuring it operates at optimal efficiency and meets the growing needs of the organization and its stakeholders. This approach to upgrade the infrastructure is grounded in the understanding that proactively replacing assets is far more cost-effective than dealing with unplanned, reactive replacements.

	Unforeseen failures or breakdowns in infrastructure can lead to emergency situations, necessitating immediate attention and often requiring overtime crew-hours to resolve the issues promptly. By proactively replacing assets according to established standards and client specifications, the organization not only minimizes the risk of unexpected failures but also avoids the additional costs associated with emergency work.
Customer Value	Customers benefit from line rebuild projects as these initiatives enhance the reliability, efficiency, and safety of the CWH distribution system. Through the replacement and upgrading of aging components, rebuild projects reduce the frequency of unplanned outages, leading to improved power quality and increased customer satisfaction. Additionally, modernized infrastructure enables increased capacity, scalability, and integration of renewable energy sources, contributing to a more resilient and sustainable energy grid. The incorporation of advanced technologies and safety features further ensures a safer environment for both customers and utility personnel. While the upfront costs are high, the long-term advantages include lower maintenance costs, reduced energy losses, and potential savings, making distribution line rebuild projects a valuable investment for CWH customers.
Reliability	Pole line rebuilds play a crucial role in sustaining the reliability of the CWH distribution system. By replacing aging components and upgrading infrastructure, these projects significantly reduce the likelihood of equipment failures and unplanned outages. The installation of modern technologies enhances the overall stability of the power supply, minimizing voltage fluctuations and disruptions. Customers benefit from a more robust and resilient distribution system that can withstand various challenges, ensuring a consistently reliable power source. The proactive nature of rebuild projects contributes to a reduction in emergency repairs and downtime, ultimately leading to increased reliability and satisfaction among customers who experience fewer interruptions in their power supply.

Safety	Pole line rebuilds contribute to improving the safety of the CWH electrical infrastructure. These projects often involve the installation of more robust and resilient components, reducing the risk of accidents and electrical hazards. Enhanced safety features can include advanced insulation materials, fault detection systems, and improved grounding mechanisms. The rebuild of end-of-life distribution lines not only minimizes the chances of equipment failures but also creates a safer environment for both customers and utility personnel. By incorporating the latest safety standards and technologies, rebuild projects help mitigate potential risks associated with electrical systems. Investing in safety ensures that the CWH distribution system meets or exceeds industry safety regulations, which creates a secure and reliable energy supply for customers while reducing the likelihood of safety-related incidents.

2. Investment Need

i. Main Driver***: Failure Risk* - The primary driver of this program is the planned and sustainable replacement of end-of-life poles, conductors, insulators, switches, and other associated pole-line equipment and apparatus that are at risk of failure. This enables CWH to maintain the same level of reliability as has been historically observed.

ii. Secondary Drivers*:* System operational objectives including safety and reliability. Through the proactive replacement of poor and very poor conditioned poles, conductors and other associated pole-line equipment, CWH can minimize safety issues, as well as maintain reliability levels.

iii. Information Used to Justify the Investment*:*CWH's asset register and the results of third-party Asset Condition Assessment as well as CWH's pole-testing program are the primary sources of information driving this program. Investing in pole line rebuilds has many benefits for CWH. Upgrading aging utility poles enhances the reliability of the power distribution system by reducing the risk of failures and service interruptions. The rebuilds mitigate safety hazards, offering a more secure environment for the public and utility workers. Moreover, the integration of advanced technologies and compliance with current standards improve overall system performance. While the upfront costs are significant, the long-term advantages include increased load capacity, modernization, and substantial cost savings through reduced maintenance. Community satisfaction and resilience to environmental factors further underscore the justification for investing in pole line rebuilds. Additional reference information on the prioritization factors used for poles and the condition results is included in the DSP (Section 5.3.2.2.2) and in Appendix C – Asset Condition Assessment Report of the DSP.

3. Investment Justification

i. Demonstrating Accepted Utility Practice: CWH is a member of the Utilities Standard Form (USF) and, like many other LDCs in the province, uses USF engineering standards which satisfies the requirements applicable for this type of work. All design and construction work is completed in accordance with USF Standards fulfilling the requirements of Ontario Regulation 22/04 and to ensure that no undue safety hazards exist.

ii. Cost-Benefit Analysis: CWH has considered alternatives such as increasing or decreasing the annual pole-line replacement targets. In addition, this would significantly reduce the reliability of the system and cause more outages to customers. Using the projected pole-line rebuild replacement figures CWH expects little change in the number of near end of life pole-lines upon completion of the 5-year plan. Furthermore, decreasing the planned annual pole-line rebuild targeted quantity would increase the potential for poles and hardware to fail while in-service, causing an increase in unplanned forced outages. Although continuing to run lines to failure may reduce the level of targeted capital investment in replacement, the risks associated with this alternative are not worth the cost savings due to increased safety, reliability, and system performance risks. This scenario may create a cycle where more frequent unexpected overhead failures and a higher number of deficiencies identified during patrols result in elevated reactive rebuild costs. This, in turn, reduces the budget capacity available for proactive rebuilds, leading to a decrease in the annual proactive replacements and rebuilds. Implementing this planned approach over a 5-year period could potentially trigger a surge in future replacements, necessitating augmented capital and operational budgets during the next Cost of Service application for the CWH. The benefits of annual pole-line replacement targets provides efficiency and cost savings in O&M going forward.

iii. Historical Investments & Outcomes Observed:
Historical costs are outlined in sections 3 & 5 of Part A of this document. CWH has observed minimization of failure and outages due to end-of-life assets failing unexpectantly. This has helped CWH maintain the levels of reliability observed.

iv. Substantially Exceeding Materiality Threshold: Not applicable.

4. Conservation and Demand Management

Not applicable.

5. Innovation

There is nothing innovative being proposed as part of this program.

A. GENERAL INFORMATION ON THE PROJECT/PROGRAM

1. OVERVIEW

Annual individual pole replacements are completed by prioritizing the identified assets that are in poor to very poor condition, due to damage or deterioration and cannot be viably repaired and are at risk of failing and may be a safety hazard. This is done by assessing the annual pole testing condition report and information provided by the 3rd party contractor's completing the inspections, as well as poles being identified by utility personnel as needing attention. Poor pole health conditions were also determined by METSCO's Asset Condition Assessment (ACA) study performed in 2021 that identified over 200 poles as being in poor to very poor condition. Below are some photos that show the condition of a portion of the poles in CWH system:

Diligent pole replacement planning is inherently safer than reactive replacement as the working conditions can be controlled, and the optimal replacement plans can be determined in advance. Poles are an integral component of overhead distribution systems, being the "support system" for circuits and associated equipment and as such, replacing prior to failure is critical to worker and the public safety.

The goal of the annual pole replacement project is to proactively replace damaged or poor health assets prior to failure. CWH will be replacing between 5-10 poles a year on across the 2025-2029 forecast period. The result is a balance between the cost of the replacement program and reliability impacts, and safety concerns associated with reactive replacement of these assets. The resulting annualized replacement rates allow for efficient use of internal resources.

Once design plans are complete, CWH applies for road occupancy permits from the Municipality and County and reviews plans with them to identify any conflicts with their planning and any potential synergies. CWH is an embedded distributor with HONI and when planning pole-line rebuilds on joint use poles coordination and planning is communicated reciprocally.

2. TIMING

i. Start Date:
ii. In-Service Date:
iii. Key factors that may affect timing: CWH considers several factors that could impact the project schedule, including:

- customer delays or restricted access to work sites;
- availability of budgets;
- resources to accommodate higher priority / non-discretionary projects;
- inclement weather, either in the form of extreme temperatures or due to restoration activities following major storms;
- delays to material shipment from vendors; and,
- general unforeseen delays such as striking rock when digging, tree conservation, municipal/regional consent forms.

CWH has utilized coordination with third parties (municipalities/suppliers/customers) to mitigate some of the issues where possible.

The risk of not completing the projected Pole replacements as scheduled is minimal as they are planned to be completed in an annualized manor over the 5-year plan. Some flexibility in completing these in any given year can be used to ensure the target amount of pole replacements within the 5-year period are completed.

3. Historical and Future Capital Expenditures

	Historical Costs ($ '000)						Bridge Year	Test Year	Future Costs ($ '000)			
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital (Gross)	106	87	77	152	180	63	105	115	115	115	115	115
Contributions	0	14	3	54	7	7	-	-	-	-	-	-
Capital (Net)	106	73	74	98	173	56	105	115	115	115	115	115

4. Economic Evaluation (Expansion Projects)

Not applicable.

5. Comparative Historical Expenditure

To date, CWH's 2018 to 2022 plan has seen 60 poles being replaced within the pole replacement project plan at an annualized cost of $120,428. The table below shows the number of poles replaced over the historical period.

Table 1: Historical Pole Replacement and Costs

Year	# of Poles Replaced
2018	7
2019	5
2020	14
2021	10
2022	24
2023	2

The average annual investment proposed is to replace units based on inspection results from both the ACA and CWH's annual inspection program. Note that the forecast costs also account for increased inflation and increased material and labour costs.

6. Investment Priority

This is a high priority project for CWH and is ranked 2nd using CWH prioritization process outline in the DSP.

The health condition and age profile of CWH's current pole population are currently at a manageable point where CWH can viably replace approximately 5 to 10 poles per year within the pole replacement project, before the number of poles in poor condition become unmanageable. Poles are one of the most common assets that both employees and the general public come in to contact or close proximity to and as such require a focused attention and priority to proactively maintaining and replace.

7. Alternatives Analysis

CWH has considered alternatives that involve increasing or decreasing the annual replacement target associated with this project. Based on the number of overall pole changes anticipated over the duration of CWH's five year forecasted capital projects, and CWH's total pole count health condition assessment analysis, we expect the pole population's health index to be relatively similar after 5 yrs, with the same amount of near-end of life poles.

The replaced poles will be owned 100% by CWH and funded through its capital project plan, that is the recovery of annual deprecation in its' rate-base to pay for asset replacement.

Some of the options that are considered when evaluating a pole replacement:

i. Do nothing and run to fail: CWH does consider reactive replacement for some pole replacements. While this can be employed for unplanned and unexpected failure of poles, it is not sustainable to carry out for all pole replacements. Customers would experience longer and increased unexpected outages. In addition, replacing poles reactively generally incurs a premium as they are unplanned and inevitably are replaced outside normal hours and therefore resource costs increase. This ultimately would increase reactive renewal costs. Typically, these poles are addressed in the Cap Trouble Call program.
ii. Like for like replacement (proactive): This is the standard approach when inspection and ACA data indicates that a pole needs replacing. All poles are replaced with the latest standard design. The proposed proactive replacement of unsafe poles will ensure that the number of unplanned outages remains minimal by avoiding asset failures, so that the customers have access to reliable electricity for their needs. Costs will also be reduced when compared with completing all poles under a reactive program.
iii. Upgrades: If a pole has been identified as needing upgrading this is typically done with coordination with third parties, customers, road authority, and expansion developments. If these are driven by a third-party then these are carried out under System Access projects.

8. Innovative Nature of the Project

Not applicable.

9. Leave to Construct Approval

Not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	The infrastructure will be upgraded to current CWH specifications and CSA and USF design standards and will improve reliability. The proactive replacement of an asset is more cost-effective than an unplanned, reactive replacement, which may require overtime crew-hours for emergency work. CWH utilizes a one-visit approach when considering pole replacement projects to minimize the return visits to upgrade or replace pole attachments at a later date. (i.e., whilst replacing a pole, CWH will see if assets attached to it or in the vicinity also require replacement) Like all other utilities, replacing and maintaining the condition of its poles is a continuing yearly program. Every year, CWH assesses the number of poles that need replacement and balances this off against other priorities.
Customer Value	The investment will address worries related to low line clearances and potential pole failures, mitigating safety and reliability risks. The project's proactive replacement strategy proves to be a more cost-effective approach compared to reactive replacements.
Reliability	Pole replacement projects will allow CWH to maintain the reliability of electrical distribution systems by addressing structural weaknesses, incorporating advanced safety features, and preventing unplanned failures. Pre-emptive replacement of aging poles minimizes the risk of unexpected outages, contributing to a more dependable system. The projects also enable technological integration, and compliance with current standards, further ensuring a robust and scalable network. This project is part of the long-term pole remediation program and will enable CWH to maintain reliability.

Safety	By replacing aging or compromised poles, these initiatives mitigate the risk of collapses and failures, reducing hazards to both the public and utility personnel. When the pole falls, there may be other equipment (e.g., overhead transformer or overhead switch) that could also fall. Additionally, adherence to current safety and engineering standards ensures that the replaced poles comply with the latest regulations. This project will directly address potential safety incidents but also contribute to creating a secure and resilient environment, aligning with the highest safety standards in the industry by replacing poor and very poor condition poles.

2. Investment Need

i. Main Driver*: Failure Risk* - The main driver of this project is to maintain system reliability and performance by addressing poles that are at risk of failure. CWH's asset register and the results of third-party Asset Condition Assessment as well as CWH's pole-testing program are the primary sources of information driving this annual project. To efficiently manage pole assets, replacing in service poles at end of life prior to failure in the field is good utility practice. This allows for controlling the timing of pole replacements which is more cost effective than replacing poles in an unplanned manner. As seen in all CWH customer survey's reliability is a high priority for our customers who expect minimal outages, and replacing poles prior to failing in the field ensures no negative impact to customers due to forced outages from broken poles.

i. *Secondary Drivers*: System operational objectives including safety and reliability. Through the proactive replacement of poor and very poor conditioned poles, CWH can minimize safety issues, as well as maintain reliability levels.

ii. Information Used to Justify the Investment*:.*
Pole failures pose a safety risk to staff and the public. In the case that there are transformers on the pole, a pole falling may also cause the transformers to fall down and fail. Hence, CWH utilises its GIS system to overlay the poles identified as decrepit from the ACA (poor and very poor) with its system map to identify the locations and how many customers could be impacted (as well as critical infrastructure connected e.g., a hospital) by an unexpected failure, resulting in a transformer tank rupturing, and oil being spilled onto the ground. Additional reference information on the prioritization factors used for poles and the condition results is included in the DSP (Section 5.3.2.2.2) and in Appendix C – Asset Condition Assessment Report of the DSP.

3. Investment Justification

i. Demonstrating Accepted Utility Practice: CWH is a member of the Utilities Standard Form (USF) and, like many other LDCs in the province, uses USF engineering standards which satisfies the requirements applicable for this type of work. All design and construction work is completed in accordance with USF Standards fulfilling the requirements of Ontario Regulation 22/04 and to ensure that no undue safety hazards exist
ii. Cost-Benefit Analysis: Replacing assets with a poor health condition are a critical part of an overall sustaining proactive replacement strategy that optimizes the overall lifecycle management of the utility's assets. A minimum number of overall replacements are required over the course of the 5-year plan to sustain asset performance at current levels. CWH's asset maintenance of poles are described above in section A. Regular inspections and testing programs are designed to identify poor health poles for proactive replacement prior to failure.
iii. Historical Investments & Outcomes Observed: Historical costs are presented in Section A3 of this document. The proactive replacement strategy of the project as planned is less costly than reactive replacements. CWH's strategy has been to sustain the system and continue to maintain reliability and continue to minimize outages, and this is what has been seen during the 2018-2023 period. Reliability levels have typically been maintained. Safety from falling poles has continued to be addressed with no increase in any safety issues.
iv. Substantially Exceeding Materiality Threshold: Not applicable.

4. Conservation and Demand Management

Not applicable.

5. Innovation

There is nothing innovative being proposed as part of this program.

A. General Information on the Project/Program

1. Overview

Distribution transformers are a critical component of the distribution system that services CWH customers and managing the lifecycle of these components on a run to failure basis requires an adequate stock of inventory. CWH's transformer inspections, and subsequent maintenance of transformers extends the life of transformers in the field, although transformer replacements due to age and poor condition are necessary as well as replacing transformers damaged in the field from storms and vehicle accidents.

No CWH distribution transformers either underground or overhead in the field were found to be in very poor condition and very few were assessed to be in poor condition in the ACA completed in 2021. This can be attributed to the proactive inspection and maintenance program of distribution transformers which relies on an inventory of transformers in stock in the event of a transformer running to failure.

Alternatives have been considered that involve increasing or decreasing the annual transformer inventory targets for this program. Based on the number of overall transformer changes anticipated over the next five years through all capital projects and programs, CWH expects little change in the number of near-end of life transformers upon completion of the 5-year plan. CWH stocks only what is necessary to connect new customers and replace active transformers that fail in any given year.

This strategy optimizes the assets life cycle and reduces capital investment needed by proactively maintaining and inspecting transformers regularly. Balancing the transformer maintenance plan with replacement needs will be sustained over the 5 year period with asset performance staying level

The purpose of CWH's annual distribution transformer purchase project is to ensure an adequate inventory of overhead and underground transformers of all applicable sizes and voltages. These transformers are for both new service connections that are driven from builders and customers and replacement of damaged transformers in the field for both overhead and underground applications.

Historically CWH purchased thirty-one overhead and sixty-four underground transformers during the period 2018-2023, or an average of 16 transformers per year. In the forecast period, CWH is planning to purchase and install up to 13 new units per year, depending on specific customer/system requirements and combined with CWH identified transformers nearing end of life. In addition, given the development intensification within its service areas, CWH anticipates purchasing additional three phase pad-mount transformers to maximize the amount of energy available while minimizing the physical footprint of the equipment.

2. Timing

i. Start Date: 2025
ii. In-Service Date:2025-2029
iii. Key factors that may affect timing:

The main risk to having adequate inventoried stock of distribution transformers and completing the planned transformer purchase schedule annually is longer delivery times of ordered transformers which is becoming more common in previous years. Lead times for distribution transformers is upwards of 52 weeks or more and having an adequate supply of transformers for new and replacement applications reduces the risk of these long lead times inherent with transformer purchases. The risk of maintaining an adequate stock of inventory over the 5-year annualized period is minimal although actual delivery and purchase dates may not fall within the planned year due to delayed deliveries.

3. Historical and Future Capital Expenditures

	Historical Costs ($ '000)						Bridge Year	Test Year	Future Costs ($ '000)			
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital (Gross)	152	128	88	14	27	82	219	306	306	306	306	306
Contributions	0	3	0	0	0	0	0	0	0	0	0	0
Capital (Net)	152	125	88	14	27	82	219	306	306	306	306	306

4. Economic Evaluation (Expansion Projects)

Not applicable.

5. Comparative Historical Expenditure

CWH's annual distribution transformer purchases over the 2018 to 2022 timeframe has averaged $81,597. Transformer prices have increased approximately 25% from 2018 costs to 2021 costs and the cost of inflation will increase these prices in CWH's 2025 to 2029 DSP timeframe.

6. Investment Priority

This is considered a medium investment priority and has a priority score of 3. In order to maintain system integrity and reliable service to the customers, CWH plans to replace its overhead and underground transformers (e.g., pole-top and padmounted transformers) with the new standardized transformers when they fail, unless identified as in need of immediate replacement. In order to pursue this strategy, CWH had to ensure it has an adequate stick of transformers to be able to replace transformers quickly once they do fail. This allows CWH to minimize disruption to customers and performed replacements in the most optimal manner. CWH stocks only what is necessary to connect new customers and replace active transformers that fail in any given year.

7. Alternatives Analysis

According to the Kinectrics Report "Asset Amortization Study for the Ontario Energy Board", the Typical Useful Life of distribution polemounted and padmounted transformers is 40 years. While age is a factor, CWH utilizes the results of the ACA to ensure a detailed review and a condition-based decision is completed in order to identify if any transformers should be replaced proactively. CWH overall approach adopts a combined proactive and reactive replacement plan as outlined below.

Some of the options that are considered when evaluating a transformer replacement include:

i. **Run to fail**: If there are no safety (corrosion or oil leaks) issues present, this is the typical CWH approach for transformer replacement. While this can be employed for unplanned and unexpected failure of transformers, it is not sustainable to carry out for all transformer replacements. Customers would experience longer and increased unexpected outages. In addition, replacing transformers reactively generally incurs a premium as they are unplanned and inevitably are replaced outside normal hours and therefore resource costs increase. This ultimately would increase reactive renewal costs.

ii. **Like for like replacement (proactive):** This is the approach when inspection and ACA data dictates that a transformer needs replacing. Through this approach CWH is able to address the high priority at risk assets, mitigating safety, environmental concerns, and ensuring reliability levels are maintained. The proposed proactive replacement of unsafe transformers will ensure that the number of unplanned outages remain minimal by avoiding asset failures, so that the customers have access to reliable electricity for their needs. Costs also be reduced when compared with a completing all transformers under a reactive program.

iii. **Upgrade to address overloading issues**: this is usually brought up through customer complaints and/or a customer request. This is very sporadic year over year.

8. Innovative Nature of the Project

Not applicable.

9. Leave to Construct Approval

Not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	The infrastructure will be upgraded to current client specifications and design standards and will improve reliability. Proactive replacement of an asset is more cost effective than an unplanned, reactive replacement, which may require overtime crew-hours for emergency work and prolonged outage restoration time.
Customer Value	Being responsive to developers, builders and customers servicing requirements is a priority to CWH and being prepared for connecting new services via new transformer installations enables this. New transformers are also needed to replace failed transformers in the field which addresses our customers expectation of CWH continuing to provide a reliable electrical service to them as identified in customer engagement surveys. Replacing distribution transformers brings tangible benefits for customers, including enhanced reliability with reduced unplanned outages, improved energy efficiency leading to potential cost savings, and stable voltage regulation for optimal performance of electrical devices. With reduced maintenance requirements, enhanced safety features, and long-term cost savings, the replacement of distribution transformers directly enhances the overall value and efficiency of the electrical distribution system for customers.
Reliability	The implementation of this replacement program is anticipated to uphold reliability by minimizing the risk the downtime of transformer and any reliability impacts. This strategic approach not only minimizes the impact to reliability, but also contributes to the overall resilience of the system, reducing the likelihood of service interruptions and optimizing the reliability.

Safety	Transformer failures pose safety risk to staff and the public. The transformer may fail when staff are working on the unit or when the public is near the unit. Oil filled leaking transformers can be removed from service and will be safely disposed of using a credited environmental waste service. Investments in proactive transformer replacements under this program will help mitigate the safety and environmental risks associated with failure of these assets.

2. Investment Need

i. Main Driver*:* Safety & Reliability - CWH proactively inspects and maintains transformers to extend their life and ensure worker and public safety is being met and the reliability and performance of transformers is not compromised. This allows CWH to run transformers to failure and having an adequate stock of replacement transformers is necessary for this project plan.

ii. Secondary Drivers*: Customer Service Requests* - Stock transformers are also required for new service connections and CWH endeavors to be responsive to customer and developers needs and connecting new services in a timely manner.

iii. Information Used to Justify the Investment*:* CWH has used a combination of the ACA results, along with historical replacement based on failures. In addition, CWH continues to see growth in its area and has used known information to incorporate transformer purchases for any potential customer connections.

3. Investment Justification

i. Demonstrating Accepted Utility Practice: CWH is a member of the Utilities Standard Form (USF) and, like many other LDCs in the province, uses USF engineering standards which satisfies the requirements applicable for this type of work. All design and construction work are completed in accordance with the USF Standards fulfilling the requirements of Ontario Regulation 22/04 and to ensure that no undue safety hazards exist. In addition, it is typical and accepted practice for utilities to have a run to fail strategy for the replacement of distribution transformers.

ii. Cost-Benefit Analysis: CWH's typical approach is the replace transformers as they fail. By having an adequate supply of transformers ready, CWH is able to respond quickly to failures minimizing any impacts to outage times. Without the ready supply of transformers, reliability would be impacted more with lead times varying for each replacement. In addition, if CWH identifies any transformer(s) through its inspection and ACA that are in danger of imminent failure, CWH will proactively replace these.

iii. Historical Investments & Outcomes Observed: Historical costs have been presented in Section A3 of this document. The strategy of having an adequate stock level of transformers has allowed CWH to use a run to fail strategy, whilst minimizing outage impacts, reactive costs, and being able to maintain reliability levels.

iv. Substantially Exceeding Materiality Threshold: This is not applicable.

4. Conservation and Demand Management

Not applicable.

5. Innovation

There is nothing innovative being proposed as part of this program.

A. General Information on the Project/Program

1. Overview

The Township is planning on completing a road construction project along St David St North in Fergus. CWH plans on taking advantage of this road reconstruction to replace 3 existing poles that were installed circa 1990, in poor condition and are out of plumb due to the lack of anchoring/guying available at the time of installation. In addition as part of Township's excavation, CWH will be able to install UG Conduit for UG conductor while avoiding restoration costs.

CWH will replace three existing poles in poor condition due to noncurrent standard design and leaning at an unacceptable degree. In addition, CWH will install two primary 3-phase risers and one primary 2-phase riser, install 4 -4" duct bank , install new 350 mcm copper primary 15 KV conductor, new terminations and hardware, converting some of the asset into UG assets making them more reliable and less susceptible to damage from third party actions.

2. Timing

i. Start Date: May 2025
ii. In-Service Date: December 2025
iii. Key factors that may affect timing: Permits, supply chain etc

3. Historical and Future Capital Expenditures

	Historical Costs ($ '000)						Bridge Year	Test Year	Future Costs ($ '000)			
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital (Gross)	0	0	0	0	0	0	0	114	0	0	0	0
Contributions	0	0	0	0	0	0	0	0	0	0	0	0
Capital (Net)	0	0	0	0	0	0	0	114	0	0	0	0

4. Economic Evaluation (Expansion Projects)

This is not applicable

5. Comparative Historical Expenditure

CWH has not completed any recent projects that are similar in nature to the proposed and therefore no comparable expenditures exist.

6. Investment Priority

This investment program is classed as a high priority since it is addressing assets that are at risk of failure and taking the opportunity of bundling this work when the Township is carrying out work, to minimize disruption to customers. Through CWH's prioritization process this project has a priority score 2. This means after System Access Mandatory projects, this is the next highest level priority project.

When infrastructure relocation / replacement requests are initiated under this program, they will be balanced with other mandatory System Access projects but take priority over other system undertakings and plans.

7. Alternatives Analysis

The following options have been considered by CWH:

i. **Do nothing**: This is not an option. These poles and the pole line at leaning at an unacceptable angle and are in poor condition and at risk of failure. They also pose a safety risk to the public. If not addressed, these poles and the associate equipment could fall over causing outages and pose significant safety risk.

ii. **Replace the assets in conjunction with the Township Road construction project:** This is the preferred option. It allows CWH to minimize any disruption to it customers, as well as take advantage of any joint efforts with the Township, providing efficiencies in delivering this project.

iii. **Replace separate to the Township project:** This option, whilst feasible, would mean additional impact to customers as CWH would have to come at a different time to the Township. Any potential efficiencies firm combing the project with the Township project would also be lost.

8. Innovative Nature of the Project

This is not applicable.

9. Leave to Construct Approval

This is not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	All new installations are designed and constructed as per CWH's latest standards, specifications, and system requirements in order to serve customers in the most efficient and cost-effective manner while providing system flexibility under normal and emergency conditions. CWH is using the opportunity of the Township carrying out work to minimize disruption to customers and cost by coming back at a different time to complete this project.

Customer Value	The extension and installation of additional poleline will result in CWH's ability to meet the requirements of the Townships new operation centre, as well as provide flexibility for future growth on industrial and residential lands. In addition, it gives CWH increased ability for load transfers allowing for the maintaining of the levels of reliability.
Reliability	By repairing leaning poles, this will reduce the risk of it falling and causing a potential outage, thus enabling CWH to maintain its reliability. In addition, all new construction is in accordance with CWH's current standards and specifications, which lend themselves to more reliable performance reducing the frequency of outages and providing more flexibility with increased load transfer capabilities. Construction is coordinated and performed with minimum interruption to existing customers.
Safety	By addressing assets that are at risk of falling over and posing safety risks, this will remove the safety risk protecting both the public and employees.

2. Investment Need

i. Main Driver*:* Failure Risk – Addressing assets that are at risk of failing due to being in poor condition will enable CWH to maintain reliability. This aligns with customers' wants of the utility maintaining a similar level of reliability and minimizing outages.

ii. Secondary Drivers*:* Safety is the secondary driver of this program. The existing equipment is aged and in poor condition and is at risk of falling over which poses a safety risk to both the public and employees. The replacement of the deteriorated infrastructure to current industry standards will reduce the safety and access concerns and risk of failure.

iii. Information Used to Justify the Investment*:* CWH has been engaged with the Township of Centre Wellington to understand the scope of its requirements and related timings, to ensure it aligns its plans with the Township.

3. Investment Justification

i. Demonstrating Accepted Utility Practice: CWH uses established standards and construction practices, as well as preapproved standard materials for a cost-effective installation. If alternatives are requested by the customer, CWH evaluates the cost and benefits of the proposal. CWH approves designs and installations as per the latest CSA, USF and/or CWH standards which are in line with industry standards allowing third parties reasonable access.

iv. *Cost-Benefit Analysis:* These assets need to be addressed to mitigate any failure and safety risks. By combining this work with the Township, CWH is able to minimize impact to customers, as well as take advantage of any efficient that can eb achieved with combining the efforts. By replacing these assets, CWH will be able to maintain reliability levels and reduce the safety risk posed in an efficient and least impactful way to its customers.

v. *Historical Investments & Outcomes Observed:* Where CWH has completed projects to convert asset to UG, CWH has experienced better reliability and the plant is more visually appealing to its customers. In addition, costs are generally reduced when completing these projects in conjunction with municipal road construction projects (i.e., reduced restoration costs, etc.)

vi. Substantially Exceeding Materiality Threshold: This is not applicable.

4. Conservation and Demand Management

This is not applicable.

5. Innovation

This is not applicable.

A. General Information on the Project/Program

1. Overview

CWH has an active and stock meter population (total meter count) of 7,840. CWH replaces damaged and failed meters in the field on an as needed basis and is experiencing an average annual failure rate of approximately 1.5%.

On a proactive basis CWH schedules regular Meter reverification changeouts and sampling practices to ensure all active meters in the field have a current seal period. Mass deployment of smart meters occurred in 2009 with a seal year of 2019, a Measurement Canada approved sampling of these meters was completed in 2019 to acquire an 8 year extension given the majority of CWH's current active meters a 2027 seal.

CWH has a limited number of meters to reverify in 2025 and 2026 which is reflected in the budgets. Starting in 2027 CWH's meter capital expenditure will increase to accommodate the planned 6 year seal extension through sampling mass deployed meters, and provision an annual replacement going forward of approximately 1000 meters to replace the fully depreciated assets.

2. Timing

i. Start Date: 2025
ii. In-Service Date: 2025-2029
iii. Key factors that may affect timing:
   - *Customer Connection timings*
   - *Supply Chain issues*

3. Historical and Future Capital Expenditures

Table 1: Historical & Future Capital Expenditures

	Historical Costs ($ '000)						Bridge Year	Future Costs ($ '000)				
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital (Gross)	33.9	94.4	37.7	25.5	79.6	22.7	52.5	24.9	51.4	272.3	272.3	272.3
Contributions	0	0	0	0	0	-3.5	0	0	0	0	0	0
Capital (Net)	33.9	94.4	37.7	25.5	79.6	19.2	52.5	24.9	51.4	272.3	272.3	272.3

4. Economic Evaluation (Expansion Projects)

This is not applicable.

5. Comparative Historical Expenditure

Metering services are ongoing annual expenditures. Historical costs are reflected in Section 3 above. The following table shows the number of meters purchased each year from 2018-2023. Meters are purchased into inventory and exact installation timing depends upon the needs of customers.

Table 2: Number of Meters Purchased Per Year

Year	# of meters purchased
2018	120
2019	516
2020	310
2021	44
2022	318
2023	12

The per unit cost for material and labour were derived from historical data on equivalent projects. This cost was then corrected to account for changes in exchange rates, labour, and material increases.

6. Investment Priority

This investment program is classed as a high priority / non-discretionary due to the obligation to connect new customers and the need to comply with mandated service obligations as defined by the DSC and Measurement Canada. This program is ranked 1st due to it being a mandatory program.

7. Alternatives Analysis

This is a mandatory project and a regulatory requirement. Metering asset management is governed by Measurement Canada regulations and customer requirements for new and upgraded services.

No alternatives were considered since failure to perform the work to install, repair, replace and/or reseal meters would be in violation of the DSC and Measurement Canada Guidelines, and has the potential to negatively impact the reliable source of billing settlement data.

8. Innovative Nature of the Project

This is not applicable.

9. Leave to Construct Approval

This is not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	Customer connection projects are driven by customer requests and the customer's specific technical requirements. CWH uses standardized designs that have been engineered and approved in order to build efficiencies into the process. Customer connection requests are fulfilled consistent with CWH's Conditions of Service. Additionally, through addressing meters that are expiring, CWH will have reduced the number of meters that would be susceptible to unexpected failure and therefore reduce the cost for having to reactively repair these meters.
Customer Value	Benefits to the customer include timely service and supply of electricity coupled with Time of Use (TOU) pricing and data visibility. Additionally, by upgrading and renewing existing meters that are expiring, this will ensure that customer meters continue functioning, capturing accurate electricity usage
Reliability	By installing new meters that are up to current standards, this ensures that the reliability of the meters themselves continues to be maintained, thus enabling a reliable source of billing settlement data.
Safety	New meters will meet all safety standards.

2. Investment Need

i. Main Driver*:* Mandated service obligation - The main driver for this program is CWH's obligation related to metering services as defined by the DSC and Measurement Canada. CWH is obligated to install and maintain meters at all customer connection points from both residential and commercial customers. By accommodating new connection requests and by replacing meters that have expired with new meters, CWH ensures that it complies with its obligations to provide, install, and maintain a meter installation for retail settlement and billing purposes for each customer connected to the distribution system.

ii. Secondary Drivers: Failure Risk – By addressing expired meters, this reduces the risk of the meters failing and ensures the continued delivery of reliable and accurate bills.

iii. Information Used to Justify the Investment*:* New meter installations are mandatory investments arising from customer requests for new service connections, therefore customer requests are the source of information used to justify the new meter installations. CWH also collects and tracks data on its existing meters, and this information is used to determine when a meter requires testing, resealing, or replacing.

3. Investment Justification

i. Demonstrating Accepted Utility Practice: For new connections or service upgrades, CWH plans and executes its metering program to accommodate customer requests and comply with regulations. All new meters installed comply with the latest standards and regulations, and all metering services will be carried out in accordance with CWH's standards and practices. Meter changes due to customer concerns about meter inaccuracy, and for meter seal life are driven through Measurement Canada.

ii. Cost-Benefit Analysis: This is not applicable.

i. *Historical Investments & Outcomes Observed:* This historical costs and number of meters purchased during the historical period are detailed in sections A3 and A5 of this document. Through its metering program, CWH has been able to continue to meet customer requirements, comply with relevant regulatory requirements, and accurately and correctly measure and bill customers for the electricity that they use.

iii. Substantially Exceeding Materiality Threshold: This is not applicable.

4. Conservation and Demand Management

This is not applicable.

5. Innovation

This is not applicable.

A. General Information on the Project/Program

1. Overview

Centre Wellington Hydro Ltd. (CWH) has planned a new “Fergus MS-5” station to be constructed at an estimated budgeted cost of $3,355,200, with the station commissioned and in-service in 2026. CWH currently services customers (4,604 residential, 601 C&I) in Fergus through four Distribution Stations. All four existing distribution stations are 44kV to 4kV and are located within the urban boundaries of the urban areas of Elora and Fergus. The capacity of the existing 4 stations is a total of 21MVA, and the aggregate peak load for the stations, averaged over the 2021 to 2023 years was 16.5MVA, with an absolute peak aggregate load of 19.1MVA. The current capacity allows for one of the stations to be removed from service for planned or unplanned outages with no room for additional stations to also be taken out of service at the same time. Further to this, the geographical location of the existing stations are situated in a manner that limits feeder egress to the location of loads and customers in a large part of Fergus. Through various consultations including the Regional Planning Process (RPP) with the Independent Electricity System Operator ("IESO") and Hydro One Networks Inc. ("HONI"), CWH’s load forecast data identified approximately 5% increased load year over year over the 5-year CoS timeframe.

In the event of unexpected failures and/or significant increase in load, this reduces CWH resiliency in being able to switch loads to ensure all customer continue to be served without interruption. The new station will provide further capacity in the needed areas to alleviate the need for expansion of other existing circuits in the system. Whilst expansion of these circuits could alleviate a short term need, in the long term, this investment would be redundant as CWH would eventually need to build a new station to accommodate the going customer population and hence demand in its Fergus service area.

The new station in Fergus, as proposed offers the following advantages to the customers its services. The location is on the south-end of Fergus, well away from the flood plain but also situated within a high-load area. Furthermore, it’s located on a piece of land that has long been considered for a future CWH station and is already owned by CWH. CWH has good working relationships with the Township of Centre Wellington and will work to ensure the resulting electrical infrastructure meets the local/community needs, similar to the experience at Elora MS-1 in Bissell Park.

The government of Ontario has designated Centre Wellington as an area of significant growth within the larger region of Wellington County. The new station will accommodate the anticipated growth in the Township of Centre Wellington, which is expected to be 10% over this DSP timeframe. Reliability and service quality that our customers currently receive and are in favour of continuing as evidenced through CWH customer engagement will continue to be provided through the new station build and allow for sufficient electrical infrastructure to meet the expected growth, as well as increase resiliency and flexibility within CWH network. This station will also allow CWH to address near future electrification needs including but not limited to EV chargers which CWH has seen and continues to expect to see an increase in requests for.

The urban area of Centre Wellington areas expected to grow by 20% (intensification target within Wellington County's official plan conversation) or more over the next thirty years, with it being preferred that growth will be accelerated in areas that are currently on municipal services. CWH has an obligation to prepare to support this growth.

CWH expects that this investment will have minimal impact to CWH customer bills, whilst also meeting the needs of future demand and keeping reliability at the levels customer expect. This investment will help CWH deliver on the needs identified through its customer survey.

Due to the long lead times the industry is experiencing with Station Transformers, CWH is purchasing the transformer for this new station in 2024. The costs or this transformers will stay in work-in-progress until the station is in-service in 2026.

2. Timing

i. Start Date: 2024
ii. In-Service Date: 2026
iii. Key factors that may affect timing:
The current state of inflationary costs, delayed material delivery times and skilled experienced labour force may all contribute to the timing of completing the station build. CWH has experienced equipment purchasing delays in recent years that could impact the construction timeline of this new Municipal station. CWH has attempted to mitigate this by placing an order for the transformer in 2024.

3. Historical and Future Capital Expenditures

	Historical Costs ($ '000)						Bridge Year	Test Year	Future Costs ($ '000)			
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Capital (Gross)	0	0	0	0	0	0	0	0	3,355	0	0	0
Contributions	0	0	0	0	0	0	0	0	0	0	0	0
Capital (Net)	0	0	0	0	0	0	0	0	3,355	0	0	0

4. Economic Evaluation (Expansion Projects)

Not applicable.

5. Comparative Historical Expenditure

From the years 2012 to 2016 CWH had a Station upgrade and rebuild program as part of its Asset Management Plan within that era's Cost of Service rate rebasing. Within CWH's Fergus Distribution system this program saw to completion civil and electrical rebuilding of the four distribution stations in Fergus with new switchgear, automated reclosers, feeder cabling, control shack with SCADA connections, and oil containment. In the following Cost of Service era (starting in 2018) CWH replaced the 5MVA fully deprecated station transformer at Fergus MS-2 with a 6MVA unit. These improvements increased the overall capacity to service the existing load and growth and provided SCADA data to give feeder loading visibility which allowed for more flexible switching to meet the demand. The actual cost for each of the mentioned stations rebuilds are as per below table.

STATION	Year rebuilt	Total cost
Fergus MS-2 - Station rebuild	2012	$1,164,265
Fergus MS-1 - Station rebuild	2013	$1,249,340
Elora MS-1 - New Station build	2014	$1,935,513
Fergus MS-3 - Station rebuild	2015	$807,551
Fergus MS-4 - Station rebuild	2016	$705,614
Elora MS-2 - Station rebuild	2016	$496,695
Fergus MS-2 - New Station transformer	2019	$784,078

CWH has acquired preliminary budgetary costing to build a new station in Fergus to ensure reliability is maintained within the Fergus distribution system with feeder switching flexibility and increase overall capacity to meet the projected load demand. Preliminary costs attributed to the entire project are expected to be $3,355,200 which is around a 70% increase compared to the 2014 Elora MS-1 New Station Build actual costs as seen in the table above. This project will be identical to the Elora MS-1 new station build in 2014 with the same transformer, switchgear, reclosers, and other equipment specifications and layout with the same load serving capabilities. The reasons for the increase are due to supply chain costs, with most major asset components within the station now costing significantly more. Further, due to other economic factors, the cost of inflation and other elements has meant costs are a lot more than they were 10 years ago. In the purchasing of assets and the building of this new station, CWH will continue to follow its procurement framework to achieve the best solutions and costs possible.

6. Investment Priority

This is a high priority project for CWH. Whilst this is not a test year project and therefore has no formal priority score, it would be considered one of the top 3 priorities for CWH. The need for the new Fergus MS-5 Station project has been a consideration within CWH's Asset Management Process for a number of years. As mentioned above CWH went through multi year Stations rebuilding projects which were projects completed as part of the AMP with consideration to the combined overall systems reliability and capacity. These betterments along with the additional capital project to replace the station transformer at Fergus MS-2 allowed CWH to delay the need for the now necessary Fergus MS-5 station project.

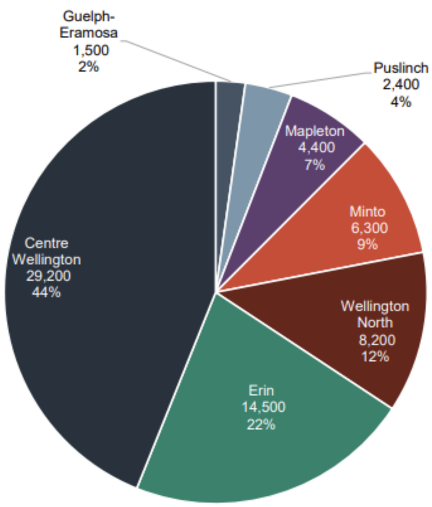
Centre Wellington Township is considered one of the Provinces places to grow and the most recent by-law that Wellington County has passed approving the Official Plan[1] for the County supports the provinces objectives. The tables below show the forecasted growth in the County with Centre Wellington marked for the greatest growth area.

Figure 1
County of Wellington
Population Forecast by Area Municipality

Year	Centre Wellington	Erin	Guelph-Eramosa	Mapleton	Minto	Wellington North	Puslinch	County of Wellington
2016	29,000	11,800	13,200	10,800	8,900	12,300	7,600	93,600
2051	58,200	26,300	14,700	15,200	15,200	20,500	10,000	160,000
Population Growth								
2016 - 2051	29,200	14,500	1,500	4,400	6,300	8,200	2,400	66,400

Note: May not add up precisely due to rounding.
Source: Watson & Associates Economists Ltd.

Figure 2
County of Wellington
Population Growth Allocation, 2016 to 2051
by Area Municipality



Source: Watson & Associates Economists Ltd.

[1] Report (wellington.ca)

A-3, Table 1
Township of Centre Wellington
Population and Housing Forecast, 2016 to 2051

Fergus

Year	Population (Excluding Census Undercount)	Population (Including Census Undercount)[1]	Households				Persons Per Unit (PPU)
			Low Density[2]	Medium Density[3]	High Density[4]	Total	
2016	14,300	14,700	4,060	470	1,170	5,690	2.51
2021	18,500	19,100	5,100	790	1,410	7,310	2.53
2026	19,500	20,100	5,290	960	1,530	7,790	2.50
2031	22,900	23,600	6,200	1,010	1,770	8,980	2.55
2036	26,900	27,700	7,200	1,340	1,930	10,470	2.57
2041	30,700	31,600	8,220	1,520	2,100	11,840	2.59
2046	32,600	33,600	8,440	1,960	2,480	12,870	2.53
2051	35,300	36,300	8,850	2,430	2,785	14,060	2.51
2016 - 2041	16,400	16,900	4,160	1,050	930	6,150	
2016 - 2051	21,000	21,600	4,790	1,960	1,615	8,370	

Elora/Salem

Year	Population (Excluding Census Undercount)	Population (Including Census Undercount)[1]	Households				Persons Per Unit (PPU)
			Low Density[2]	Medium Density[3]	High Density[4]	Total	
2016	6,900	7,100	2,090	210	370	2,660	2.59
2021	7,600	7,800	2,250	240	460	2,960	2.57
2026	10,500	10,900	3,120	340	550	4,000	2.63
2031	11,100	11,400	3,240	350	570	4,160	2.66
2036	11,800	12,100	3,450	390	590	4,430	2.66
2041	12,700	13,100	3,580	650	600	4,820	2.63
2046	12,900	13,300	3,630	650	700	4,990	2.60
2051	13,600	14,100	3,780	720	780	5,280	2.58
2016 - 2041	5,800	6,000	1,490	440	230	2,160	
2016 - 2051	6,700	7,000	1,690	510	410	2,620	

Given the governments projections for growth for the Township of Centre Wellington there will be a need for increased electrical servicing.

Through the Asset Condition analysis, monitoring system performance and development requirements the need for the new station was assessed. Data sets that fed into the analysis for the New Station project and decision making were; Stations normal and peak loading, operating maps with feeder locations, lengths, and loading, asset condition of other stations, projected growth and EV charging requests.

Within CWH's AMP process the objectives are to distribute electricity safely and reliably with highest operating efficiency to maintain low distribution rates and these key objectives are based on a ranking to determine priority investments. The ranking scale is from 5 to 1 (5 being the highest) in prioritizing investments as per the below list and The Fergus MS-5 capital project planning process took each of them into consideration when planning the project.

- Maintaining public and employee safety - Ranking 5
- Maintaining reliability commensurate with customer needs - Ranking 5
- Providing customer service quality to satisfy customer needs - Ranking 5

- Controlling costs - minimizing asset life cycle costs - Ranking 4
- Minimizing risk of in-service failures - Ranking 4
- Minimizing environmental risks - Ranking 4
- Aligning the DSP with regional planning objectives - Ranking 3
- Facilitating new renewable generation connections - Ranking 3
- Facilitating the smart grid development - Ranking 2

The key priorities as ranked above that impacted the investment priority were maintaining reliability commensurate with customer needs (5), Providing customer service quality to satisfy customer needs (5), Controlling costs - minimizing asset life cycle costs (4), Minimizing risk of in-service failures (4), and aligning the DSP with regional planning objectives (3). Although facilitating new renewable generation connections was not a high consideration for short term needs, the additional station will increase the generation capacity of the overall Distribution system for future connections which will support the expected future DER connections.

7. Alternatives Analysis

CWH has considered three alternatives, in addition to its recommended approach, to the planned station build project, two wires based, and one do nothing approach. CWH did not consider a non-wires solution, specifically a BESS project, as our challenge is not capacity on the sub-transmission feeder that currently has adequate capacity with additional capacity available, or meeting a portion of peak demand on the 4kV system for a select few hours which are generally the benefits of BESS systems. Rather, needing a solution to allow for appropriately loaded feeders as per their design parameters with flexible switching options for normal and abnormal scenarios for the distribution system as a whole within the 4kV systems inherent distance capabilities.

The following options were considered:

1) **Do nothing and manage the system with existing stations and feeders.**

Based on the current growth projection of the population as outlined in the Official Plan by the town, CWH's existing distribution system will become overloaded from the system capacity stand-point, less reliable because of lack of system redundancy and new development in the area cannot be serviced, which would put CWH in breach of its obligations to facilitate new customer connections. This would also lead to larger costs in the future, for replacing failed assets, impact of longer outages etc. In addition, reliability of the system would become worse which is not line with CWH's customer preferences as outlined by the customer engagement survey.

2) **Extend feeders from other stations by rebuilding polelines to accommodate dual circuits built out to support the serviced area that the Fergus MS-2 serves under normal and abnormal conditions. This would require the combination of both option a) and b) below.**

   Option A – Replacement of nineteen (19) poles to bring an additional circuit up Tower Street South between Elora Street and McQueen Boulevard (Est. $380,000).

Option B - Replacement of thirty-five (35) poles to bring an additional circuit up Scottland Street between Belsyde Avenue to McQueen Boulevard (Est. $525,000).

This alternative does not increase the distribution system's load capacity without additional investment in existing Municipal Stations. A new station would still be required with the 4-5 year period. Whilst this option may help alleviate some short term requirements, once customer demand increase as expected from the provinces and towns projections, a new station will be needed to be built within the five-year timeframe. Once this new station is built this would deem the investment made a part of this option redundant.

3) Plan a voltage conversion for the Fergus Distribution System to raise capacity.

This would be a multi-year, multi-million dollar project option requiring the replacement of all existing Municipal Stations, distribution transformers and significant investment in other system upgrades. CWH had determined that this is not the most optimal solution as current stations and equipment at 4kV is adequate for medium to long term growth with additional capacity potential from a new station build and station transformer replacements with increased kVA ratings at other current stations. CWH does plan on carrying out a voltage conversion study in future years.

4) Build a new station on land that has been reserved for this purpose.

Impact – The distribution system load is increasing and will continue to do so, system reliability can be maintained at the levels customers expect with the building of this new station on the south-side of the Grand River and project can be implemented within minimal disruption to existing customer-based. This option, as outlined earlier, will allow CWH to meet additional capacity needs from the project customer number increase, maintain reliability, and have more flexibility for switching of capacity. In addition, this will also enable connection of EV chargers and other DER type connections in the future.

8. Innovative Nature of the Project

Not applicable.

9. Leave to Construct Approval

Not applicable.

B. Evaluation Criteria and Information Requirements

1. Efficiency, Customer Value, Reliability & Safety

Primary Criteria for Evaluating Investments	Investment Alignment
Efficiency	Project will improve overall distribution system capacity providing redundancy consistent with CWH

	other existing Municipal Stations. CWH already has the land identified and has a good relationship with the Township, which will ensure any permitting and impacts to customers will be minimized.
Customer Value	Project will support future growth as predicted by the province and county, as well as DER investments while its construction can be completed without significantly impacting existing customers. Additionally, CWH customers will continue to receive the same levels of reliability with minimal impact to their rates.
Reliability	The implementation of this station will not only provide CWH with greater flexibility to switch loads but also allow CWH, even with system demand growth, maintain similar levels of reliability which is important to its customers as identified through its survey.
Safety	Project will be built in a unique geographic location, away from the existing Municipal Stations. It will be built on the south-side of the Grand River, the second of this side of the river. The other existing station south of the river is located within the river's flood plain. This will give CWH greater flexibility should significant weather events occur. The station will be constructed to a similar standard as our existing Municipal Stations, leveraging CWHs existing design, construction and investment experience since 2014. With the new station mimicking this standardized design it will make operations and maintenance for the CWH easier and safer going forward.

2. Investment Need

i. Main Driver*: System Operation Objectives- Reliability* - The main driver for this project is to be able to maintain consistent reliability of the distribution system whilst accommodating additional connection and load expected in the near/medium term.

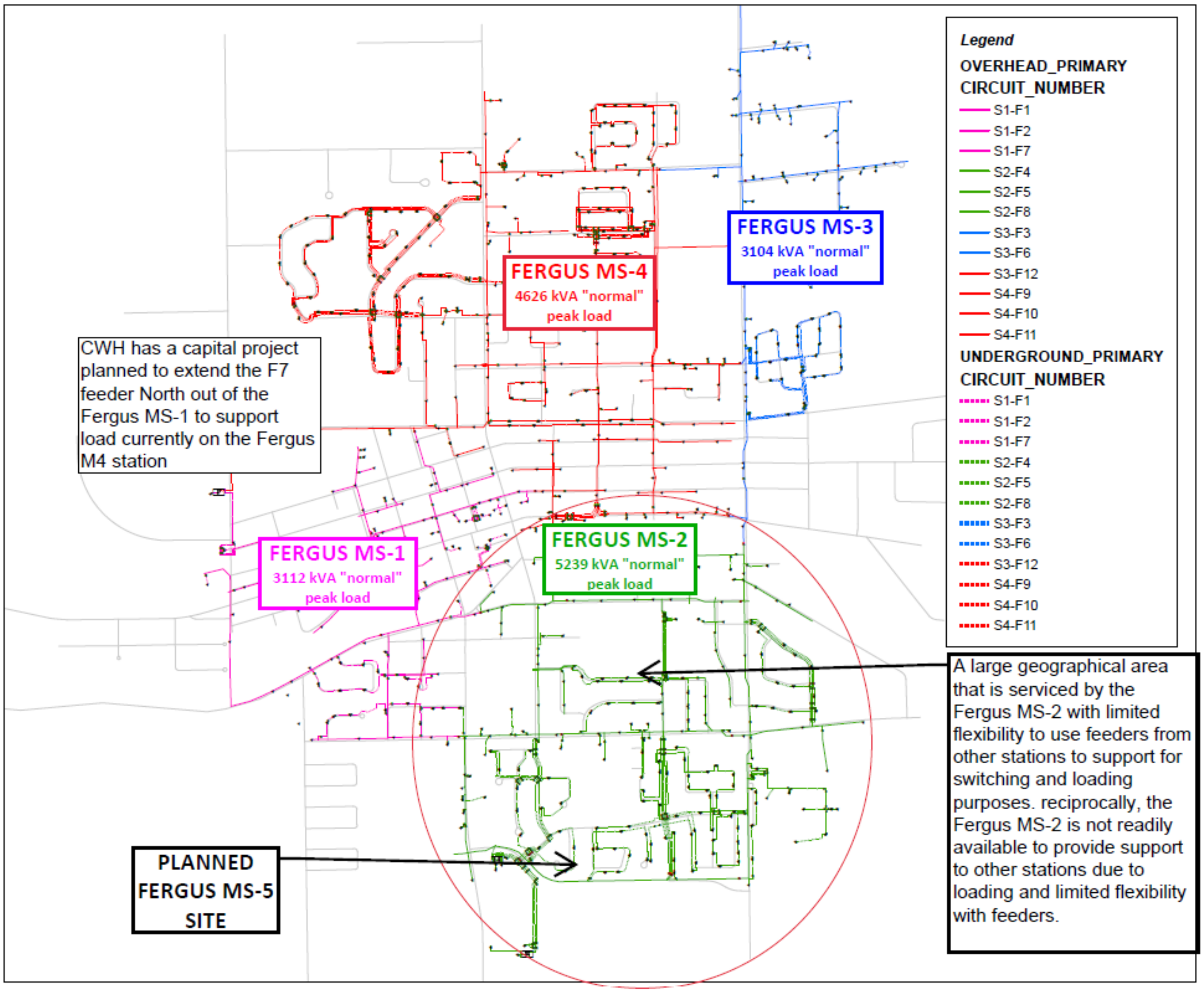
ii. Secondary Drivers*:* Customer Service Requests - Secondary drivers of this project considered are requests from existing customers along the Highway 6 corridor that have requested increased electrical service sizes to be able to install EV chargers.

iii. Information Used to Justify the Investment*:*
The below table shows the load projections for the Fergus distribution system through the near and medium term forecasted period supporting the expectation

of load growth and planning. The M3 designated feeder is a dedicated feeder that CWH owns within its service territory and the load indicated in that row is the total circuit load feeding both 4kV and 44kV connected stations and customers. The 4kV distribution system load is indicated on the bottom row and presents the load forecasted on the 4kV distribution system that CWH's stations and feeders are required to accommodate. It can be seen that the acceptable capacity required to allow for only a single station to be out of service for maintenance, using 100% nameplate ratings of 16MW, will not be available in the near-term forecast timeframe.

Feeder/s	Historical Data (MW) Net Load[1,2,3,4,5]			Near Term Forecast (MW) Gross Peak Load[1,2,3,4,5]					Medium Term Forecast (MW) Gross Peak Load[1,2,3,4,5]				
	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
M3	20.51	20.3	20.83	19.35	20.79	21.63	22.37	23.65	24.86	25.73	26.48	27.23	27.93
4kV	16.41	16.24	16.66	15.48	16.63	17.30	17.89	18.92	19.88	20.58	21.18	21.78	22.35

Fergus Station Distribution Overview



Municipal Station	Base Rating (kVA)	2022 Normal Peak Loading	2022 Absolute Peak Loading	2022% Utilization Normal	2022% Absolute Peak Utilization
Fergus MS 1	5000	3112	3846	62.24%	76.92%
Fergus MS 2	6000	5239	5239	87.32%	87.32%
Fergus MS 3	5000	3104	4698	62.08%	93.96%
Fergus MS 4	5000	4626	5336	92.52%	106.72%

The above table show the rating, loading and utilization for each of the four stations within the Fergus service area. These peaks represent operational risk when one Municipal Station is out of service, resulting in a situation where the failure/partial failure of a second station, during when one is already out of service would result in significant outages. Full station outages are not common as a result of proactive station maintenance and testing, however it does occur and CWH experienced the loss of the Elora MS-1 due to unexpected equipment failure of reclosers in 2022, and unexpected transformer failure at the Fergus MS-2 in 2019.

In conjunction with the above information, CWH has also consider the information provided by the provinces and county's plans that project the increase in population and therefore customer of CWH (as outlined earlier in this document), as well as the potential for new renewable energy generation (such as DERs) that is a result of meeting Energy Transition targets.

3. Investment Justification

i. Demonstrating Accepted Utility Practice: The new Fergus MS-5 station will increase the operational effectiveness of CWH's distribution system in Fergus and allow for a more robust load balancing under normal operations and outages caused by weather events. It will adequately accommodate new load connections from densification, electrification and new customers which have been identified through local planning and the regional planning process facilitated by the IESO. Furthermore, it will accommodate an increased capacity for DER connections that are anticipated in the future. CWH is an embedded distributor owning the 44kv dedicated feeder supplied by the host distributor that the Fergus MS-5 will be connected to, and additional sub-transmission feeders and transformation are not required to complete this project.

ii. Cost-Benefit Analysis: As part of the planning process CWH considered alternate projects to address the need for feeder/station capacity in Fergus on the South side of the Grand River. Wires and non-wires solutions were considered however non-wires solutions (BESS) were not part of the final considerations with specific detailed project budgetary figures used as the capital cost was expected to be prohibitive. A distribution system wide voltage conversion option was also discounted early in the process for the same expected elevated costs. The alternative analysis table below is used to demonstrate the consideration given to different potential projects to address the need for increases the distributions systems capacity in Fergus.

Alternative Option Description	Build planned distribution station	Status quo - do nothing	Extend existing feeders from 2 other stations	Plan a voltage conversion

Program Scope	Build Fergus MS-5 6/8 MVA station with 3, 4kV feeders connecting to existing infrastructure with limited new circuit extension for one of the three new feeders at 320 meters.	Do nothing and manage the distribution system as is with 4 distribution stations and 12 feeder design.	Extend existing feeders by rebuilding pole lines to accommodate dual circuits to needed area.	A voltage conversion plan would require the replacement of all CWH's distribution systems underground and overhead line transformers and station transformers. It would also necessitate an additional sub-transmission feeder to connect increased transformation at current station sites.
Total Gross CAPEX	$3.36M	$0	$905K	Currently, this option has not been pursed further as it is deemed an unfeasible option given the timelines associated with the need of this new station. CWH is planning on undertaking a future voltage conversion study to help inform any investments required beyond this new station.

Annual Program benefits	This option provides sufficient capacity for load switching under normal and abnormal circumstances. No new sub-transmission feeder requirements. It also allows CWH to connect future load growth with minimal effort and impact to reliability, as well as future DER and EV type connections.	This option does not add required switching abilities required to enable reliable load transferring and balancing. This option does not add any capacity for load growth or DER connections.	This option would provide sufficient reliability and capacity from Fergus MS-3 and Fergus MS-2 feeders in the short term for about 4 to 5 years. The increased capacity from this option would be XX% compared to the preferred option. However, within the five year period, capacity constraints would be reached based on current projections which would result in a new station being required and thus making the investment in this option redundant.	Whilst this option could ultimately lead to meeting the objectives of CWH, it is a costly and very lengthy process to achieve. IN addition, CWH has invested in many station assets over the last 10 years which would become redundant before being fully utilized. CWH does not deem this option as the most beneficial or cost effective for its customers at this time.

Program economics	From an economics view this option provides the necessary improvement s in a cost-effective way when compared to other options.	From the program economics perspective this option is not as desirable as the preferred option. By doing nothing the risk of overloading the Fergus MS-2 station and its feeders would be an eventuality. Continuing to load the station and feeders until they reach operational andequipment limits is notpreferred. The continuous overloading of feeders would result in reliability issues, and equipment degradation andoperational inefficiencies.Inevitabl y, the area will requireadditional capacity where a new scoping of solutions and in all likelihood require a new distributions station.	From a project economics view this option would be considered a short-term solution (405 years) and economic costs would be wasteful in time as future load would have to be supplied by increased transformatio n from new stations or a voltage conversion. New dual circuits built to address near future challenges would be considered redundant in time and provide no benefit to the reliability or load servicing capabilities to the distribution network. Therefore this is not the most cost effective solution.	
Customer feedback	Through its DSP survey in December 2023 and January 2024, 92% of customers indicated that CWH should carry out it proposed investment in the new station to maintain current reliability levels, with minimal impact to rates.			

Other Constraining factors	The constraining factor is that the Fergus MS-5 station needs to be built to address reliability and growth in the Township of Centre Wellington as soon as possible. This option is the most economical considering the long term needs. A new station is the preferred solution to maintain reliability through existing feeders and service new growth.	Status quo would not address reliability and growth projections and a solution would be required eventually. Existing stations and feeders would experience overloading which would accelerate thermal degradation, reducing the assets lifetime and increase the potential for a catastrophic failure.	The constraining factor is that the additional capacity and feeder switching capabilities would be limited to the remaining available capacity on the F2 feeder from the Fergus MS-1 and F6 from the Fergus MS-3 stations. And these will be additional costs to build feeders near term that will not be required once the Fergus MS-5 is built, which would be required within the next 5 years anyway based on the current projections.	This is a multi-year and very costly option. Not only would this option take many years, many of the newer station assets would ultimately become redundant before being fully utilized.

iii. Historical Investments & Outcomes Observed: CWH has completed numerous station improvements and rebuilds over the last 10 years that have contributed to the system reliability for customers as measured through improved SAIDI and SAIFI statistics. These projects have increased CWH's ability to balance load, more effectively switch load under normal and outage related situations and improve data set collection to improve asset management planning

iv. Substantially Exceeding Materiality Threshold: see section 3.i

4. Conservation and Demand Management

CWH identified no clear CDM option that would be able to meet the drivers and needs of this project.

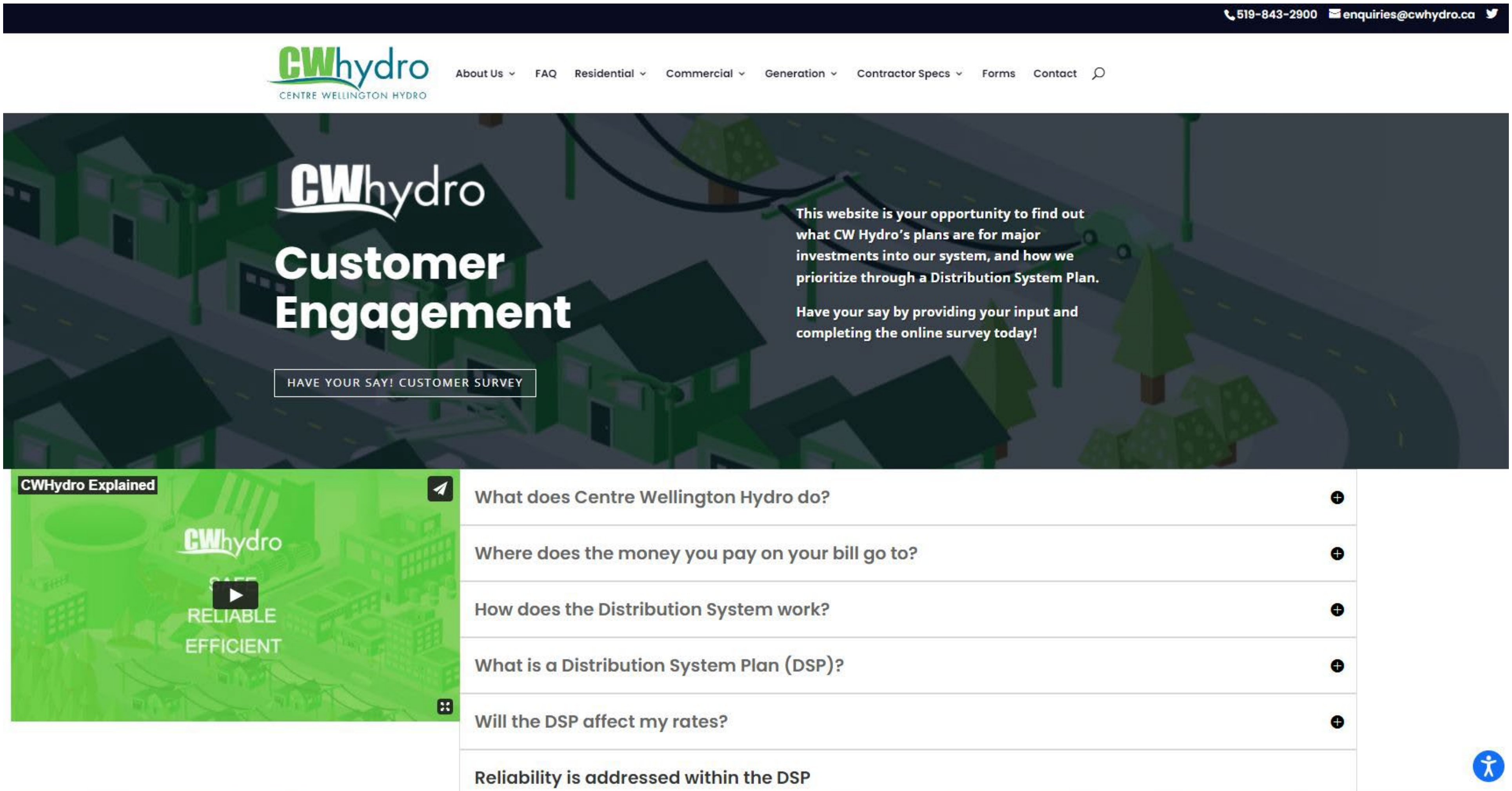
5. Innovation

There is nothing innovative being proposed as part of this program.

Appendix B

DSP Customer Survey Report 2024

Centre Wellington Hydro Webpage Screenshot



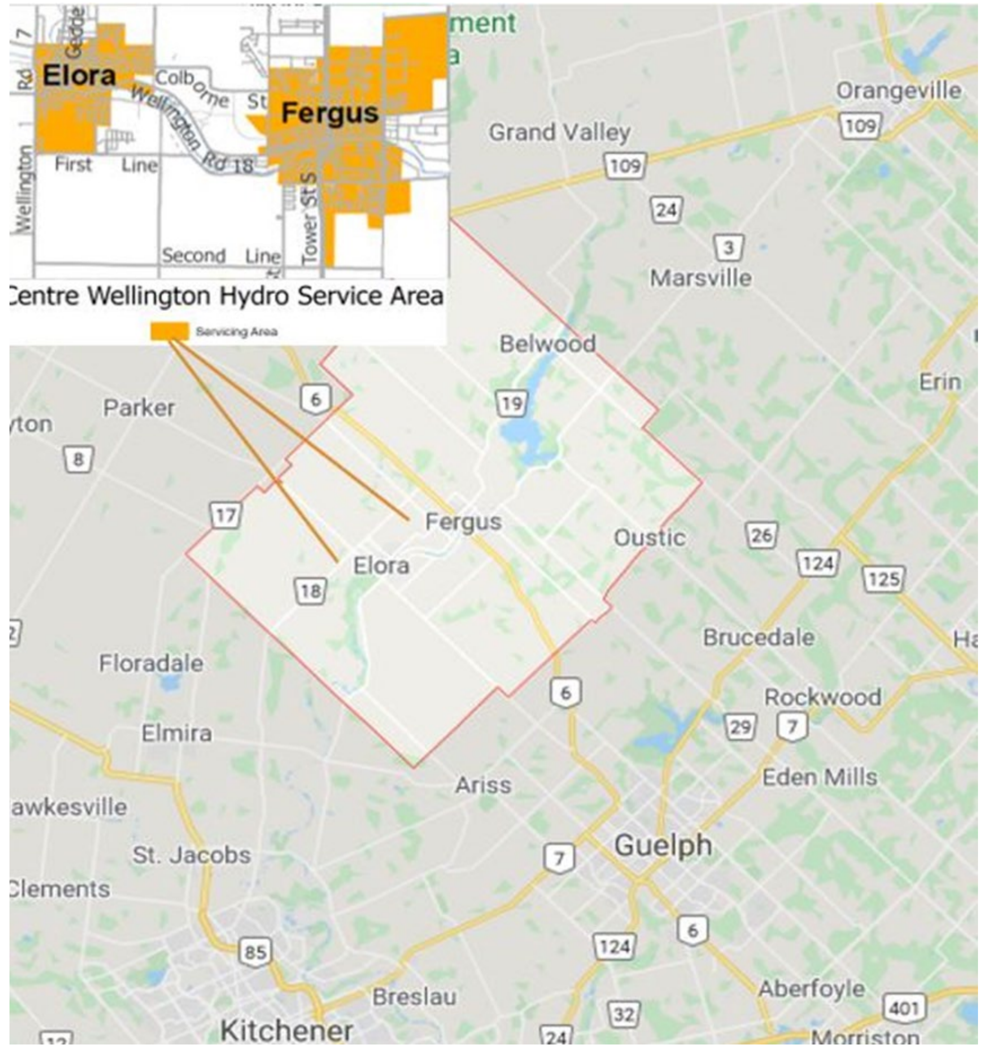
What does Centre Wellington Hydro do?

We own, operate, and maintain the Distribution System that supplies you with electricity in the Town of Fergus and Village of Elora. The Township of Centre Wellington, and you, its residents are the sole shareholder of Centre Wellington Hydro.

Our customer base consists of:

- 6,612 Residential Customers
- 787 Small Commercial Customers
- 60 Commercial Industrial Customers
- 7,459 Total customer count

The service territory is approximately 11.61 sq. km of high-density urban area, with customer density of approximately 646 per sq. km.



Our Assets consist of:

- 6 Distribution stations
- 82 kms of underground cable
- 78 kms of overhead conductor
- 1,923 poles
- 900 overhead and underground transformers
- A fleet of 8 vehicles
- Business office and service centre at 730 Gartshore St in Fergus

In 2022 the CWH team: Issued 89,906 bills ● Answered 4,470 calls ● Completed 1,404 underground locates ● Connected 75 new customers and supported 91 customer upgrades.

We have a Full-Time staff of 16 employees and a Board of Directors with 4 independent members and 1 Municipal councillor. Just **23%** of what you pay on your bill goes directly to CWH so we can perform all the functions required to operate your Utility.

Where does the money you pay on your bill go to?

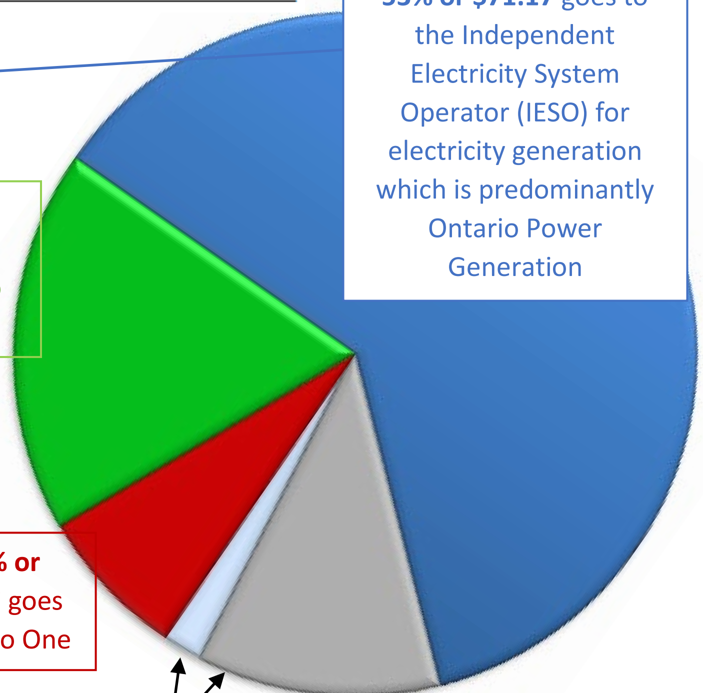
CWhydro

CENTRE WELLINGTON HYDRO
Office: (519) 843-2900

Account Number	Name	Service Address
500-00000000-00	JOHN ELECTRIC	1234 YOUR STREET

Meter Number	Read Dates Present	Read Dates Previous	Billing Days	Code	Meter Readings Present	Meter Readings Previous	Mult	Usage	Usage Billed	Units	Power factor	Adjust. factor
ELE: CWH 00000	2021/09/01	2021/08/01	31	MR	108197	107441	1	756	790	kWh		1.0453
WTR: W000000000	2021/09/01	2021/07/30	33	MR	040595	040460	0	14		CU MTR		

	RATE	USAGE	CHARGES
Electricity:			
OFF PEAK SUMMER	0.082000	486.96	36.04
MID PEAK SUMMER	0.113000	112.09	11.43
ON PEAK SUMMER	0.170000	156.95	23.70
Delivery Charges			51.41
Regulatory Charges			4.11
Other Charges:			
Overdue Interest			
HST #865470769RT001			16.47
Water & Sewer Charges:			
Water Metered Rate	2.440000	14	35.00
Wtr Mtr Base Rate 5/8"			11.86
Sewer Metered Rate	2.710000	14	40.46
Swr Mtr Base Rate 5/8"			13.56
ONTARIO ELECTRICITY REBATE			-14.82
CURRENT CHARGES DUE			$229.22
TOTAL AMOUNT DUE			$229.22



53% or $71.17 goes to the Independent Electricity System Operator (IESO) for electricity generation which is predominantly Ontario Power Generation

23% or $32.21 goes to CWH.

$10% or $13.97 goes to Hydro One

$20.58 or **14%** goes to the Ontario Energy Board (OEB) and taxes.

The water and sewer charges on your bill goes to the Township of Centre Wellington and has no affect on the electricity portion or what CWH receives.

How does the Distribution System work?

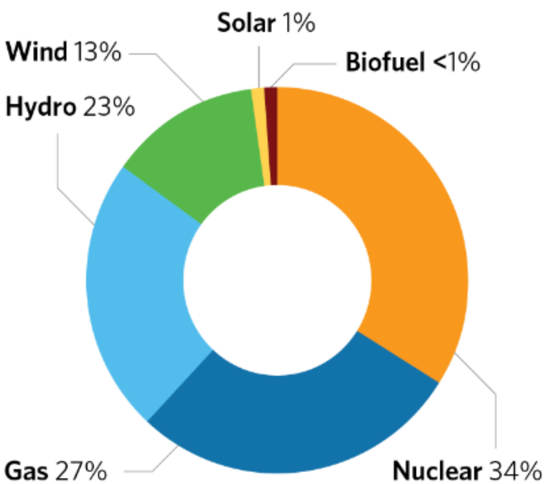
Ontario’s electricity system spreads throughout the province over what is called an electricity “grid”. The electricity grid’s overall components are broken out into three main sections: Generation, Transmission, and Distribution. All of these components work together to deliver the electrical needs to every customer in the province, from small residential and commercial to large industrial connections. The system is improved by grid technologies that support generation connections down to the distribution level.

All of these high-level sections are regulated by the Ontario Energy Board (OEB), who prescribes the requirements for Utilities to be licenced and operate within the province. The OEB also approves the electricity rates that are charged.

Generation:

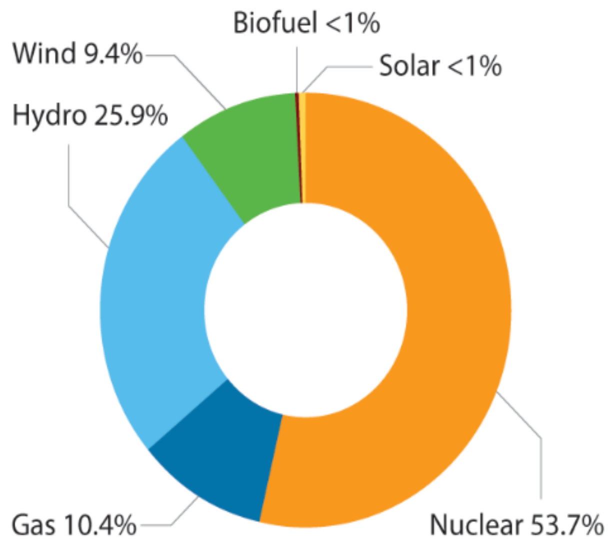
Ontario has many sources of generation throughout the province. The bulk of Ontario's generation comes from nuclear power and Hydro-electric stations, and the remainder comes from natural gas fired plants and renewable sources such as wind and solar.

Generation capacity connected by fuel type in 2022:



Nuclear	13,144 MW or 34%
Gas/Oil	10,470 MW or 27%
Hydro	8,922 MW or 23%
Wind	4,883 MW or 13%
Solar	478 MW or 1%
Biofuel	296 MW or <1%

Generation output by fuel type in 2022:



Nuclear	78.8 TWh or 53.7%
Hydro	38.0 TWh or 25.9%
Gas/Oil	15.2 TWh or 10.4%
Wind	13.8 TWh or 9.4%
Solar	0.75 TWh or <1%
Biofuel	0.3 TWh or <1%

Transmission:

The bulk electricity that is generated is then transmitted across the province along high voltage transmission tower corridors. Vast amounts of electricity can be delivered to both rural and city locations across the province to wherever the demand requires it. Hydro One is the Transmission company who owns and operates the transmission tower lines and transformer stations that deliver electricity to areas like Centre Wellington.

Distribution Systems:

The final step in the grid electricity delivery is Distribution Systems. Centre Wellington Hydro (CWH) is your Local Distribution Company (LDC), and we are locally owned and operated by the Township of Centre Wellington and you, its residents. CWH lowers the voltage to safely connect to homes, business, and industries to meet every electrical need.

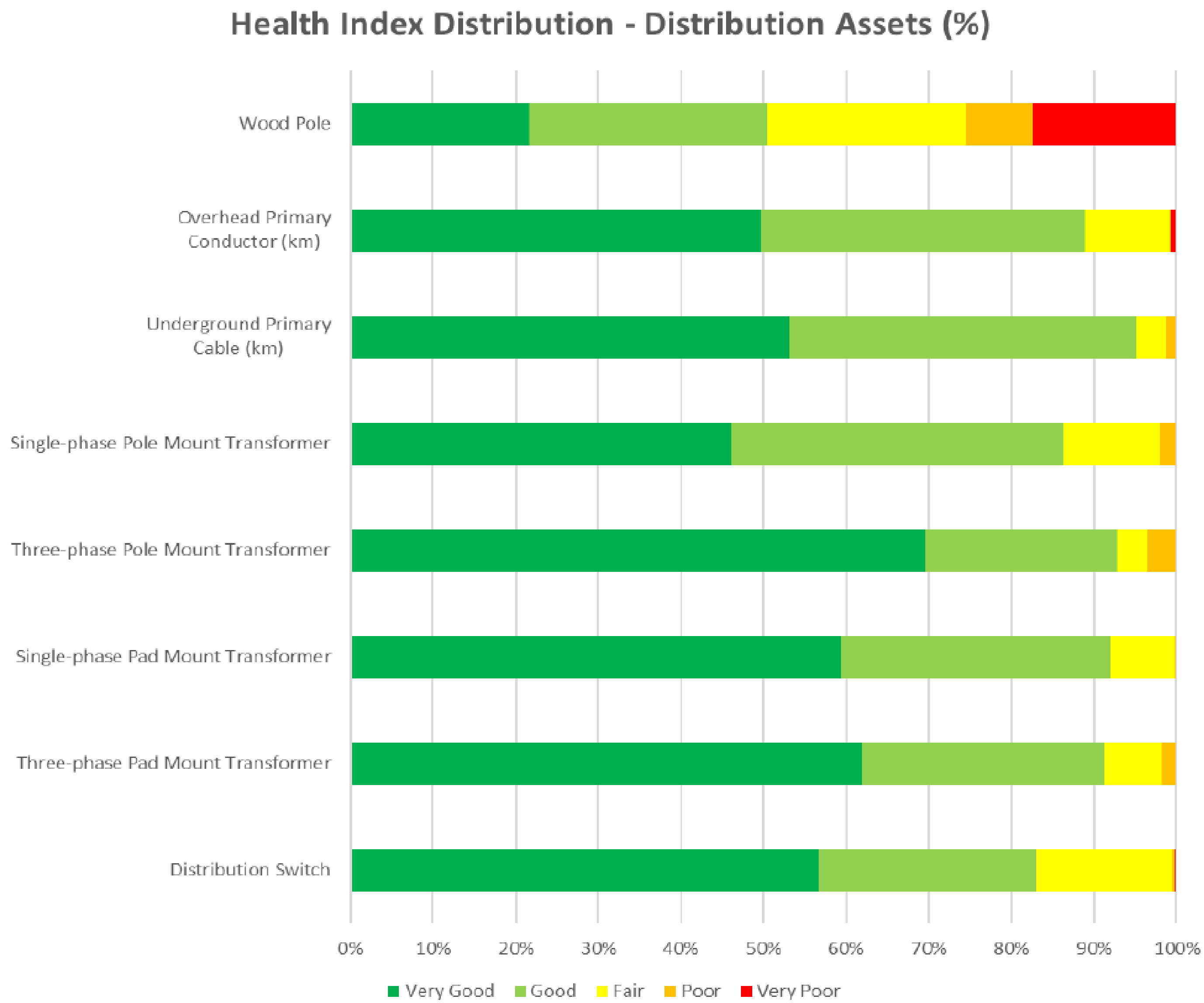
Operating the Distribution System to service our customers includes installing and maintaining pole lines, underground circuits, transformers, switches, and other equipment to ensure the safe, reliable delivery of electricity right to your home or business. We meter this electricity and monitor the system to ensure the settlement of electricity is fair.

What is a Distribution System Plan (DSP)?

A DSP is a utility specific report that identifies the forecasted 5-year strategic programs CWH will use to maintain and replace its system as needed to provide the continuous, safe, reliable electrification to existing and new customers. All utilities must submit these plans to the Ontario Energy Board (OEB link).

CWH's investment planning shows the efficient budgeted costs to run the programs necessary to operate the distribution system, and replace and maintain our 6 distribution stations, 1,923 poles, 160 kms of overhead and underground circuits, 900 transformers, and 7,500 revenue meters.

CWH has fantastic outage and restoration statistics and proactively works towards maintaining the low outages our customers enjoy. To do this we need to run the programs that will keep our equipment running at optimal performance and replace assets in poor condition. You will see from the Asset Condition Assessment graph that 25% of our poles are in poor or very poor condition. **One main focus over the next 5 years will be replacing these poles.**



Another priority for CWH within the DSP is a planned new distribution station build in Fergus. The new station will allow CWH to maintain reliability by increasing CWH's ability to switch load throughout the system for regular planned operations, maintenance activities, and when responding to outages. The **Fergus MS-5 station** will increase the capacity CWH will need to service new growth load anticipated in the Township of Centre Wellington from new customers and electrification including EV chargers.

Completing the survey will give you an opportunity to comment on CWH's plans over the next 5 years.

Will the DSP affect my rates?

Yes, the DSP will affect the rates set for the 2025 to 2029 timeframe, which the investment plan within the DSP covers.

Centre Wellington Hydro drafted its 2025 to 2029 DSP through a process that started with an Asset Condition Assessment (ACA) and inputs from engineering and technical experts. The fulsome review of CWH's distribution system assets condition, and the technical decision to replace and maintain these assets at the targeted pace was tempered with our customers expectations, and rate impacts.

CWH's strategy coincides with potential rate increases that are inline with inflation.

How will my engagement help?

CWH has completed a draft DSP that focuses on the condition of our assets and the capital and maintenance programs that we feel are required to keep the system up to date and reliable from a technical perspective.

By completing the survey, you have a say in what we are planning, which will help us understand the customer's point of view and how they compare with our plans.

Your feedback from the survey will be used to make sure CWH's plans align with our customers expectations and to finalize the DSP, taking your feedback into account.

Why participate in the survey? We want to know...

- Is CWH on the right track with its replacement and maintenance strategy?
- Should we be replacing aging assets more aggressively or allow them to fail?
- Are you willing to pay more on your electric bill to fund reduced outages and response times?
- Are we missing something that you feel is important?

Reliability is addressed within the DSP:

CWH’s reliability is better than the provincial average, meaning our customers have fewer outages, and when an outage occurs, the time it takes to restore power is less. CWH accomplishes this through capital replacement programs and proactive maintenance programs that have been consistent over the last five years. The current DSP includes asset replacement and maintenance to the degree that reliability will remain the same and rates will increase only relative to inflation.

The 3 main contributing causes of outages in CWH’s area, other than scheduled maintenance are due to tree contact, adverse weather, and defective equipment.

Outages by Cause Code in respective years							
Cause Code	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Tree Contacts	2	0	0	1	1	0	0
Defective Equipment	5	10	8	7	6	3	5
Adverse Weather	0	1	0	4	3	2	4

CWH proactively trims trees to keep tree related outages low and plans to continue with the current 3-year trimming cycle. Regular trimming helps keep adverse weather outages to a minimum as high winds can cause tree uprooting and broken and falling limbs onto overhead lines, contributing to outages.

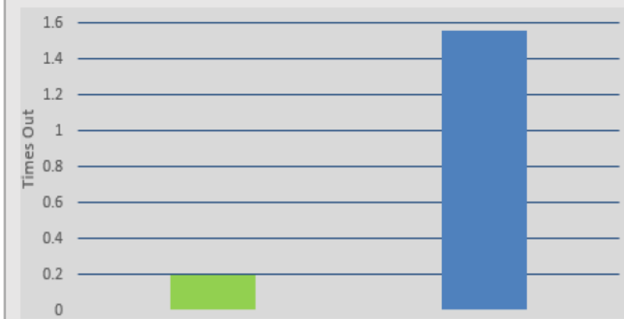
Keeping outages low requires replacing assets prior to failure while in service. Items such as poles, porcelain insulators and switches are replaced proactively, and this keeps reliability high and reduces the safety risk of failing while in service.

Some assets, such as transformers can be run to failure as it does not present a high safety risk and the cost to replace them is very high.

CWH balances this desire to maintain its current reliability performance with the costs associated with capital expenditures and maintenance programs.

Please complete the survey to let us know your thoughts on our approach to reliability.

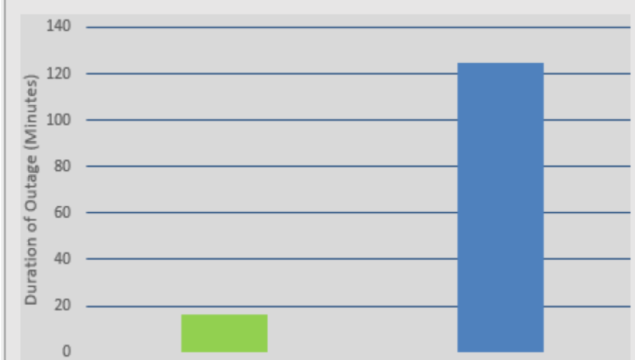
SAIFI - System Average Interruption Frequency Index - is the average number of interruptions that a customer experiences annually. The average number of interruptions that a CWH customer experienced in 2022 was 0.2 with the provincial 5-year historic average for all Utilities being over 1.5 times.



CWH 0.2 times | Ontario avg > 1.5 times

CWH customers experience a fraction of outages in a year compared to the provincial 5 yr. average.

SAIDI - System Average Interruption Duration - is the average outage duration for each customer served. CWH’s SAIDI for 2022 was 0.21 and the 5-year provincial historic average of all Utilities is 2.08.



CWH Customers average outage length was 12.6 minutes

The 5 yr. industry average outage length is over 2 hrs

CWH’s Scorecard

Scorecard - Centre Wellington Hydro Ltd.

7/14/2023

Performance Outcomes	Performance Categories	Measures		2018	2019	2020	2021	2022	Trend	Target Industry	Target Distributor
Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	New Residential/Small Business Services Connected on Time		99.53%	100.00%	100.00%	100.00%	100.00%	up	90.00%	
		Scheduled Appointments Met On Time		99.51%	100.00%	99.69%	100.00%	100.00%	up	90.00%	
		Telephone Calls Answered On Time		97.88%	98.16%	69.90%	90.92%	94.23%	down	65.00%	
	Customer Satisfaction	First Contact Resolution		99.72	99.88%	99.43%	99.03%	99.26%			
		Billing Accuracy		99.82%	99.97%	99.88%	99.96%	99.90%	up	98.00%	
		Customer Satisfaction Survey Results		79.9	79.90	81%	81	79%			
Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety	Level of Public Awareness		85.60%	85.70%	85.70%	83.70%	83.70%			
		Level of Compliance with Ontario Regulation 22/04 [1]		C	C	C	C	C	flat		C
		Serious Electrical Incident Index	Number of General Public Incidents	0	0	0	0	0	flat		0
			Rate per 10, 100, 1000 km of line	0.000	0.000	0.000	0.000	0.000	flat		0.000
	System Reliability	Average Number of Hours that Power to a Customer is Interrupted [2]		0.31	0.45	0.27	0.26	0.21	down		0.65
		Average Number of Times that Power to a Customer is Interrupted [2]		0.70	0.48	0.20	0.22	0.20	down		0.24
	Asset Management	Distribution System Plan Implementation Progress		100	85	73%	70	76%			
	Cost Control	Efficiency Assessment		3	3	3	3	2			
		Total Cost per Customer [3]		$710	$731	$675	$660	$715			
		Total Cost per Km of Line [3]		$31,963	$32,898	$30,739	$30,457	$33,310			
Public Policy Responsiveness Distributors deliver on obligations mandated by government (e.g., in legislation and in regulatory requirements imposed further to Ministerial directives to the Board).	Connection of Renewable Generation	Renewable Generation Connection Impact Assessments Completed On Time [4]		100.00%							
		New Micro-embedded Generation Facilities Connected On Time		100.00%						90.00%	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Financial Ratios	Liquidity: Current Ratio (Current Assets/Current Liabilities)		1.52	1.28	1.42	1.49	1.53			
		Leverage: Total Debt (includes short-term and long-term debt) to Equity Ratio		1.07	0.98	0.93	0.86	0.80			
		Profitability: Regulatory Return on Equity	Deemed (included in rates)	9.00%	9.00%	9.00%	9.00%	9.00%			
			Achieved	7.14%	5.19%	7.86%	9.84%	9.33%			

1. Compliance with Ontario Regulation 22/04 assessed: Compliant (C); Needs Improvement (NI); or Non-Compliant (NC).
2. An upward arrow indicates decreasing reliability while downward indicates improving reliability.
3. A benchmarking analysis determines the total cost figures from the distributor’s reported information.
4. Value displayed for 2021 reflects data from the first quarter, as the filing requirement was subsequently removed from the Reporting and Record-keeping Requirements (RRR).

Legend: 5-year trend: up, down, flat. Current year: target met, target not met

CWH’s outstanding performance on the measures in the OEB scorecard indicate no substantial additional material projects are required. CWH continues to strive to better serve the customer with the highest excellence. CWH’s intended action within the DSP is to maintain the performance of the historical averages, with capital budgets increasing relative to inflation of material and labour costs. When developing the DSP, CWH always considers its customers priorities and ensures that the investments it proposes will allow CWH to continue to serve its customers as they expect. CWH will continue to invest in its technology and people, as needed, to ensure it continues to provide a high standard of service of resolving customers issues at the first time of asking as well as maintain a high level of billing accuracy.

Customer Engagement Survey

Centre Wellington Hydro Customer Engagement Survey for Distribution System Planning and Cost of Service Application

This survey is for Centre Wellington Hydro (CWH) electric customers and is not relevant to customers who receive a water and/or sewer only bill from CWH.

General:

Phone:

Will ONLY be used to contact you if you are drawn for one of the two $200 grocery card prizes.

Email:

Will ONLY be used to contact you if you are drawn for one of the two $200 grocery card prizes.

My Service Area is:

- [ ] Fergus
- [ ] Elora

I am a:

- [ ] Residential customer
- [ ] Commercial customer

CWH's capital investment plans are supported by a Distribution System Plan (DSP) that explains the need for our capital investments.

Have you reviewed CWH's Customer Engagement webpage that describes our DSP preparation?

- [ ] Yes
- [ ] No

Satisfaction:

How satisfied are you with the overall service you receive from CWH?

Very Satisfied

Is there anything specific CWH could do to improve our service?

Power Outages:

How many power outages have you experienced in the last 12 months?

None

Did you contact CWH about the outage?

- [ ] Yes
- [ ] No

Are you aware that CWH has an “outage” and “report a problem” map on our website at www.cwhydro.ca?

- [ ] Yes
- [ ] No

How many power outages do you feel are acceptable in a 12-month period?

None

Effectiveness during an Outage:

During an outage, how would you rate our effectiveness?

Responding to the power outage:

Effective	Ineffective	Undecided	Not applicable	Haven’t had an outage
○	○	○	○	○

Posting information on our cwh.ca website/Twitter:

Effective	Ineffective	Undecided	Not applicable	Haven't had an outage
◉	○	○	○	○

Providing an estimated time for power restoration:

Effective	Ineffective	Undecided	Not applicable	Haven't had an outage
○	○	○	○	○

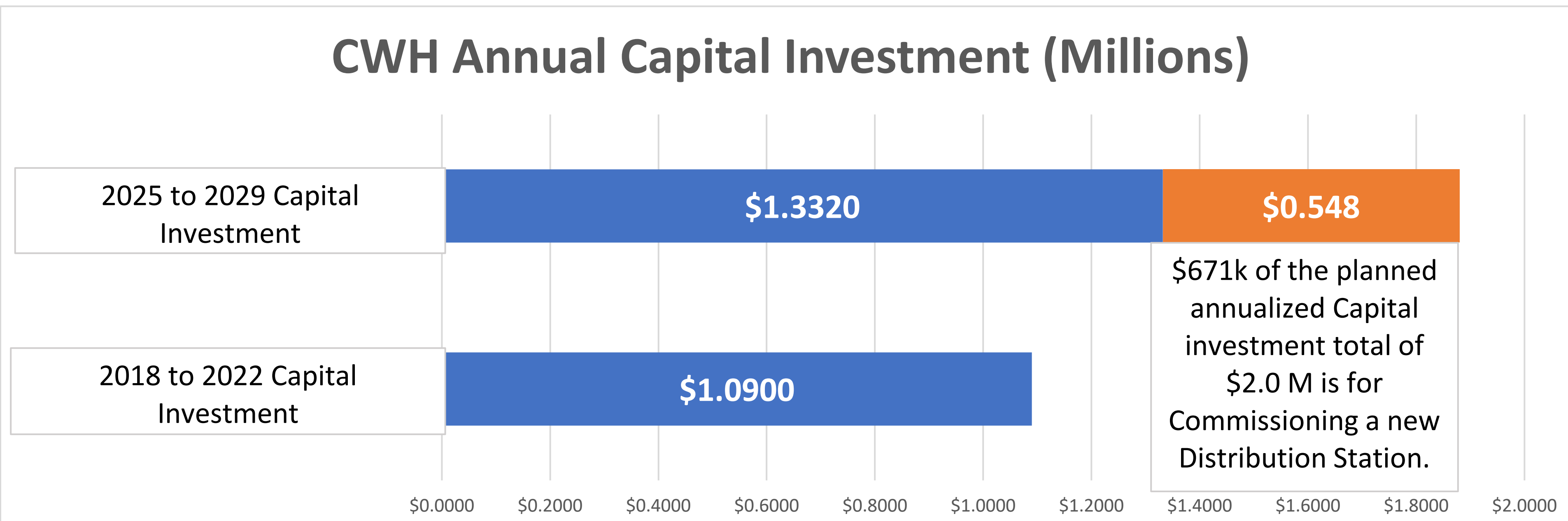
Providing reason for the outage:

Effective	Ineffective	Undecided	Not applicable	Haven't had an outage
○	○	○	○	○

Responding to questions:

Effective	Ineffective	Undecided	Not applicable	Haven't had an outage
○	○	○	○	○

Capital Investment Plan:



CWH spent $1.1 Million annually on Capital Investments in our current DSP timeframe from 2017 to 2022. CWH is proposing an annual Capital Investment Budget of $2.0 Million for the next 5-year (2025 to 2029) DSP with the higher investment mainly due to an extraordinary spend for a new Distribution Station build in Fergus.

Aside from the planned new station build a large portion of our Capital Investment Budget is directed to the replacement of poles in poor and very poor condition, and a large truck replacement.

Do you agree with an investment plan that replaces assets prior to failure in the field?

Agree

When replacing Fleet vehicles, which of the following statements do you most agree with?

☐ Replace vehicles without additional cost for more efficient options.

☐ Replace vehicles with lower emission solutions such as all electric or hybrids with additional cost.

CWH customers experience outages for reasons such as loss of supply from our transmitter (Hydro One), adverse weather, planned outages so CWH can proactively improve our system, and defective equipment. The table below shows the annual statistics for outage causes.

Outages by Cause Code in respective years							
Cause Code	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Tree Contacts	2	0	0	1	1	0	0
Defective Equipment	5	10	8	7	6	3	5
Adverse Weather	0	1	0	4	3	2	4

Some power outages can be avoided by replacing aging equipment before it becomes defective and fails. This is called a proactive replacement strategy, and CWH has accounted for this within the draft DSP and investment projections.

Based on the above information, please select the statement you most agree with.

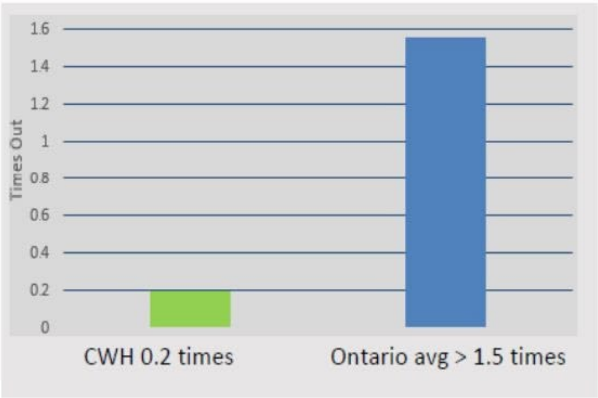
○ Proactive replacement to maintain current reliability.

○ Run to failure even if more outages result and reliability goes down.

CWH's Reliability is excellent compared to Ontario's industry average. Our customers have fewer outages, and our responsiveness keeps outage duration to a minimum.

AVERAGE YEARLY OUTAGE FREQUENCY

SAIFI



AVERAGE OUTAGE DURATION

SAIDI

Our approach to the next 5-year DSP plan is to maintain the current excellent reliability and complete similar projects with minimal rate increases, which are mainly due to inflation and increased material costs.

Which of the following investment approaches align with your expectations?

- Accelerated investment plan with increased rates, above inflation, and material cost escalation, to improve reliability even more.
- Carry out the DSP proposed investment for pole replacements and a new station to maintain the current levels of reliability with minimal increases to rates to cover inflation and material cost escalation.
- Reduced investment plan with reduced rates that would negatively affect the Distribution System and reliability.

Another reason for CWH's positive reliability and customer service is our Distribution maintenance program which falls under the Operations, Maintenance & Administration (OM&A) budget. CWH's maintenance programs include tree trimming, transformer inspections and repair, Station inspections, and pole testing to name a few.

The projected total Operations & Maintenance spend for 2025 is approximately $955,300. Through the Distribution System Planning process, the projected annual increase for OM&A budgets will be inline with inflation. This will allow us to continue running the current operations and maintenance programs that help us keep outages to a minimum, poles, transformers, and other equipment safe for workers and the public, as well as a continued high level of customer service.

Do you agree with CWH's Operations & Maintenance investment plan that would maintain the distribution system equipment and support customers at current day standards and reliability?

Agree

Which of the following approaches align with your expectations?

Continue with current maintenance programs with increases in-line with inflation to balance electricity reliability and rates.

Electronic Billing:

Producing paper bills each month comes with a considerable cost in postage, paper, supplies and equipment. If we switched all of our customers to electronic billing, where you received your bill via e-mail each month, certain costs would be eliminated.

Would you support us implementing ONLY electronic billing if it resulted in monthly savings on your electricity bill?

Yes

Grid Modernization:

The electricity industry is evolving. Smart devices for homes and business such as internet connected thermostats and switches, renewable solar generation, and battery backup power supplies are examples of new technologies. Electric vehicles are becoming more common and connecting them on a large scale to the electric grid will need to be done with load control and 2-way flow capabilities. CWH will need to adapt to these technologies and customer expectations.

How important is it to you that CWH invests in infrastructure that will accommodate new technologies?

Very important. CWH should start investing now to be prepared for new technologies and I am willing to pay more.

Final Comments:

Are you confident that your local hydro company, Centre Wellington Hydro, will continue to make responsible decisions about the future of electricity infrastructure and capital investment in your community?

- [ ] Yes
- [ ] No

Do you have any other comments about CWH you wish to share?

Submit

Appendix C

CWH Business Plan

BUSINESS PLAN 2023 - 2029

Table of Contents

Table of Figures

1. Executive Summary

Centre Wellington Hydro Ltd. (“CWH”) is a fully licensed distributor of electricity pursuant to a distribution license ED-2002-0498 issued by the Ontario Energy Board (the “OEB” or “Board”) under the Ontario Energy Board Act, 1998 (the “Act”), and also falls under the Ontario Business Corporations Act (OBCA) as a private corporation.

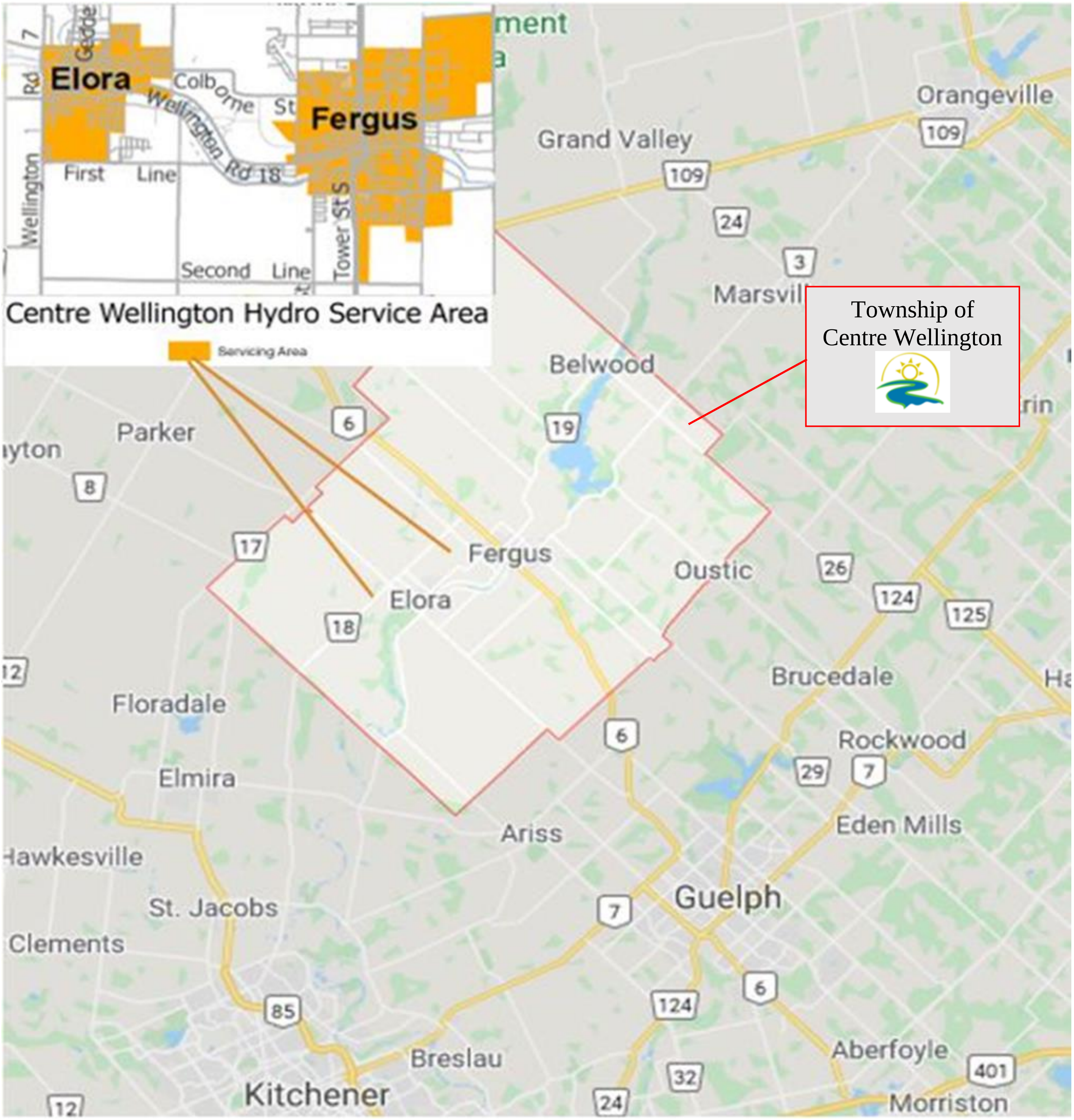
CWH was formed at the time of deregulation by the merging of the former Fergus PUC and Elora Hydro Electric Commission by the newly formed municipality of the Township of Centre Wellington, which is the sole owner of CWH. CWH’s core business is developing and managing an electrical distribution network in the Municipality of the Township of Centre Wellington in southwestern Ontario, specifically the Town of Fergus and Village of Elora, and delivers electricity to residential, commercial and industrial customers via its distribution system. CWH earns income based on fixed and volumetric service charges for the distribution of this electricity and other revenues. The service charge prices are set through a periodic rate making process via applications to the OEB.

2. About the Utility

2.1 Utility Description

Servicing just over 7,459 customers in the Town of Fergus and Village of Elora, CWH is considered a small LDC in the province. The service territory (Table 1 below) is comprised of approximately 11.61 sq. km. of high-density urban area, with customer density of approximately 642 per sq. km. To service both areas, CWH owns and operates two distinct distribution networks, one in each, Fergus and Elora, with 1,935 poles, 160 kms of overhead and underground conductor, 881 distribution transformers and associated equipment. CWH is an embedded LDC and both distribution networks receive upstream power from Hydro One at 44 kV, which is stepped down to 4.16 kV at six distribution stations, four of which are located in Fergus and two located in Elora. CWH employs 15 full time highly trained staff (See Organization Chart in Table 3 below) and is an active partner in the community we live and work in.

Table 1 – CWH Service Territory



2.2 Corporate Structure and Governance of the LDC

Centre Wellington Hydro is wholly owned by the Township of Centre Wellington, as can be seen in Table 2 below.

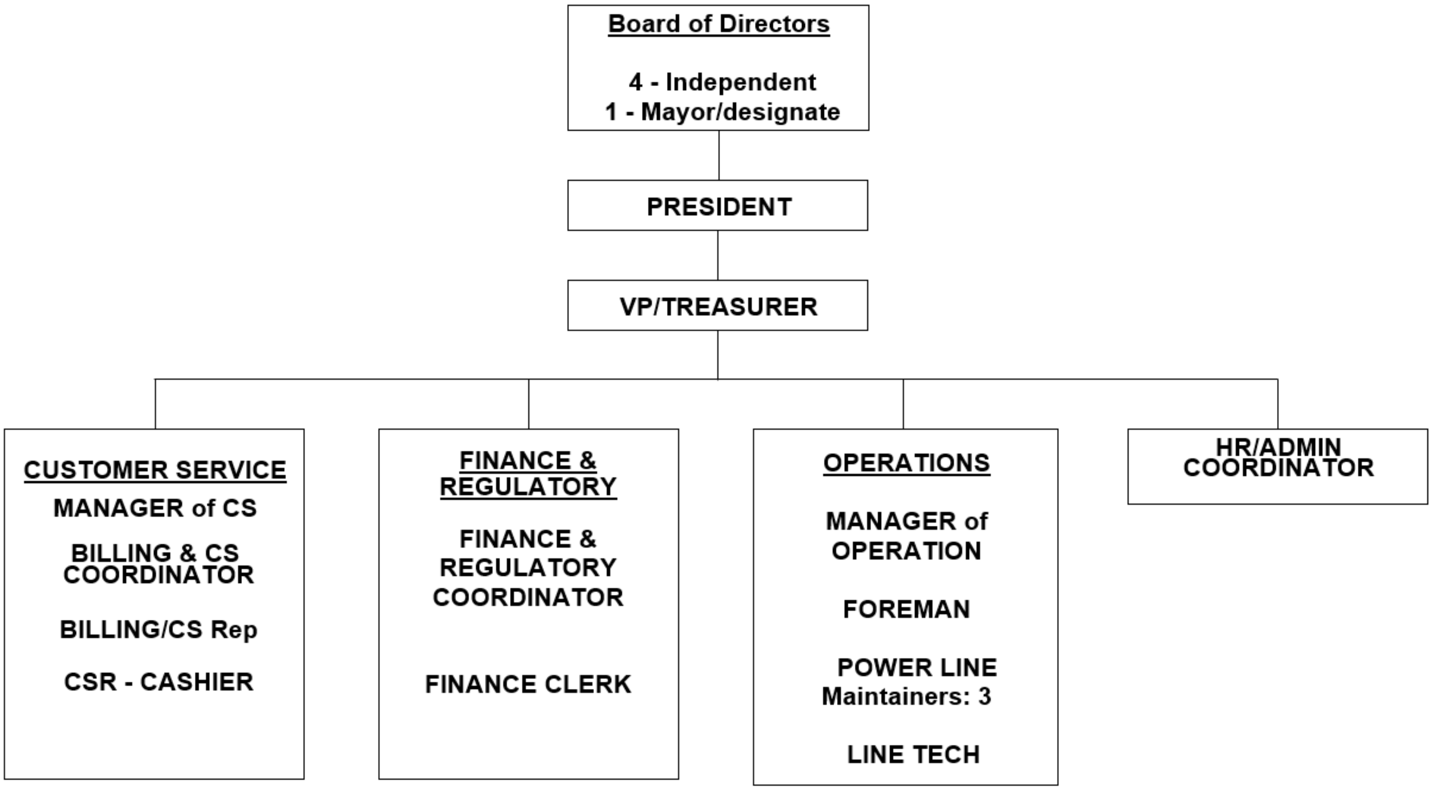
CWH has made steps towards the OEB's objectives in setting out best practices for governance to build upon the OEB's focus of utility performance and assist the OEB to obtain insight into the quality and robustness of decision-making of the LDC's business.

Since the previous Business Plan was developed CWH has implemented improvements to how the Board functions including forming a Governance & Nominating Committee, Audit Finance Committee, and HR Committee, each with their own mandates. Further to this a Board Mandate and Code of Ethics for Directors have been implemented to hold Directors accountable.

The Board operates with 80% of Directors being independent of the Holding company and shareholder, with a total of 5 Directors steering the corporation.

Table 2 - Corporate Structure

Table 3 – Centre Wellington Hydro Ltd. Organizational Chart



3. Mission, Vision, Values

The Board of Directors has reviewed and updated the previously approved mission, vision and values for CWH. The following mission, vision and values have been approved for the 2024 – 2029 Business Plan.

3.1 Mission

To provide safe, reliable, efficient delivery of electrical energy within the Township of Centre Wellington while being accountable to our shareholders…. the citizens of Centre Wellington.

3.2 Vision

To be a sustainable Local Distribution company for our customers and shareholder equally by being dedicated and responsive to their needs and adaptable within the electricity sector.

3.3 Values

Community
We value People, including the progress of social, economic and environmental betterment to support them.

Local presence
We value local control, local accountability, local employment, and local purchasing.

Professionalism
We value commitment to excellence and teamwork including collaboration, respect and accountability.

Accessibility
We value flexible convenient access to our services for customers, developers, contractors and the public.

4. Strategic Goals and Objectives

CWH has identified the following strategic goals. These are key areas of focus that support the utility's mission and the continued health and development of CWH.

1. Keep customers, shareholders and stakeholders informed so they can make effective decisions and in turn provide support for the utility.

2. Be the preferred energy provider and trusted partner for existing customers and new potential customers within Centre Wellington.

3. Continue to form strategic alliances with other similar utilities who face similar issues and combine forces to share resources and address complex issues collectively.

4. Invest heavily in our people to continually enhance their skills, maintain their focus, and give them chances to develop and realize their potential within our organization as an employer of choice.

5. Continued prudent investment while capitalizing on technology, innovation and enhanced solutions to sustain our performance, reliability, efficiency, safety, and regulatory compliance while providing opportunities for customers and the shareholder.

6. Preserve corporate viability and return on equity for our shareholder in order to support new business opportunities and ventures within the sector while prioritizing based on potential to improve the customer experience.

4.1. Objectives

CWH plans on achieving its strategic goals by setting and meeting the following objectives:

Customer Loyalty

We shall count on our customers, who ultimately own us, to help us thrive. We will earn that support by providing them with the highest levels of customer service, reliability and cost effectiveness. Competitive rates, excellent reliability, responsiveness and professionalism will lead CWH to being the preferred service provider in Centre Wellington. We will engage and support them by advocating for them within the electrical sector of Ontario, from long term energy planning to new regulations and policies that will affect them.

Provide Information

We shall keep people informed (customers, staff and shareholders). With complete, accurate and up-to-date information allowing them to make decisions which benefit all stakeholders and ensure the continued viability and effectiveness of the utility. Well informed local leaders educated and engaged customers and well trained and experienced staff will round off the full circle of stakeholder involvement.

Strategic Alliances

There is a vast pool of people with experience, knowledge and expertise in the electrical industry within the province, including the fraternity between utilities, partnerships with private consultants in many disciplines and contacts with vendors supplying the latest technology and enhanced products for all distribution companies and customers. All the above are tapped through associations, partnerships (both informal and formal, for profit and not for profit corporations), forums and working groups. Working collectively and collaboratively, they can share ideas and resources, solve problems, adapt to new regulations and policy changes from governing bodies. CWH is a member of the following associations, partnerships, and groups:

- Electricity Distributers Association
- Cornerstone Hydro Electric Concepts Inc.
- Utility Collaborative Services
- Utilities Standards Forum
- Centre Wellington Chamber of Commerce

Invest in our People

We will invest and retain our quality people by making their experience at CWH positive, safe and progressive in the industry. We will offer continuous opportunities for training and personal development, and continuing education, in an effort to foster a promote from within mindset, and successful succession planning. Healthy lifestyle benefits and competitive collective agreements, along with keeping staff informed and including their input regarding the culture of CWH, will ensure employee engagement and satisfaction.

Prudent Investment and Capitalize on Technology

CWH continues to invest in our distribution system, including implementing new technology enabling staff to serve customers more efficiently, who in turn are empowered to make informed decisions through convenient means. For example, CWH updated its website in 2020 and Customer Information System (CIS) hosting platform in 2021. These offer customers convenient online account set up, Move in/Move out, and other options through devices of their choice. Convenient e-bill delivery and immediate access to TOU consumption and history, has improved the customer's experience and allowed staff to process customer orders in a timelier manner.

CWH has enhanced its Cyber security posture since the implementation of the OEB's Cyber Security framework by using an IT consulting expert and outsourcing IT security services and management of its security program to a service provider with more advanced technology than CWH could implement and manage in-house.

CWH has joined a GIS working group through CHEC and upgraded its GIS licensing in 2021 to allow for collaborative benefits of being on the same platform as partner utilities and gleaning collective knowledge and expertise within the group. This will improve customer notifications and communications with CWH, as well as allow for more precise asset tracking and presentment as a tool for staff.

In 2022, CWH upgraded our financial system, and SCADA system as both were at end of life. The Financial system upgrade was required, as patches and technical support were going to end due to the version CWH was on. Upgrading our existing system was more beneficial due to the timing and staffing at CWH. The financial system is used for payroll, job costing, accounts payable, accounts receivable and inventory to name a few modules. It is a crucial component to having accurate and timely information. CWH will be reviewing vendors prior to the next upgrade to ensure the current financial systems makes good business sense for CWH. The SCADA system upgrade has brought CWH to the latest Survalent SmartVu platform which will ensure CWH's system monitoring, remote operations, and data collection are robust and supported by the vendor.

Whether allocating capital to ensure employee and public safety, increase productivity, or investing in new software through operational spending, the adoption of new technology will be necessary. CWH will need to focus on technology as a way to better serve and support our customers and efficiently implement positive change.

5. Economic Overview and Customer Description

As described in Centre Wellington's Economic Development Strategic Plan, the Township of Centre Wellington is a municipally governed Township located in Wellington County, in south-central Ontario. Although predominantly rural, it includes two urban settlement areas: Fergus and Elora, both located on the Grand River. Based on the Province of Ontario's Places to Grow requirements, this growing Township of close to 30,000 residents is expected to hit 52,000 (or double in size) by 2041. Centre Wellington is strategically located near the Toronto Waterloo Tech Corridor (Kitchener-Waterloo, Guelph and Toronto).

Centre Wellington's Economic Development Strategic Action Plan will continue to provide the roadmap for sustainable employment growth by targeting specific sectors/industries, supporting the vital local agriculture sector and identifying opportunities for small business start-ups. Although the majority of these new citizens will be situated outside of CWH's service territory, the influx of people, activity and goals as identified in the Township's strategic plan (see Table 4 below) will increase business both small and large, which CWH will play a supportive role in.

As seen below, the Township's strategic planning themes will need a trusted, reliable Local Distribution Company, such as CWH, to support and provide services to be developed. Enhancing downtown cores, accommodating increased tourism, supporting communications infrastructure, bolster proliferation of electric vehicles and charging, and servicing business expansion are all priorities for CWH to be the preferred and trusted electric service provider.

Table 4 – Township of Centre Wellington Strategic Plan

BR+E		
Creating a Competitive Climate for Business Retention and Expansion	Becoming More Ready for Investment	Planning for Sustainable, Distinct Downtown Cores
Strategic Communications, Connecting Partners and Conveying a Clear Message	Building Tourism and Arts, History and Culture as Main Economic Drivers	Supporting Agriculture and Agri-Business

A modest increase in residential, small commercial and industrial connections is expected over the coming years until all undeveloped land in CWH's existing service territory is fully developed. This limited customer growth will be a challenge for CWH to address as costs of operating, maintaining and administrating an LDC increase over time at a higher rate than achievable cost savings through productivity improvement initiatives. Future additional cost requirements to be proficient in the industry while supplying safe and reliable energy to our customers will have to come from current customers without the benefit of increased customer volume to pay for it. It is important for CWH to sustain its distribution fixed and volumetric rates at a competitive/fair position for its customers.

Below is the makeup of CWH's Residential, Commercial and Industrial customer classes and the total count for each as of December 31, 2022.

Customer Category	Count
General Service (<50kW)	787
General Service (>50kW)	60
Residential	6,612
Total	**7,459**

6. Outcomes of the Renewed Regulatory Framework

On October 18, 2012, the Ontario Energy Board ("The Board") issued its "Report of the Board: A Renewed Regulatory Framework for Electricity Distributors: A Performance Based Approach". The report set out a comprehensive performance-based approach for the Renewed Regulatory Framework which promotes the achievement of outcomes that would;

- benefit existing and future customers;
- align customer and distributor interests;
- continue to support the achievement of important public policy objectives; and
- place a greater focus on delivering value for money.

On March 5, 2014, the Board issued its report on "Performance Measurement for Electricity Distributors: A Scorecard Approach". The report set out the Board's policies on the measures that are to be used to assess a distributor's effectiveness and improvement in achieving customer focus, operational effectiveness, public policy responsiveness, and financial performance to the benefit of existing and future customers.

With the above in mind, the next section provides an account of how CWH continues to improve in its understanding of the needs and expectations of its customers and its delivery of services.

6.1 Customer Focus

As a public business CWH's focus on its customers is 2-fold; we are equally responsible to our customers to provide safe reliable electricity at a reasonable cost, as approved by the regulator. Secondly, our customers being our shareholder have the expectation that ownership will enhance value and produce advantages. No decision within the utility is made without considering the benefits and impacts to the customer, be it capital planning, tree trimming, or other operations and maintenance programs and spending considerations. Customers are engaged through education opportunities at the school level, through outreach at Spring home shows and other local events, and Chamber of Commerce engagement opportunities.

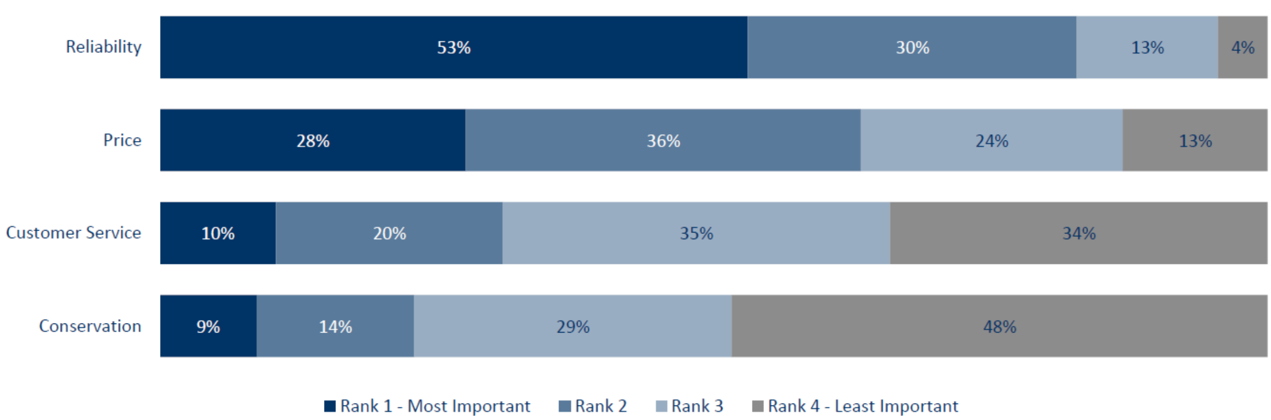
In March 2020 due to the COVID-19 pandemic, CWH office staff pivoted very quickly to working from home. To ensure our customers were still able to have excellent customer service, CWH upgraded the phone system to Voice Over IP (VOIP). The enhanced capabilities of moving to VOIP gave all staff the ability to receive and make phone calls through employees' computers whether in the office or working remotely. CWH also redesigned its website to ensure customers were getting the best online experience, without investing a significant amount of money. This was accomplished by ensuring our new website was mobile friendly, information was easily accessible, and all of our required forms were made available and fillable online.

6.2 Seeking Customer Input

CWH values customer input and feedback and customer satisfaction largely depends on whether a utility's products or services fulfill its customers' expectations. Quantifying customer satisfaction involves accumulating specific customer perceptions of the service they receive.

CWH has completed 4 statistically sound Customer Satisfaction Surveys using the same template since 2017 provided by Redhead Media/Advanis, which establish reliable trending data. The most recent survey completed in 2023 shows the overall customer satisfaction Index Score is 79% which is a consistent trend since 2017. The survey identifies areas that we continue to be challenged with, for example we still have work to do to familiarize customers with their electric bill and understanding it. Overall customer satisfaction from these surveys is a measure on the Distributor Scorecard as a Key Performance Indicator (KPI) and is incorporated into goal setting and the planning processes, with a focus on ensuring and improving customer satisfaction. Below is direct feedback from our customers from the most recent customer satisfaction survey completed in Q2 of 2023 indicating their priorities.

Please rank the following 4 aspects of customer service from most important to least important.

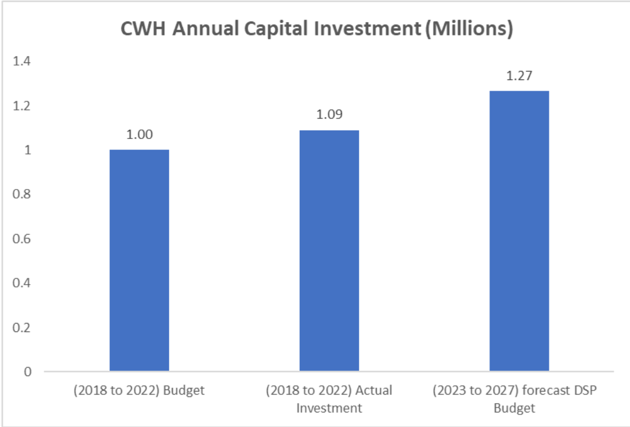


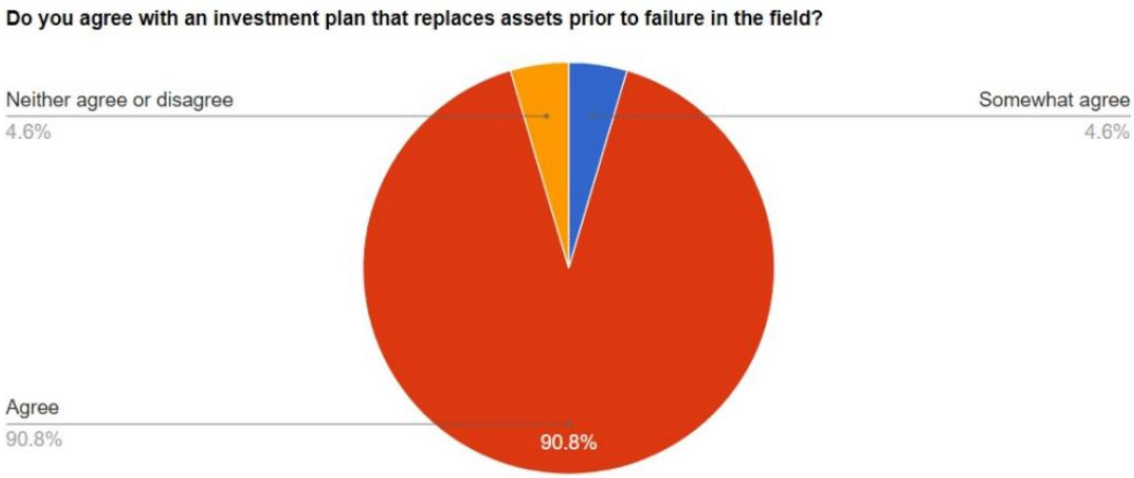
To further seek customer input for the purpose of long-term planning CWH engaged customers through the use of an on-line education and presentment of capital and maintenance planning website with a follow-up survey. This strategy brought to light customers input on CWH's specific initiatives within our 5-year horizon of capital and operational budgeting plans. This was done by presenting details of CWH's Distribution System Plan (DSP) and then asking them for input on those plans. CWH will further engage customers in support of updating the 2025 to 2029 DSP and ensure they are heard throughout the planning process.

Two key questions and responses within the survey were:

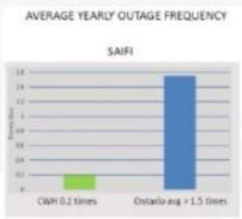
Capital Investment Plan

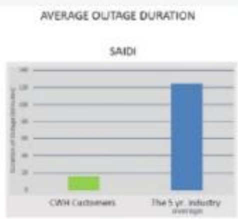
CWH will have spent $1.09 Million annually on Capital Investments in our current DSP timeframe from 2017 to 2022. CWH is proposing an annual Capital Investment Budget of $1.26 Million for the next 5-year (2023 to 2027) DSP. A large portion of our Capital Investment Budget is directed to the replacement of poles in poor and very poor condition, station transformer replacements, and large truck replacements.

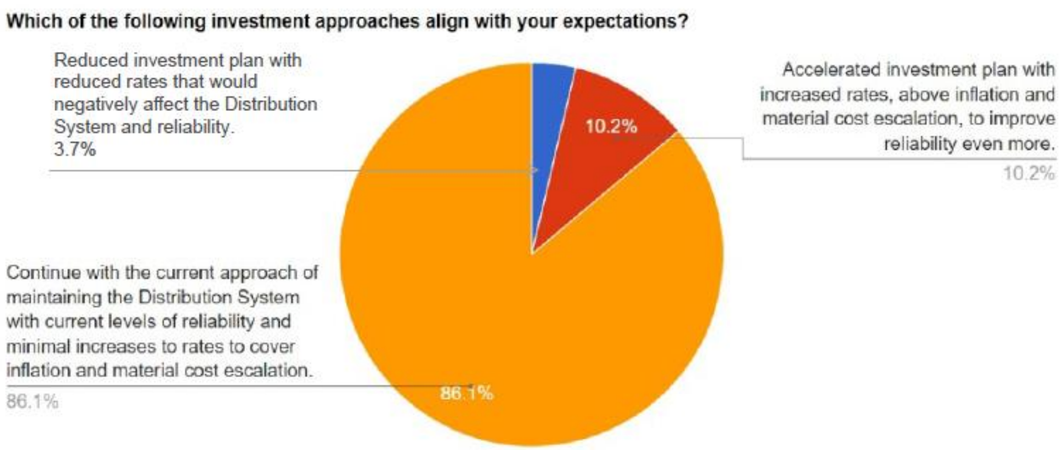




CWH's Reliability is excellent compared to Ontario's industry average. Our customers have fewer outages, and our responsiveness keeps outage duration to a minimum. Our approach to the next 5-year DSP plan is to maintain the current excellent reliability and complete similar projects with minimal rate increases, which are mainly due to inflation and increased material costs.







6.3 Alignment of Goals to Needs and Preference of Customers

Acting on customer feedback and taking advantage of the data trends from numerous satisfaction surveys is the best way to ensure CWH priorities and goals are in synch with our customers. Below is direct feedback from our customers from the most recent customer survey completed in 2021, specific to CWH's future operational and capital expenditure priorities and planning which supported the development of CWH's updated DSP. CWH plans to further survey customers in Dec 2023 on the DSP's capital planning.

- Maintain and Upgrade Equipment to continue to maintain existing reliability levels.
- Replace assets prior to failure to maintain reliability levels while minimizing rate impacts.
- Consider replacing vehicles with lower emissions solutions.
- Consider investment in infrastructure that will accommodate new technologies.
- Move to only electronic billing if it results in monthly savings to electricity bills.

CWH has built these priorities into its planning process and specific project needs. Below are direct links to how CWH's DSP addresses these customer priorities.

- CWH has replaced 2 vehicles through its fleet replacement schedule with new EV's.
- Proactive replacement programs such as annual pole replacements, pole line rebuilds, and distribution transformer, station transformer replacements to replace assets in poor condition and/or past end of useful life before they fail.
- Continue to facilitate customer requests.
- Continue to invest in computer software to continue to enable a good customer experience for when the customer requires access to information from CWH.

6.4 Public Policy Responsiveness

CWH believes that the current state of the electricity sector is grounded through public policy that ensures the sustainability of generation, transmission and distribution, while considering economic, social and environmental consequences. CWH is doing its part by responsibly upgrading and maintaining its distribution system in stride with the useful life of the infrastructure and growth of the community in an efficient manner at reasonable cost. CWH's Asset Condition Assessment (ACA) and DSP are used as a tool to ensure the schedule for these activities are planned effectively and a balanced approach to spending is continued into the foreseeable future. CWH is particularly proud of our continued low outage and duration of outage statistics (as seen in the trended scorecard in Appendix A to the Business Plan) that corroborate our effectiveness at managing the distribution system.

In recent years, public policy has driven environmental improvements in the sector by means of the LDC's Conservation and Demand Management obligations. CWH's CDM program, under the Conservation First Framework, was extremely effective in reducing electric usage in our service territory and meeting all conservation targets successfully.

CWH will continue to work with our customers and explore new conservation options that will benefit the environment. Public policy implementation to improve social issues within communities in Ontario was most prevalent in 2020 through 2022 to address the Covid Pandemic Emergency and its effects on electricity customers due to financial hardships. CWH successfully implemented every new policy directive from the Ministry of Energy Northern Development and Mines (ENDM) and the OEB, such as freezing rates and other TOU changes as well as administering Covid Emergency Assistance Plans to residential and small business, and changes to the disconnection process for nonpayment. Public Policy is ever evolving to advance improvements to the Environment, communities and people in the province and CWH is a proud and committed partner in these endeavours.

6.5 Financial Performance

CWH continues to record solid financial performance metrics. Key factors to this financial success are effective business planning, a continuous focus on operational efficiency, and managing capital and OM&A expenditures to budget. The Business Plan and DSP will serve an important role in providing the future direction of financial expenditure and performance. Financial results are discussed in detail at section 8 of this Business Plan.

7. Performance Metrics and Benchmarking

Perhaps the most widely known benchmark of efficiency rating for Ontario electric utilities comes from the PEG report which surveys utilities for the OEB. The PEG analysis is one of the only instruments that compares utilities' cost efficiencies on a consistent basis and is publicly available. PEG produces an annual report that provides a ranking of the utilities included in the study, summarizes the results, and provides insight into the trends in utility efficiency scoring.

As a result of this study, CWH has expended considerable effort to understand the drivers of their efficiency ranking and has undertaken initiatives to improve its scores. The following section reviews past performances and projects future performances based on load forecast and forecasted capital and operational expenditures.

7.1 Past Performances

In the most recent PEG report, CWH has moved from the 3rd stretch factor cohort to the 2nd stretch factor cohort, this metric is completed annually and published each summer for all LDC's. The PEG report uses econometrics to determine the cost efficiency of distributors. The PEG past performance consists of five groups, Group 1 (of 5) is ranked as the most efficient group. The percentage difference between actual and predicted cost is the measure of cost performance. Group 2 is determined by having actual costs between 10% and 25% below the predicted costs. In the PEG report for 2022 data there were 14 distributors out of 54 categorized in Group 2.

In CWH's 2018 CoS Settlement document, an average annualized capital expenditure of $1M was agreed to for the years 2018 to 2022. While CWH's capital in 2018 and 2019 were greater than $1M due to specific projects, the remaining life of CWH's DSP, 2020 to 2022 annual capital expenditures have been below $1M. The table below summarizes each year's net capital expenditure for the life of our most recent DSP. The above average capital spending in 2018 and 2019 were due to high value assets, such as a station transformer replacement, vehicle replacement and computer software additions. Given our modest annualized capital budget and size of distribution system, high value individual assets can cause spikes in capital spending from year to year. CWH anticipates this in 2024 and 2026 as a station transformer replacement at Elora MS-2 and a new Fergus MS-5 station build are being planned, which will cause an incremental increase in capital spending.

Table 5 – Net Capital Additions (reduced by Cap Contributions)

	2018 - Actual	2019 - Actual	2020 - Actual	2021 – Actual	2022 - Actual	5-Year average
Capital Additions	$1,172,990	$1,922,298	$653,286	$678,323	$681,686	$1,021,700

The utility's revenues per class and overall revenues have also been historically steady and increases requested through the annual Incentive Rate Mechanism (IRM) application rate process have not resulted in overall bill impacts over the OEB threshold of a 10% impact that has required mitigation.

Table 6 – Residential Historical Bill Impacts

Year	2017	2018	2019	2020	2021	2022	2023	2024
Monthly Charge	21.02	26.33	29.25	29.75	30.32	31.23	32.29	33.79
Volumetric	0.0074	0.0042	-	-	-	-	-	-
Overall Bill Impact	**1.95%**	**1.90%**	**0.10%**	**-0.10%**	**-0.10%**	**1.82%**	**3.05%**	**3.68%**

It is important to note that bill impacts also include the effects of the disposition of deferral and variance accounts from pass-through charge (regulatory assets).

CWH's historical performance measures and metrics which are updated annually and published via the Scorecard can be found in Appendix A. The scorecard reports the past 5 years in a variety of areas that are prescribed by the OEB.

7.2 Managing our Assets through Capital and Operational Spending

CWH's predominant function is to maintain, refurbish and replace assets as they age, deteriorate, become obsolete or fail due to weather, people or acts of God that inhibit them from performing their intended functions in a safe and reliable manner. CWH's proposed investments align with the Strategic Goals and Initiatives and with CWH's Distribution System Plan (DSP) as evaluated by METSCO for efficiency, customer value and reliability.

CWH's Distribution System Infrastructure assets were put through an Asset Condition Assessment (ACA) in 2021 to identify each major components health. These health scores derived from criteria such as age and degradation factors were plotted in graphical representations showing current conditions of assets from very poor to very good condition. As described in CWH's DSP these asset health scores were used for Asset Management Planning to forecast the level of future capital investments to maintain a reasonable average life expectancy. CWH's operations and maintenance programs are reviewed against asset conditions to ensure opportunities to extend the life of assets are taken advantage of where possible and budgeted for. Capital, operations and maintenance expenditure predictions for the future 5-year period from 2025 to 2029 have been budgeted and presented within CWH's current DSP.

Priorities and strategies for budget development are presented in the DSP which starts with background and drivers for capital investment in each of the four general categories: system renewal, system access, system service and general plant. These background drivers coupled with the Health Index and condition of field assets which were assessed through the ACA in 2021 form the basis for determining priority spending for specific projects. CWH works with sector partners and stakeholders through planning engagements; these partners include:

- customers
- the regional and municipal governments
- IESO
- Regional Infrastructure Planning Group – Kitchener, Waterloo, Cambridge, Guelph Region
- the transmission company – Hydro One
- the upstream distributor – Hydro One

5-10 Year Capital Planning to Address Growth, Aging Infrastructure and DER's

CWH places a high priority on balancing its obligations to accommodate growth while addressing the upkeep and replacement of its aging infrastructure. The key objectives of the capital investment programs to be proposed by CWH for the next 5 to 10 years include:

- Supporting residence and local business by ensuring customer needs for electricity supply and reliability are met through implementing cost effective solutions, mitigating the risk of asset failures in service, and through economically efficient investments;

- Mitigating and reducing our community's safety risks from distribution system operations by providing reliable infrastructure;

- Meeting CWH's regulatory obligations and supporting our community by focused customer service, serving customers within the service territory, relocate lines when requested by the County and Municipality, complying with Measurement Canada regulations related retail revenue metering;

- Providing access to the distribution system in support of green energy initiatives through Distributed Energy Resources (DER's) generation connections. Continue to promote conservation and environmentally positive solutions, and;

- Providing training and equipment to staff to work safely and productively.

Historically CWH has taken steps to weave reliability and sustainability into all aspects of its operations from power supply to encouraging and helping customers incorporate green features into their homes and businesses. CWH is an efficient and effective small utility. Planning is something CWH has always done well and will continue to do so in future years.

7.3 Operational Costs

Planning for the future also includes operating expenses to ensure the prescribed useful life of assets are realised and if possible extended, as well as considering system reliability, customer service, and overall cost to customers. This is a balancing act and CWH's traditional proactive approach to OMA plans show proven results in our competitive rates, high reliability scores and customer satisfaction.

CWH's Maintenance and Operations Management is reviewed within Distribution System Planning considering safety, equipment reliability, financial requirements, and inspection processes. Stakeholders' needs can differ and assessing the impact to all, customers impact, employee engagement and training, environment, and CWH's financial situation alike is priority.

CWH analyzes its operation budget on a regular basis to ensure that it operates as closely to the budget amounts as possible and are aware if jobs are over or under budget and attempts to mitigate any overages. Operational maintenance planning is completed by following CWH's Distribution Maintenance Program and focuses on balancing cost-effective spending with practical operational requirements and finding efficiencies when possible. These efficiencies ensure planned in-service life of assets are met and exceeded where possible by proactive inspections, field audits and maintenance programs. CWH's Management Planning into capital and maintenance is described in more detail with the CWH's current DSP.

7.4 Return on Equity

The actual return on equity for 2022 is 9.33%, which is slightly above the Board Approved 2018 rate of return on equity of 9%. Further information on the topic of Return on Equity can be found in Section 8.

7.5 Target Performance

This section summarizes the projected performance of the utility and the long-term perspective on the health and age of the distribution assets. It captures the results of CWH's projected PEG performance, Rate Base and projected revenues based on its priorities for capital investments and operational expenditures.

CWH is persistent in its goal to meet all targets set out by the OEB in the annual scorecard and has been successful in doing so to date with numerous targets being exceeded. The scorecard measures are set by the OEB and are deemed an industry target.

CWH sets out to leverage technology to improve the customer experience. The utility has launched upgrades to its website to include an interactive reporting map and educational tools about the industry and regulatory processes which will increase communication with its customers. Through collaboration with organizations (such as CHEC), opportunities to test and pilot new technologies will be available, and ultimately positively affect the future of CWH.

As a result of populating the OEB's Benchmarking model, the current projections for 2024 and 2025 indicate CWH's costs to be more than 10% below the predicted cost total. This has CWH remaining in Group 2.

The capital and distribution expense budgets are created through an asset management planning process with a focus on enhancing the short and long-term management of its assets as well as complying with regulatory requirements. CWH's priorities take into account both reliability goals and cost to customers when planning capital and O&M expenditures and budgets. Over the period of 2025 to 2029 CWH is anticipating an annualized capital expenditure of $2.0 million.

8. Strategy and Implementation Summary

8.1 SWOT Analysis

The use of the SWOT (strengths, weaknesses, opportunities, and threats) analysis is not new to CWH, and it has proven to be an important management tool that has helped evaluate key aspects of the utility to identify factors that will drive performance and decision making going forward.

Strengths and Weaknesses are generally associated with internal factors such as:

- Financial resources, such as funding, ability to meet its financial obligations
- Physical resources, such as a utility's location, facilities and equipment
- Human resources, such as employees, and target audiences – the customer
- Current processes, such as employee programs, department hierarchies and software systems

Opportunities and Threats are associated with external factors such as:

- Market trends, like new products and technology or shifts in audience needs
- Economic trends, such as local, national and international financial trends
- Funding, such as donations, legislature and other sources
- Demographics, such as a target audience's (customer) make up and types of loads
- Political, environmental and economic regulations

8.2 CWH Strengths

Being municipally owned yet independently operated provides a distinct advantage. Our customers are also our shareholders, and we can make decisions based on the aggregate benefit to them. This may mean decisions that are better for them as customers rather than shareholders. Private ownership only, may not have this option.

High level of customer loyalty and satisfaction.

Highest levels of customer service (reliability, responsiveness and courtesy) have been achieved through years of positive, cooperative and productive relationships with our customers, contractors, and shareholder. CWH's size plays a role in this strength as we are easily accessible to all our stakeholders and intertwined within the fabric of the community including its businesses, clubs, associations and events. We are the trusted energy advisor to our customers and as such are positioned to evolve in stride with our customers as their options and needs transform.

Local Community Social and Environmental Responsibility

CWH works closely with the Centre Wellington Resource Group and had representation on the Community Advisory Group for the County of Wellington's recent Climate Change Mitigation Plan in an effort to responsibly promote local, social and environmental change. CWH's concern has fostered a forward-thinking mindset within the organization that works toward balancing community needs including growth and opportunity with environmental impacts. CWH continually strives to implement new technologies to advance our capabilities and offerings and works with customers to assist them with opportunities to take advantage of new technologies for new and established customer connections. By improving processes and efficiencies we can reduce or offset cost and wasteful electrical usage and the impact of larger inefficient equipment.

Collaboration and high performing, capable staff.

Staff are well trained, positive, safe, focused and adaptable to ever changing policies and understand the high priority put on the customer's experience with CWH. All these attributes have been enhanced by the history of collaborating with outside organizations and other like-minded LDCs through formal and informal partnerships. Workload has increased due to more regulation, added rate changes, applications and options for customers, and increased capital projects, with CWH staffing levels going up only nominally by 0.5 employees to a total of 15.5.

Condition of Distribution System and physical plant.

CWH's lines, poles, underground conductors, transformers, substations, etc. are in good condition without any advanced degradation of asset conditions. Our office and shop facilities are functional and no major expenditures in the future, other than normal upgrades, are required.

8.3 CWH Weaknesses

Minimal ability to increase customer growth/base.

CWH's customer growth rate is very modest at an average of 1.23% annually since 2013. CWH expects customer growth to continue at this pace, mainly from densification development. Housing and industry saturation to CWH's borders, and the increasing penetration of bulk metered condominium style housing within CWH's service area is a challenge. CWH anticipates the continuation of the 1.23% annual development growth occurring over the 2025 – 2029 timeframe.

Employee Staffing levels within Departments to maintain continuity

CWH currently employs 15.5 full time staff members to carry out the day to day and long-term activities of an LDC. Since the introduction of Bill 35 – The Energy Competition Act - there has been a continuous increase in activities introduced to Utilities through policy changes and regulation. Adapting to these changes and increased responsibilities while staying efficient and economically sound is challenging for LDC's without increasing staffing levels.

The COVID Pandemic and policy changes to address it is an example of unexpected situations that can arise and tax staffing levels and resources to cope with. During the Pandemic to date CWH has had to make multiple rate changes, administer the CEAP and CEAP-SB program, comply with additional monthly reporting and increase communications with our customers to ensure they understood all changes, options, and supports. Not COVID related, but also in the summer/fall of 2020, a large undertaking was the Customer Choice initiative. This project required software upgrades in a very short timeframe, an influx of customer confusion, and manual staff time to process requests until necessary software upgrades were available, tested for billing accuracy and implemented.

CWH will need to continue addressing these challenges through strategic alliances and collaborating with partners such as Cornerstone Hydro Electric Concepts, Utility Collaborative Services, Utility Standards Forum and the Electricity Distributors Association as well as continually investing in our people and or contracting outside services for specialized expertise when appropriate.

Our staff is at the core of CWH's success and employee retention is a major risk, especially to an organization of our size. Attrition in the industry is at a peak and CWH is not immune to this with highly skilled and trained staff on the eve of retirement. CWH must continue to offer competitive compensation, health and pension benefits and policies that show we support their well-being such as Healthy Lifestyle benefits. Retaining staff by offering advancement through continuous training and development will be key to success in the future, and succession planning.

8.4 CWH Opportunities

Customized Service

Consumers want more control, choice and convenience; there will be opportunities in the future to expand services to accommodate these requests by upgrading or improving Customer Information Systems, GIS systems, phone systems, etc.

Collaboration

Private sector investment into DER's are expected and CWH is encouraged by the potential opportunities this brings to support environmentally friendly supply. These DER's coupled with electrification of transportation infrastructure, and energy efficient options for customers and businesses through natural market incentive or government regulation will be an incentive for all stakeholders to collaborate. CWH is well positioned to partner with the community and developers on these possible projects.

Community support

CWH will support the community through education for schools and service groups on safety and conservation initiatives as well as support the local economy by purchasing goods and services of local business, offering high skilled employment, and providing billing services to the Municipality. An example of CWH's support for the community we serve in is a planned expansion to electrical servicing of event grounds that host the annual Highland Games and Festival, Fall Fair, Truck and Tractor pulls, and many school and sports events.

8.5 CWH Threats or Risks

Regulatory/Political - Policy Risk

As a regulated business, CWH is subject to the direction of Government legislated boards and committees. Regulatory changes and constant additional requirements may adversely affect utility plans within the 5-year DSP timeframe. Recent examples of this are, eliminating LDC's participation of conservation by centralizing programs at the IESO, winding down the fair Hydro plan, adding on-bill rebates onto bill prints, and overhauling the OEB regulatory structure.

Continued public pressure towards the energy sector in terms of cost of electricity has forced the current provincial government to continue with electric rebates which the LDCs must administer at a cost, both monetary and from a staff resource perspective. The high-profile issues of energy costs, climate change and reducing greenhouse gas emissions will continue to drive policy changes and LDC's will need to be responsive to these needs. The inevitable connection of DER's, proliferation of electric vehicle use, and other climate driven government policy changes are potential Risks to CWH.

Cost Challenges

Along with all other LDC's, CWH is facing rapidly increasing inflation which has driven up the cost of material, equipment, and distribution grid apparatus costs substantially. This is especially the case for the largest of assets CWH is faced with replacing in capital investment plans over the Cost of Service timeframe including a new distribution station project, bucket truck replacement, and distribution transformer replacement program. In most cases the cost of these items has doubled since CWH's last approved rate rebasing. Along with the increased costs CWH is having to increase its inventory due to lengthened and uncertain delivery schedules for large and small material and equipment to ensure stock levels are adequate to reliably respond to asset replacements for planned and unplanned work.

Other factors driving up costs are increased Cyber Security requirements, including hardware, software, insurance rates, and consulting labour to ensure CWH's data, and privacy are protected along with that of its customers we serve.

Cloud based solutions for systems and process in the industry are also driving up OM&A costs and overall costs in general as these have shifted from an upfront capital cost to monthly service and maintenance fees. These costs are typically higher over the timeframes that upfront capital costs would be attributed too.

Ability to keep pace with technological advancements.

CWH's greatest strengths lie within the range of traditional utility activities yet has had to adapt to the inception of new technologies such as smart meters, SCADA, connecting renewable energy, and process changes such as billing and settlement processes that require new skill sets. Adopting and adapting to new technologies will be a threat that CWH will need to continue to address and keep pace with through employee training, development and recruitment, as well as collaboration within the industry.

9. Personnel Plan

Like the broader industry CWH is facing the same challenges related to the electricity industry is, relative to its aging demographics and infrastructure. Matching the resource capability with work demands in the electricity sector requires good planning. Numerous contributing factors are affecting workforce planning, including a shortage of proficiently skilled personnel, and increased work demands, therefore CWH has opted to invest in its current staff members on the various aspects of successfully operating a utility. The BoD HR Committee annually reviews the staffing and succession planning report for CWH to ensure consistent operational levels are maintained, staff are appropriately trained, and emergency services are uninterrupted.

10. Financial Results

CWH's financial performance has remained strong over the past 5 years with income (net of regulatory movement) of $464,467 (2018), $533,424 (2019), $323,923 (2020), $621,458 (2021) and $561,772 (2022) respectively.

It is common for a utility to have a decreasing income the closer it gets to filing their cost of service application as the rate base for the utility was set in the previous Cost of Service. CWH's bank balance remains healthy and is not anticipated to change from this situation. With the projected increase in capital expenditures in 2024 and 2026, CWH anticipates increasing its debt. At the end of December 2022 CWH's debt to equity ratio was close to 45/55. This is below the 60/40 split that is used in the OEB's Revenue Requirement Workform.

10.1 Important Assumptions

Load forecasting affects all aspects of the utility's future including supply capacity of the distribution system and revenue requirements. The load forecast also has the potential to be significantly impacted by Conservation and Demand Management targets. Each LDC had a target to reduce its annual energy supplied (kWh). CWH's target was 8,730,000 kWh in energy reduction for the period of 2015-2020. CWH has not established targets for the 2022 to 2027 period.

CWH's preliminary Load Forecast for 2025 is anticipating a consistent consumption and demand compared to the previous two years (2020 and 2021). This is primarily seen in the residential class and in the GS<50 and GS 3,000-4,999 classes. CWH has learned its 4th largest customer will be ending business by Q1 2025 which could contribute to an overall reduction of load in the first few years of the CoS 2025 to 2029 timeframe, this customer is within the GS 50-2,999 class. The residential class pays a fully fixed distribution rate and the load forecast for this class does not directly impact distribution revenue.

The OMA budgets for 2024 and 2025 are based on business as usual, with, CWH staff returning to in person conferences, seminars and training post Covid.

Table 7 - Load and Customer Forecast Table

		2018 Board Approved	2018 Actual	2019 Actual	2020 Actual	2021 Actual	2022 Actual	2023 Actual	2024 Forecast
Residential	**Cust/Conn**	6,107	6,213	6,234	6,447	6,542	6,586		
	kWh	44,716,576	46,552,089	45,878,451	49,497,551	49,994,215	46,067,113		
GS<50	**Cust/Conn**	758	755	782	777	784	788		
	kWh	20,596,746	23,320,955	22,669,052	23,240,081	23,728,198	22,105,340		
GS 50-2999	**Cust/Conn**	45	53	49	58	58	59		
	kWh	59,273,907	53,321,831	52,423,807	50,457,001	53,111,196	53,103,572		
	kW	160,292	143,527	143,971	143,721	152,528	149,415		
	TA	$47,415	$50,603	$48,831	$52,040	$54,422	$55,000		
GS 3000-4999	**Cust/Conn**	1	1	1	1	1	1		
	kWh	18,632,513	18,999,941	18,101,354	14,539,031	15,657,577	16,099,321		
	kW	43,538	43,889	42,600	38,002	36,889	39,163		
	TA	$22,450	$26,377	$26,067	$22,695	$22,076	$27,300		
USL	**Cust/Conn**	13	11	13	14	14	14		
	kWh	548,560	571,748	585,041	589,141	617,066	640,132		
Sentinel Lights	**Cust/Conn**	29	27	26	26	26	26		
	kWh	38,252	36,404	35,563	35,580	35,485	35,089		
	kW	106	101.12	98.79	98.83	99	96		
Streetlights	**Cust/Conn**	1,716	1,796	1,813	1,848	1,848	1,863		
	kWh	558,906	520,134	517,704	525,998	588,172	568.919		
	kW	1,536	1,436	1,429	1,445	1,630	1.533		
TOTAL	**Cust/Conn**	**8,669**	**8,856**	**8,918**	**9,171**	**9,270**	**9337**		
	kWh	**144,365,460**	**143,323,102**	**140,210,972**	**138,884,383**	**143,731,909**	**138,619,486**		
	kW	**205,472**	**188,953**	**188,099**	**183,267**	**191,146**	**190,208**		

Table 8 - Operation Costs Table (‘000)

	2018 Board Approved	2018 Actual	2019 Actual	2020 Actual	2021 Actual	2022 Actual	2023 Forecast	2024 Forecast	2025 Forecast
Operations	$366	$353	$347	$393	$347	$435	$455	$442	$488
Maintenance	$320	$419	$504	$384	$342	$453	$460	$462	$468
Billing and Collecting	$521	$509	$539	$562	$598	$637	$667	$688	$717
Community Relations	$40	$35	$33	$34	$43	$45	$39	$45	$46
Administrative and General	$1,091	$1,104	$1,145,	$1,054	$1,087	$1,116	$1,239	$1,283	$1,395
Total	**$2,338**	**$2,420**	**$2,568**	**$2,427**	**$2,417**	**$2,686**	**$2,860**	**$2,920**	**$3,114**

10.2 Actual Return vs Allowed Return

Liquidity : Current Ratio (Current Assets/Current Liabilities)

Since 2016 CWH has had a consistent current ratio around 1.5. All capital spending since 2016 has been funded by cash and no new loans or short-term payment arrangements have been required. The value of 1.0 to 1.5 is an indicator of good financial health and CWH expects to remain within range of this metric.

In 2022, CWH’s liquidity rate was 1.53, and CWH anticipates this value to slightly decrease in 2024 as borrowing is anticipated to increase, however the value will remain in the range of 1.0 to 1.5.

Leverage: Total Debt (includes short-term and long-term debt) to Equity Ratio

In 2015 CWH made its final draw on a secured loan with Infrastructure Ontario for completion of extensive work on CWH’s distribution stations, which occurred over a 5-year period. This was the last increase CWH had in its debt. CWH anticipates increasing the debt amount in 2024/2025. As payments are made on CWH’s current loans with Infrastructure Ontario and without increasing other debt, the debt-to-equity ratio has decreased over the years and is currently 0.80. CWH anticipates the debt-to-equity ratio to increase in 2024/2025 once more borrowing occurs. CWH is comfortable in this balanced stable position.

Profitability: Regulatory Return on Equity

CWH's current distribution rates were rebased and approved by the OEB in 2018 and include an allowed (deemed) regulatory return on equity (ROE) of 9%. The actual return on equity for 2022 is 9.33% which indicates a slight over earning when compared to the Board Approved 2018 rate of return.

In 2019, CWH's ROE was lower due to tax adjustments from a prior year. Achieving an ROE of +/- 3% of the allowed ROE requires the utility to complete supplemental filing to the OEB during the utilities annual filing. An ROE consistently under or over the 3% allowed ROE could be an indication for the utility to file a CoS to rebase its revenue requirement and thus distribution rates.

Table 9 - Return on Equity Table

	2018 BA	2018	2019	2020	2021	2022
Return on Equity	9.00%	7.14%	5.19%	7.86%	9.84%	9.33%

Appendix A

CWH's 2022 Scorecard

Performance Outcomes	Performance Categories	Measures	2018	2019	2020	2021	2022	Trend	Target: Industry	Target: Distributor
Customer Focus Services are provided in a manner that responds to identified customer preferences.	**Service Quality**	New Residential/Small Business Services Connected on Time	99.53%	100.00%	100.00%	100.00%	100.00%	↑	90.00%	
		Scheduled Appointments Met On Time	99.51%	100.00%	99.69%	100.00%	100.00%	↑	90.00%	
		Telephone Calls Answered On Time	97.88%	98.16%	69.90%	90.92%	94.23%	↓	65.00%	
	Customer Satisfaction	First Contact Resolution	99.72	99.88%	99.43%	99.03%	99.26%			
		Billing Accuracy	99.82%	99.97%	99.88%	99.96%	99.90%	↑	98.00%	
		Customer Satisfaction Survey Results	79.9	79.90	81%	81	79%			
Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	**Safety**	Level of Public Awareness	85.60%	85.70%	85.70%	83.70%	83.70%			
		Level of Compliance with Ontario Regulation 22/04 [1]	C	C	C	C	C	→		C
		Serious Electrical Incident Index: Number of General Public Incidents	0	0	0	0	0	→		0
		Serious Electrical Incident Index: Rate per 10, 100, 1000 km of line	0.000	0.000	0.000	0.000	0.000	→		0.000
	System Reliability	Average Number of Hours that Power to a Customer is Interrupted [2]	0.31	0.45	0.27	0.26	0.21	↓		0.65
		Average Number of Times that Power to a Customer is Interrupted [2]	0.70	0.48	0.20	0.22	0.20	↓		0.24
	Asset Management	Distribution System Plan Implementation Progress	100	85	73%	70	76%			
	Cost Control	Efficiency Assessment	3	3	3	3	2			
		Total Cost per Customer [3]	$710	$731	$675	$660	$715			
		Total Cost per Km of Line [3]	$31,963	$32,898	$30,739	$30,457	$33,310			
Public Policy Responsiveness Distributors deliver on obligations mandated by government (e.g., in legislation and in regulatory requirements imposed further to Ministerial directives to the Board).	**Connection of Renewable Generation**	Renewable Generation Connection Impact Assessments Completed On Time [4]	100.00%							
		New Micro-embedded Generation Facilities Connected On Time	100.00%						90.00%	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	**Financial Ratios**	Liquidity: Current Ratio (Current Assets/Current Liabilities)	1.52	1.28	1.42	1.49	1.53			
		Leverage: Total Debt (includes short-term and long-term debt) to Equity Ratio	1.07	0.98	0.93	0.86	0.80			
		Profitability: Regulatory Return on Equity: Deemed (included in rates)	9.00%	9.00%	9.00%	9.00%	9.00%			
		Profitability: Regulatory Return on Equity: Achieved	7.14%	5.19%	7.86%	9.84%	9.33%			

1. Compliance with Ontario Regulation 22/04 assessed: Compliant (C); Needs Improvement (NI); or Non-Compliant (NC).
2. An upward arrow indicates decreasing reliability while downward indicates improving reliability.
3. A benchmarking analysis determines the total cost figures from the distributor's reported information.
4. Value displayed for 2021 reflects data from the first quarter, as the filing requirement was subsequently removed from the Reporting and Record-keeping Requirements (RRR).

Legend:
5-year trend: ↑ up ↓ down → flat
Current year: target met; target not met

Appendix D

Asset Condition Assessment 2021 Report

METSCO

MAKING IT POSSIBLE

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CENTRE WELLINGTON HYDRO

ASSET CONDITION ASSESSMENT FINAL DRAFT REPORT 2021

Prepared by

MAKING IT POSSIBLE

METSCO Report no. 20-211-001-D1

2021-07-09

Disclaimer

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Asset Condition Assessment Report 2021

Final Draft Report

2021-07-09

Experts: Rashid Turjo

Samer Anabtawi

Reviewed By: Kurtis Martin-Sturmey

Approved By: Alex Ferguson

Revision History

2021-07-09	2	Final Draft ACA Report	SA	RT, KMS	AF
2021-05-31	1	Draft ACA Report	SA	RT	AF
Date	**Rev.**	**Status**	**By**	**Checked**	**Approval**

Executive Summary

Context of the Study

Centre Wellington Hydro ("CWH") is an electricity distributor operating a system made up of 6 substations and over 160 km of medium-voltage distribution lines delivering electricity to 7,351 residential and commercial customers in the town of Fergus and the village of Elora in 2019. CWH engaged METSCO Energy Solutions ("METSCO") to prepare a comprehensive Asset Condition Assessment ("ACA") study for the assets comprising CWH's distribution system. The ACA is required as one of the key inputs for the preparation of CWH's five-year Distribution System Plan ("DSP"), developed in accordance with the filing requirements enacted by the Ontario Energy Board ("OEB").

Scope of the Study

METSCO's work included interviews with CWH subject matter experts to define the Health Indices appropriate for the asset types, review and consolidation of the client's data sets, analysis of CWH's asset records to calculate the Health Index values, and preparation of the final document. In total METSCO assessed and calculated Health Index values for the following asset classes:

Distribution Asset Classes	Station Asset Classes
Wood Poles	Power Transformers
Concrete Poles*	Switchgears
Overhead Primary Conductors	Reclosers
Underground Primary Cables	Station Switches (44 kV)
Pole Mount Transformers	Station Service Transformers
Pad Mount Transformers	Lightning Arresters
	Protection Relays
Distribution Switches	Power Cables
	Station Facilities

All asset condition data used in the study is maintained by CWH as part of its regular asset management practices. The ACA results are based on condition data recorded by CWH and its contractors up to the end of 2020 for distribution assets and May 2021 for station assets. The distribution asset information was provided to METSCO between January 2021 and June 2021 with the station asset information was provided between January 2021 and June 2021.

**Note: Only EOL analysis was completed on Concrete Poles due to service age data only being available.*

Methodology and Findings

For all asset classes that underwent assessment, METSCO used a consistent scale of asset health from Very Good to Very Poor. The numerical Health Index ("HI") corresponding to each condition category serves as an indicator of an asset's remaining life, expressed as a percentage. Table 0-1 presents the HI ranges corresponding to each condition score, along with their corresponding implications as to the follow-up actions required by the asset manager at CWH.

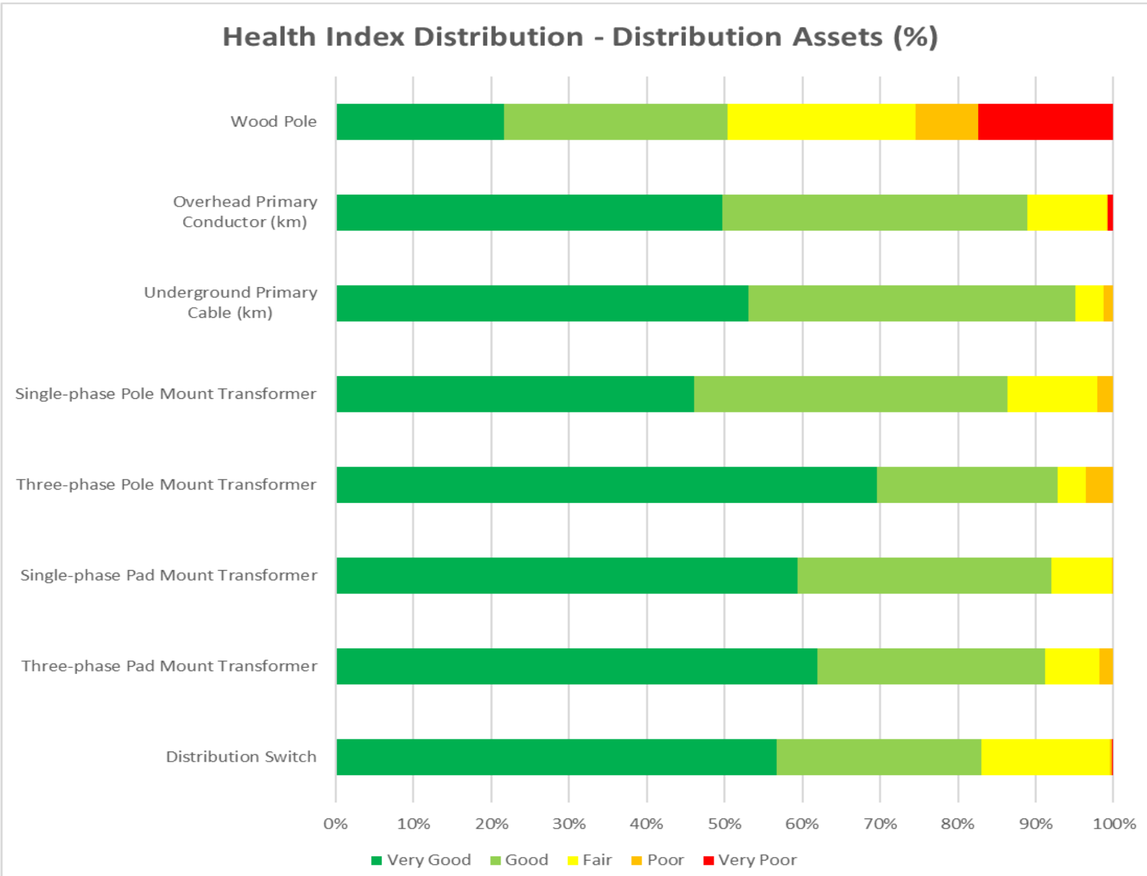
Table 0-1: Health Index Ranges and Corresponding Implications for the Asset Condition

Health Index Score (%)	Condition	Description	Implications
[85-100]	Very Good	Some evidence of aging or minor deterioration of a limited number of components	Normal Maintenance
[70-85)	Good	Significant Deterioration of some components	Normal Maintenance
[50-70)	Fair	Widespread significant deterioration or serious deterioration of specific components	Increase diagnostic testing; possible remedial work or replacement needed depending on the unit's criticality
[30-50)	Poor	Widespread serious deterioration	Start the planning process to replace or rehabilitate, considering the risk and consequences of failure
[0-30)	Very Poor	Extensive serious deterioration	The asset has reached its end-of-life; immediately assess risk and replace or refurbish based on assessment

Using this scale, METSCO calculated the HI for every asset in the scope of the assessment using the applicable and available "condition parameters" – individual characteristics of the state of an asset's components. Each condition parameter has its own sub-scale of assessment and a weighting contribution that represents the percentage in the overall HI made up by the particular parameter. METSCO's findings for each asset class were developed using this methodology, as described in more detail in Section 3 and Section 4.

The consolidated results of the ACA for distribution assets are summarized in Figure 0-1. The HI is not calculated for any distribution asset with a Data Availability Indicator ("DAI") less than 70% (i.e., less than 70% of the condition parameters – by weight – are available for that asset). For assets where a HI could not be calculated, the HI results for assets with a known HI were used to extrapolate the HI for these assets.

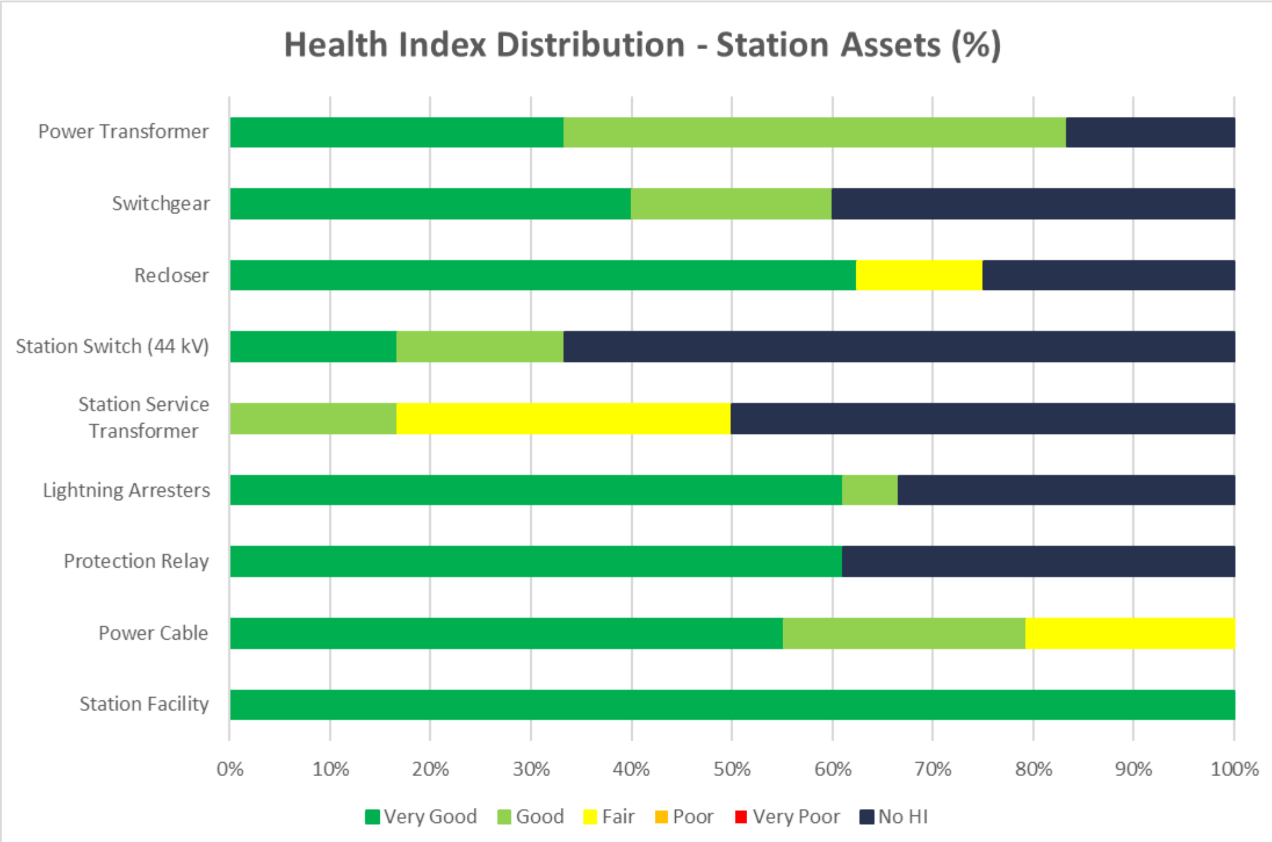
Figure 0-1: Distribution Asset Health Index Results



As Figure 0-1 indicates, the majority of CWH's distribution assets fall into the condition category of Fair or better condition. There are, however, a significant portion of wood poles that are in Poor or Very Poor condition. These assets should be further assessed by CWH to identify if any action, such as refurbishment and/or replacement is required.

Figure 0-2 summarizes the ACA results for CWH's station assets. Due to the much smaller asset population compared to distribution assets, the HI results for station assets are not extrapolated when the DAI is insufficient to calculate a valid HI. As such, the DAI threshold used for station assets is 60% and several assets do not meet this threshold.

Figure 0-2: Station Asset Health Index Results



As Figure 0-2 indicates, the entirety of CWH's station assets falls into Fair condition or better. However, half, or more of each of the reclosers, service transformers, and lightning arresters did not meet the DAI threshold and therefore do not have an HI.

Table 0-2 presents the numerical HI summary for each asset class. The HI distribution is based on the total population count of a given asset class. For each asset class, the population, average HI, average DAI, and HI distribution are listed.

Table 0-2: Asset Condition Assessment Overall Results

Asset Category	Population	Health Index Distribution (%)						Average Health Index	Average DAI
		Very Good	Good	Fair	Poor	Very Poor	No HI		
Distributions									
Wood Pole	1628	21.68%	28.69%	24.14%	8.07%	17.43%		58.02%	64.06%
Overhead Primary Conductor (km)	79.2	49.67%	39.29%	10.22%	0.13%	0.68%		81.18%	90.74%
Underground Primary Cable (km)	82	53.14%	41.90%	3.75%	1.21%	0.00%		82.20%	99.30%
Single-phase Pole Mount Transformer	241	46.06%	40.25%	11.62%	2.07%	0.00%		79.73%	99.63%
Three-phase Pole Mount Transformer	56	69.64%	23.21%	3.57%	3.57%	0.00%		85.85%	100.00%
Single-phase Pad Mount Transformer	466	59.32%	32.71%	7.76%	0.22%	0.00%		82.04%	92.64%
Three-phase Pad Mount Transformer	113	61.95%	29.20%	7.08%	1.77%	0.00%		82.40%	93.54%
Distribution Switch	379	56.65%	26.33%	16.49%	0.27%	0.27%		82.68%	99.60%
Station Assets									
Power Transformer	6	33.33%	50.00%	0.00%	0.00%	0.00%	16.67%	81.96%	81.98%
Switchgear	5	40.00%	20.00%	0.00%	0.00%	0.00%	40.00%	92.31%	69.23%

Recloser	24	62.50%	0.00%	12.50%	0.00%	0.00%	25.00%	85.69%	80.47%
*Station Switch (44 kV)***	6	16.67%	16.67%	0.00%	0.00%	0.00%	66.67%	82.95%	40.15%
Station Service Transformer	6	0.00%	16.67%	33.33%	0.00%	0.00%	50.00%	64.21%	57.89%
Lightning Arresters	18	61.11%	5.56%	0.00%	0.00%	0.00%	33.33%	97.92%	66.67%
Protection Relay	18	61.11%	0.00%	0.00%	0.00%	0.00%	38.89%	89.77%	80.56%
Power Cable	20	55.17%	24.14%	20.69%	0.00%	0.00%	0.00%	84.05%	84.14%
Station Facility	6	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	90.00%

*** Three out of the six switch are installed in 2015 or after, hence they were not included in the last inspection cycle as they are still new. These assets can be considered as in Good and Very Good Condition. They will be inspected as part of the next inspection cycle.*

CWH's Current Health Index Maturity and Continuous Improvement

Overall, CWH's asset data collection practices are sufficiently robust to enable the calculation of the recommended ACA that is consistent with industry best practices. CWH would benefit from enhanced documentation of its asset inspection and maintenance practices using mobile workforce tools connected to a Centralized Maintenance Management System.

In certain cases, such as underground primary cable, overhead switches, and overhead distribution transformers, there are opportunities for CWH to introduce additional variables that can provide further insight into the degradation level of a given asset class. For example, there remain a few instances where select recommended parameter data is not collected or is not available across a large enough portion of the population, resulting in certain condition parameters being excluded from the formulation. However, such instances represent relative exceptions rather than the rule, enabling METSCO to classify CWH's HI formulation as being closely aligned with best practices.

While the existing framework provides CWH with a significant volume of data, certain procedural and technological enhancements could further the granularity of its asset condition data and facilitate the calculation of a greater proportion of numerical degradation scores. To this end, Section 6 of this study includes a set of METSCO's recommendations for incremental data collection enhancements that CWH can consider going forward based on its assessment of their relative cost-benefit tradeoffs. METSCO prioritized the individual items according to the significance of the additional insights they would enable CWH to generate.

In providing these recommendations, METSCO is cognizant of the fact that regulated utilities are facing cost constraints across numerous facets of their operations, while contending with the effects of aging infrastructure, changing climate, evolving customer needs, and many other priorities. As such, the adoption of any incremental enhancement to the existing asset data collection practices must be grounded in management's assessment of the incremental value of such enhancements, relative to the opportunity cost of advancements elsewhere in the utility's operations. METSCO makes this observation to highlight its position that the sole fact of a gap between a utility's current process state and the industry best practices need not necessarily indicate that an action to remedy that gap is required in short order.

Table of Contents

List of Figures

List of Tables

1 Introduction

METSCO Energy Solutions Inc. ("METSCO") is an industry expert in Asset Condition Assessment ("ACA") and Asset Management ("AM") practices due to our extensive experience in conducting ACAs, developing AM plans, and implementing AM frameworks for transmission and distribution utilities across North America. METSCO's collective record of experience in these areas is among the most extensive in the world, with our AM frameworks gaining acceptance across multiple regulatory jurisdictions. A selection of METSCO's past projects is attached as Appendix A to this report.

Centre Wellington Hydro ("CWH") is an electricity distributor operating in the town of Fergus and the village of Elora. CWH engaged METSCO to prepare a comprehensive ACA study for the assets comprising CWH's electrical system. The ACA is required as one of the key inputs for the preparation of CWH's five-year Distribution System Plan, prepared in accordance with the filing requirements enacted by the Ontario Energy Board ("OEB"). The study's primary objective is to objectively determine the condition of CWH's assets as a key step in the capital expenditure process for renewal investments. Supplementary objectives include preparing the ACA results to be used for CWH's upcoming rate filing as well as to continuously improve CWH's AM framework.

A unique ACA methodology is applied to each asset class deployed within CWH's system. The adoption of the ACA methodology requires identifying end-of-life criteria for various components associated with each asset type, followed by periodic asset inspections, and recording of asset condition to identify the assets most at risk at reaching the end-of-life criteria over the planning horizon. Each criterion represents a factor that is influential, to a specific degree, in determining an asset's (or its component's) condition relative to its potential failure. These components and tests are weighted based on their importance in determining the assets' end-of-life.

The assets covered in the report include the following major asset classes:

Distribution Asset Classes	Station Asset Classes
Wood Poles	Power Transformers
Concrete Poles	Switchgears
Overhead Primary Conductors	Reclosers
Underground Primary Cables	Station Switches (44 kV)
Pole Mount Transformers	Station Service Transformers
Pad Mount Transformers	Lightning Arresters
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	Station Facilities

All asset condition data used in the study is maintained by CWH as part of its regular asset management practices. The ACA results are based on condition data recorded by CWH and its contractors up to the end of 2020 for distribution assets and May 2021 for station assets. The distribution asset information was provided to METSCO between January 2021 and February 2021 whereas station asset information was provided between January 2021 and May 2021.

The report is organized into six sections including this introductory section:

- Section 2 summarizes the ISO 5500X AM standards, discusses how the ACA fits into the overall AM framework; and provides an overview of METSCO's ACA methodology;
- Section 3 summarizes the asset Health Index ("HI") calculation methodology;
- Section 4 provides the condition assessment methodology framework and assessment for each of the identified asset classes;
- Section 5 provides METSCO's conclusions; and
- Section 6 summarizes METSCO's recommendations for CWH on data collection improvements for continuous improvement efforts for the ACA.

2 Context of the ACA within AM Planning

The ACA is a key step in developing an asset replacement strategy. By evaluating the current set of available data related to the condition of in-service assets comprising an organization's asset portfolio, condition scores for each asset are determined. The ACA involves the collection, consolidation, and utilization of the results within an organizational AM framework to objectively quantify and manage the risks of its asset portfolio. The level of degradation of an asset, its configuration within the system, and its corresponding likelihood of failure feed directly into the risk evaluation process, which identifies asset candidates for intervention (i.e., replacement or refurbishment). Assets are then grouped into program and project scopes that are evaluated and prioritized.

The ACA is designed to provide insights into the current state of an organization's asset base, the risks associated with identified degradation, approaches to managing this degradation within the current AM framework, and how to best make use of these results to extract the optimal value from the asset portfolio going forward.

2.1 International Standards for AM

The following paragraphs serve as a brief introduction to the ISO standards and provide a brief overview of the applicability of AM standards within an entity.

The industry standard for AM planning is outlined in the ISO 5500X series of standards, which encompass ISO 55000, ISO 55001, and ISO 55002. Each business entity finds itself at one of the three main stages along the AM journey:

1. Exploratory stage - entities looking to establish and set up an AM system;
2. Advancement stage - entities looking to realize more value from an asset base; and
3. Continuous improvement stage - those looking to assess and progressively enhance an AM system already in place for avenues of improvement.

Given that AM is a continuous journey, ISO 5500X remains continuously relevant within an organization; providing an objective, evidence-based framework against which the organizations can assess the managerial decisions relating to their purpose, operating context, and financial constraints over the different stages of their existence.[1]

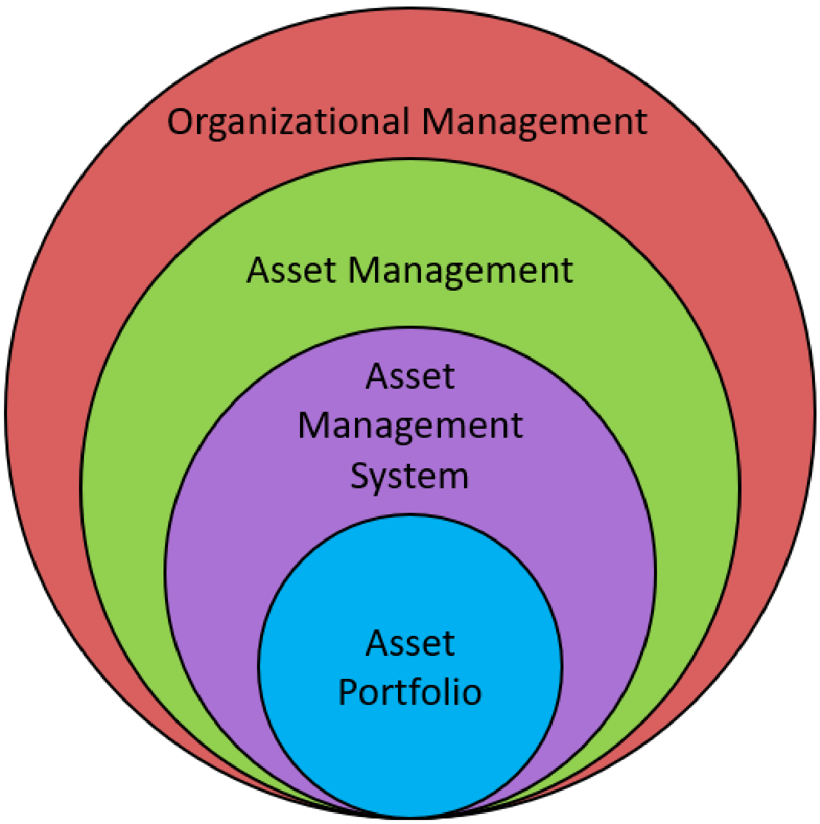
An asset is any item or entity that has value to the organization. This can be actual or potential value, in a monetary or otherwise intangible sense (e.g., public safety). The hierarchy of an AM framework begins with the asset portfolio, containing all known information regarding the assets, which sits as the fundamental core of an organization. The

[1] ISO 55000 – Asset management – Overview, principles and terminology

ACA is the procedure to turn the known condition information into actionable insights based on the level of deterioration.

Around the asset portfolio, the AM system operates and represents a set of interacting elements that establish the policy, objectives, and processes to achieve those objectives. The AM system is encompassed by the AM practices – coordinated activities of the organization to realize maximum value from its assets. Finally, the organizational management organizes and executes the underlying hierarchy.[1]

Figure 2-1: Relationship between key AM terms[1]



2.2 ACA within the AM Process

A well-executed AM strategy hinges on the ability of an organization to classify its assets via comprehensive and extensive data and data collection procedures. This includes but is not limited to: the collection and storage of technical specifications, historical asset performance, projected asset behaviour and degradation, the configuration of an asset or asset-group within the system, the operational relationship of one asset to another, etc. In this way, AM systems should be focused on the techniques and procedures in which data can be most efficiently extracted and stored from its asset base to allow for further analysis and insights to be made. With more asset data on hand, better and more informed decisions can be made to realize greater benefits and reduce the risk across the asset portfolio managed by an organization.[2]

AM is fundamentally grounded in a risk-based evaluation of continued value. The overarching goal of an AM process is to quantify all assets risk by their probability and impact (where possible) and then look to minimize these risks through AM operations and procedures. The ACA quantifies the condition of each asset under study and is an appropriate indicator of its failure probability. Making asset replacement decisions directly based on the ACA results constitutes a condition-based intervention strategy.

AM practices can help quantify and drive strategic decisions. A better understanding of the asset portfolio and how it is performing within an organization will allow for optimal decision-making. This is largely due to best AM practices being a fundamentally risk-based approach, which lends it to be a structured framework for creating financial plans driven by data. AM practices should also have goals in mind when framing asset investments, changes in asset configuration, or the acquisition of new assets. This can include better technical compliance, increased safety, increased reliability, or increased financial performance of the asset base. ISO 55002 states explicitly that all asset portfolio improvements should be assessed via a risk-based approach prior to being implemented.[2] The criticality of the asset determines its failure impact. A risk-based asset intervention strategy should consider both the probability and impact in the decision-making process.

2.3 Continuous Improvement in the AM Process

The application of rigorous AM processes can produce multiple types of benefits for an organization including, but not limited to: realized financial profits, better classified and managed risk among assets, better-informed investment decisions, demonstrated compliance among the asset base, increased public and worker safety, and corporate sustainability.[1]

AM processes are ideally integrated throughout the entire organization. This requires a well-documented AM framework that is shared between all relevant agents. In this way, the organization stands to benefit the most from its internal resources, whether it be via technical experts, those operating and maintaining the assets, or those with an understanding of the financial operations and constraints on the organization as a whole. As a future-state goal, utilities and other organizations alike should strive to document their AM guiding principles within a Strategic Asset Management Plan ("SAMP"). The SAMP should be used as a guide for the organization to apply its AM principles and practices for its specific use case. The distribution of the SAMP should be well-publicized within an organization and updated on a regular basis, in order to best quantify the most current and

[2] ISO 55002 – Asset management – Management systems – Guidelines for the application of ISO 55001

comprehensive AM practices being implemented. Just as the asset base performance is subject to an in-depth review, the AM process and system should be reviewed with the same rigor.[1]

AM should be regarded as a fluid process. Adopting a framework and an idealized set of practices does not bind the organization or restrict its agency. With time, the goal of any AM system is to continually improve and realize benefits within the organization through better management of its asset portfolio. Continually improved asset data and data collection procedures, updated SAMPs, and further integration into all aspects of an organization's activities as it grows and changes over time should be the goal of any AM framework.[2]

3 Asset Condition Assessment Methodology

3.1 METSCO's Project Execution

METSCO's execution path in completing the ACA study is a four-phase procedure:

1. *Initial information gathering*: including initial interviews with CWH staff to investigate system configuration and the prominence of certain asset classes, establish the range of available condition data sources at the beginning of the engagement, and confirm the key assumptions regarding these factors with CWH subject matter experts through a series of interviews.

2. *Database construction* – activities to construct a single database of condition-related information for each CWH asset class using the provided data sources. This includes consolidation of CWH's asset inspection records, databases containing results of technical tests performed by CWH contractors, and the entire database from the Geographic Information System ("GIS").

3. *HI and Data Availability Index ("DAI") calculation* – upon confirming the integrity of its condition dataset along with the accuracy of assumptions made in its preparation, METSCO calculated the Health Indices and DAI for all asset classes. Additional data sources were requested from CWH to improve the accuracy of the asset health calculation if applicable.

4. *Results Reporting* – the final phase of the project scope was the creation of the ACA report.

3.1.1 Data Sources

To assess the demographics and establish the unit population of CWH's system assets, METSCO was provided with CWH's asset demographic data from its current GIS. The data came from CWH's corporate asset registries containing information on asset vintage, model, and year of commissioning. The database served as the primary asset library that contained asset nameplate information such as age and unique identifiers. Currently, CWH does not record its station data in the GIS. Therefore, the station asset demographic data was collected through consultations with the CWH station planning team.

To assess the condition of CWH's system, METSCO was provided with available asset inspection and maintenance data for the asset classes in scope. Various sources hold records of CWH's inspection and maintenance activities. Most of these data came from primary sources such as equipment inspection forms completed by CWH staff or contractors, or the results of specific tests such as the Dissolved Gas Analysis ("DGA") for station power transformer oil.

Additionally, METSCO was provided with historical operating data for assets that require operating information for the HI calculation. An example of operating data used is the historical loading information for transformers.

3.2 Asset Condition Assessment Methodologies

Prior to completing an ACA, a methodology needs to be selected for the current entity. The four most common methodologies that can be employed to assess the condition of the system health include:

1. Additive models – asset degradation factors and scores are used to independently calculate a score for each individual asset, with the HI representing a weighted average of all individual scores from 0 to 100;
2. Gateway models – select parameters deemed to be most impactful on the asset's overall functionality act as "gates" to drive the overall condition of an asset, by effectively "deflating" the scores of other (less impactful) components;
3. Subtractive models – consider that a relatively Poor condition for any of several major assets within a broader system of assets could act as a sufficient justification to drive investments into the entire system; and
4. Multiplicative models – a HI that dynamically shifts the calculation towards specific degradation factors, if they are a leading indicator to show that an asset is failing.

The additive and gateway models are typically used for assessing individual assets, whereas the subtractive and multiplicative models are typically used for aggregate and composite system-level assessments. The latter models are still in an early stage and require extensive refinement and validation to confirm their applicability. The gateway model assigns gates to criteria or asset subcomponents that are difficult or expensive to replace and maintain, and/or are known to be a major cause of asset malfunctioning. This methodology is commonly used in conjunction with the additive model for major assets such as wood poles, where a "gate" score will act to reduce the HI due to a low recorded score for a given criterion. For example, if the remaining strength of a wood pole is less than 60%, the final HI for that asset is halved.

In general, most distribution utilities employ an additive model with select gateway model elements. METSCO selected this approach when conducting the ACA, which is in alignment with most of CWH's peer utilities.

3.3 Overview of Selected Methodology

3.3.1 Condition Parameters

To calculate the HI for an asset, formulations are developed based on condition parameters that can be expected to contribute to the degradation and eventual failure of that asset. A weight is assigned to each condition parameter to indicate the amount of influence the condition has on the overall health of the asset. Figure 3-1 exemplifies an HI formulation table.

Figure 3-1: HI Formulation Components

Degradation Factor: **The asset aging mechanisms, tests, or failure modes.**

Condition Indicator Numerical Score: The converted numerical score associated with the degradation factor, which corresponds directly with the indicator letter score.

Condition Max Score: The highest obtainable Score for each degradation factor. (4 x Weight)

#	Degradation Factor	Weight	Condition Indicator Letter Score	Condition Indicator Numerical Score	Condition Max Score
1	Degradation Factor 1	4	A-E	4-0	16
2	Degradation Factor 2	6	A,C,E	4,2,0	24
3	Degradation Factor 3	6	A-E	4-0	24
				Asset Max Score	64

Condition Weight: The impact of the condition with respect to asset failure and/or the safe operation of the asset. Higher impact results in higher weight

Condition Indicator Letter Score: The letter grade associated with the degradation factor – this is typically captured from the raw inspection data.

Asset Max Score: The highest numerical grade that can be assigned to the asset / asset class, given the associated degradation factors and weights.

Condition parameters of the asset are characteristic properties that are used to derive the overall HI. Condition parameters are specific and uniquely graded to each asset class. Additionally, some condition parameters can be comprised of sub-condition parameters. For example, the oil quality condition parameter for a station power transformer is based on multiple sub-condition parameters such as the acidity of the oil, its interfacial tension, dielectric strength, and water content.

The scale used to determine an asset's score for a condition parameter is called the "condition indicator". Each condition parameter is ranked from A to E and each rank corresponds to a numerical grade. In the above example, a condition score of 4 represents the best grade, whereas a condition score of 0 represents the worst grade.

A – 4 Best Condition
B – 3 Normal Wear
C – 2 Requires Remediation
D – 1 Rapidly Deteriorating
E – 0 Beyond Repair

3.3.2 Use of Age as a Condition Parameter

Some industry participants question the appropriateness of including age as a potential condition parameter for calculating asset HI values. At the core of the argument against the use of age in calculating asset condition, is the notion that age implies a linear degradation path for an asset that does not always match the actual experience in the field.

While some assets lose their structural integrity faster than would be expected over time, others, such as those with limited exposure to natural environmental factors, or those that benefitted from regular predictive and corrective maintenance, may retain their original condition for a longer period of time than age-based degradation would imply.

In recognition of the argument as to the limitations of age-based condition scoring, METSCO limits the instances where it relies on only age as a parameter explicitly incorporated into the HI formulation. In some cases, however, the limited number of condition parameters available for the calculation of asset health makes age a useful proxy for the important factors that the analysis would not otherwise capture. In other cases, such as when assessing the condition of complex equipment containing a number of internal mechanical components that degrade with continuous operation and the state of which cannot be assessed without destructive testing, age represents an important component of asset health calculation irrespective of the number of other factors that may be available for analysis.

3.3.3 Final Health Index Formulation

The final HI, which is a function of the condition scores and weightings, is calculated based on the following formula:

$$HI = \left(\frac{\sum_{i=1} Weight_i * Numerical\ Grade_i}{Total\ Score}\right) x\ 100\%$$

Where *i* corresponds to the condition parameter number, and the HI is a percentage representing the remaining life of the asset.

A gating approach is used for condition parameters that have a significant influence on the health of an asset. If the condition parameter that has been flagged as a gating parameter is below a pre-defined threshold value, the overall HI is reduced by 50%. This approach enables utilities to efficiently flag severely degraded assets through the identification of condition parameters acknowledged to be critical indicators of overall asset health.

3.3.4 Health Index Results

METSCO's assessment of asset condition uses a consistent five-point scale along the expected degradation path for every asset, ranging from Very Good to Very Poor. To assign each asset into one of the categories, METSCO constructs an HI formulation for each asset class, which captures information on individual condition parameters contributing to that asset's declining condition over time. Condition scores assigned to each condition parameter are also expressed as numerical or letter grades along with pre-defined scales. The final HI – expressed as a value between 0% and 100% - is a weighted sum of scores of individual condition parameters, with each of the five condition categories (Very Good, Good, Fair, Poor, Very Poor) corresponding to a numerical band. For example, the condition score of Very Good indicates assets with HI values between 100% and 85%, whereas assets found to be in a Very Poor condition score are those with calculated HI values between 0% and 30%. Generating an HI provides a succinct measure of the long-term health of an asset. Table 3-1 presents the HI ranges with the corresponding asset condition, its description as well as implications for maintaining, refurbishing, or replacing the asset prior to failure.

Table 3-1: HI Ranges and Corresponding Asset Condition

HI Score (%)	Condition	Description	Implications
[85-100]	Very Good	Some evidence of aging or minor deterioration of a limited number of components	Normal Maintenance
[70-85)	Good	Significant Deterioration of some components	Normal Maintenance
[50-70)	Fair	Widespread significant deterioration or serious deterioration of specific components	Increase diagnostic testing; possible remedial work or replacement needed depending on the unit's criticality
[30-50)	Poor	Widespread serious deterioration	Start the planning process to replace or rehabilitate, considering the risk and consequences of failure
[0-30)	Very Poor	Extensive serious deterioration	The asset has reached its end-of-life; immediately assess risk and replace or refurbish based on assessment

3.4 Data Availability Index

To put the calculation of HI values into the context of available data, METSCO supplemented its HI findings with the calculation of the DAI: a measure of the availability of the condition parameter data for a specific asset weighted by each condition parameter to the HI score. The DAI is calculated by dividing the sum of the weights of the condition parameters available by the total weight of the condition parameters used in the HI formulation for the asset class. The formula is given by:

$$DAI = \left(\frac{\sum_{i=1} Weight_i * \alpha_i}{\sum_{i=1} Weight_i} \right) x\ 100\%$$

Where *i* corresponds to the condition parameter number and *α* is the availability of coefficient (=1 when data available; =0 when data unavailable)

An asset with all condition parameter data available will have a DAI value of 100%, independent of the asset's HI score. Assets with a high DAI will correlate to HI scores that describe the asset condition with a high degree of confidence. For distribution assets – typified by relatively large asset populations – if the DAI for an asset is less than 70%, a valid HI cannot be calculated. The subset of distribution assets without a valid HI are assigned an extrapolated HI value using the valid HI results for assets within the same asset class and ten-year age band. Similarly for station assets – typified by relatively small asset populations – if the DAI for an asset is less than 60%, a valid HI cannot be calculated. HI results for station assets are not extrapolated due to the small population.

4 Health Index Formulations and Results

This section presents the developed HI formulation for each asset class, age demographics, the calculated scores for HI results, and the data available to perform the study.

4.1 Distribution Assets

This subsection introduces the calculated HI of CWH's distribution assets. If an asset's DAI is less than 70%, a valid HI cannot be calculated. These assets are placed in the "No HI" category and are extrapolated across the known asset population. If a condition parameter's data availability is less than 30% across the asset class population, the degradation factor is excluded from the framework.

4.1.1 Wood Poles

Wood poles are an integral part of any distribution system. They are the support structures for the overhead distribution system. The HI for wood poles is calculated by considering a combination of end-of-life criteria summarized in Table 4-1.

Table 4-1: Wood Pole HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Remaining Strength *	8	A,B,C,D,E	4,3,2,1,0	32
Wood Rot	6	A,B,C,D,E	4,3,2,1,0	24
Woodpecker Damage	1	A,B,C,D,E	4,3,2,1,0	4
Crack Damage	1	A,B,C,D,E	4,3,2,1,0	4
Insect Damage	1	A,B,C,D,E	4,3,2,1,0	4
Other Defects	1	A,B,C,D,E	4,3,2,1,0	4
Service Age	3	A,B,C,D,E	4,3,2,1,0	12
**gateway applied*			**Total Score**	**84**

Wood, being a natural material, has degradation processes that are different from other assets in distribution systems. The most critical degradation process for wood poles involves biological and environmental mechanisms such as fungal decay, wildlife damage, and weather effects which can impact the mechanical strength of the pole. Any loss in the strength of the pole can present additional safety and environmental risks to the public and CWH. The remaining strength condition parameter is a quantitative measurement that provides adequate evidence of the deterioration of the operational health of the asset.

The HI formulation for wood poles is a combination between the additive and gateway model; with the gateway applied to the remaining strength parameter. When the remaining strength for a pole is below or equal to 60%, the final HI for that pole is reduced by half. CSA standard C22.3 no. 1 requires that any pole with a remaining strength less than or equal to 60% of its design strength be replaced or reinforced[3].

Additional condition parameters include service age, wood rot presence, and mechanical defects. The industry's best practices also include the leaning of wood poles as a condition parameter. However, due to insufficient "out of plumb" data (13% DAI), it was disregarded in the formulations. A visual inspection record notes the degree of wood rot/decay developed on the pole's external surface, internal cross-section, and cross-arm sections. The presence of wood rot signifies there is a high moisture content surrounding the pole and impacts the pole's strength. Additionally, visual inspections note for the following mechanical defects found on wood poles:

- Grounding issues;
- Crossarm issues;
- Insect / Woodpecker Damage;
- Fire/ Lightning Damage; and
- Cracking.

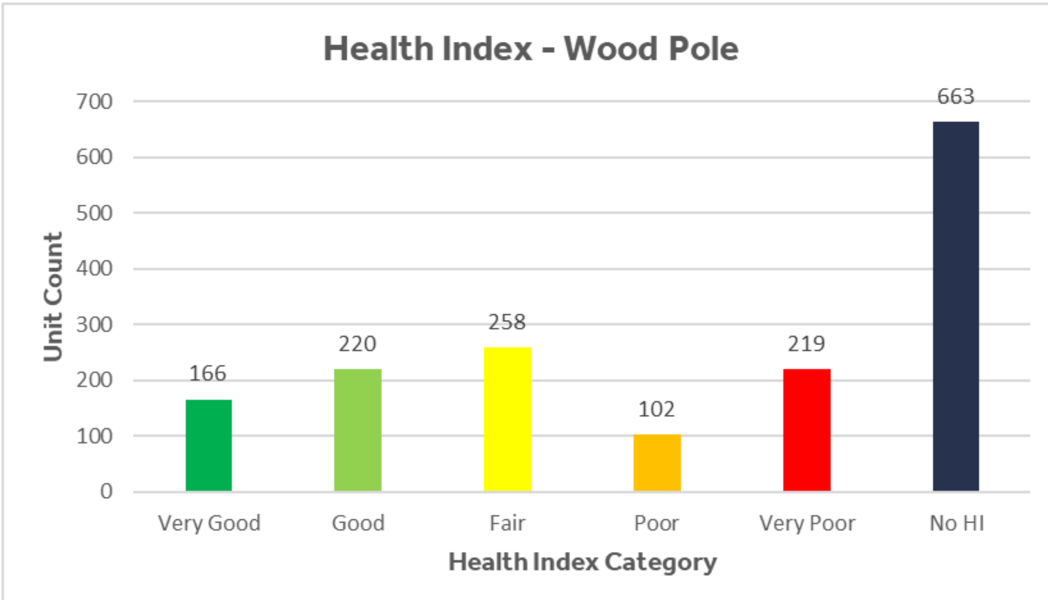
CWH owns 1,628 wood poles within its service territory. The installation date is known for the entirety of the in-service population. Figure 4-1 presents the age distribution for in-service wood poles.

Figure 4-1: Wood Poles Age Demographics

[3] *Overhead Systems*, CAN/CSA C22.3 No.1-15, 2015

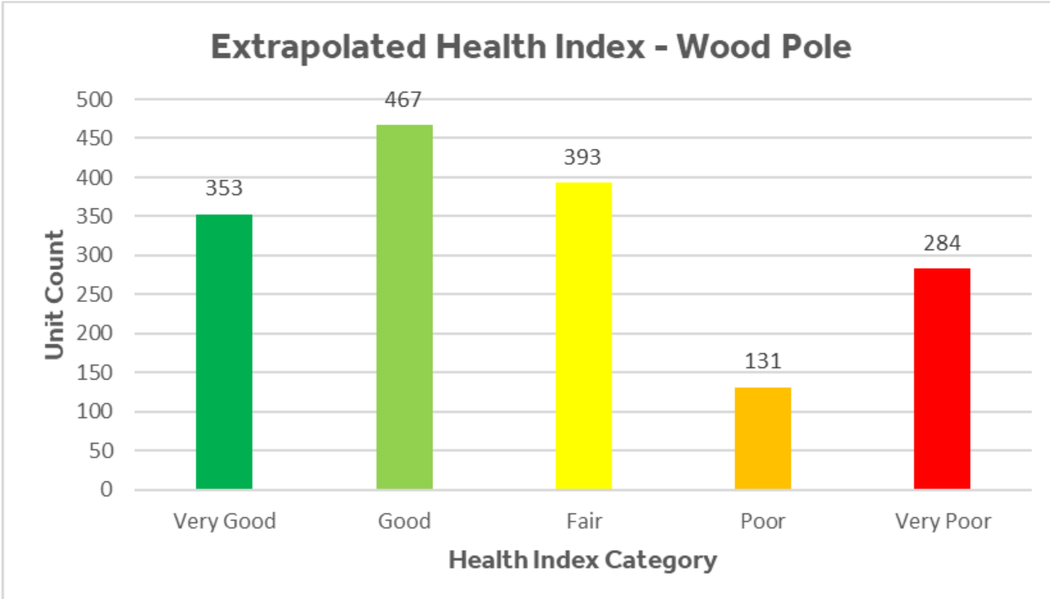
CWH's pole maintenance and nameplate data were used to calculate the HI based on the criteria provided in Table 4-1. As shown in Figure 4-2, a valid HI was calculated for 59% of the wood poles.

Figure 4-2: Wood Pole HI Results



To complete the full analysis, the HI for the remaining 41% of poles has been extrapolated based on the HI distribution with a valid HI score within each ten-year age group. The overall extrapolated HI distribution for wood poles is presented in Figure 4-3. Most of the poles are either in Fair, Good or Very Good condition, with around 25% of the total population being in Poor or Very Poor condition. These assets should be further assessed by CWH to identify if any action, such as refurbishment or replacement is required for any of the identified Poor and Very Poor assets.

Figure 4-3: Extrapolated Wood Pole HI Results



The availability of data related to the degradation factors varies from one factor to another. Table 4-2 shows the degradation factors as well as the associated data availability index. The overall average DAI for wood poles is 64%.

Table 4-2: Wood Poles' Condition Parameters' Data Availability

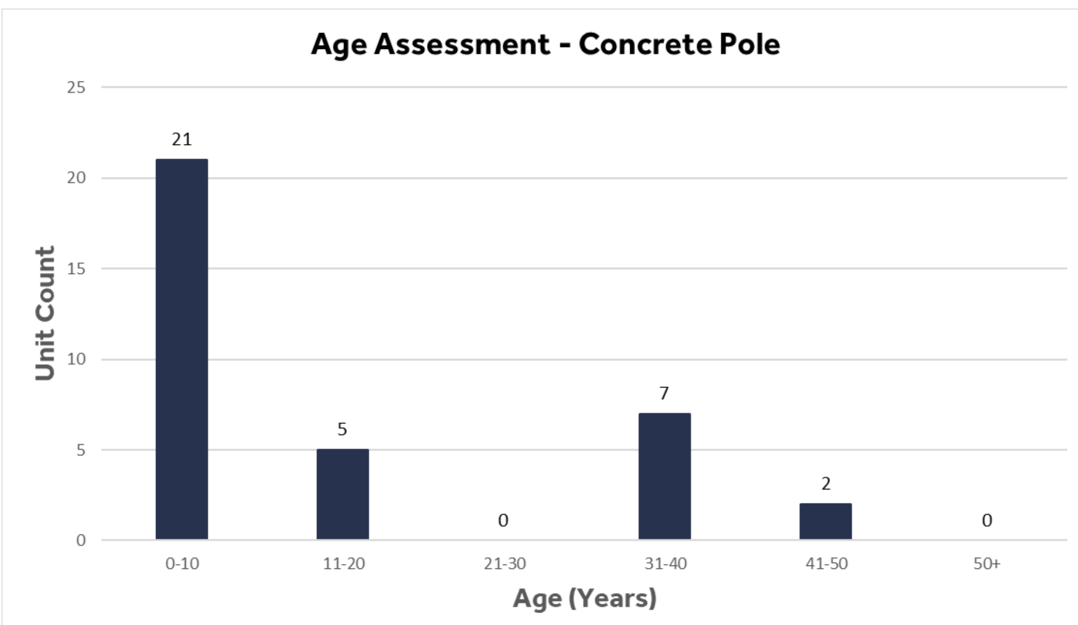
Condition Parameter	% of Assets with Data
Remaining Pole Strength	59%
Wood Rot	56%
Woodpecker Damage	59%
Crack Damage	59%
Insect Damage	59%
Other Defects	59%
Service Age	100%

4.1.2 Concrete Poles

Like wood poles, concrete poles support the overhead distribution system. Concrete poles have significantly greater strength than typical wood poles and have a longer service life. However, concrete poles are very heavy and are costlier to transport and install, hence fewer are in-service compared to wood poles. Since only the assets service age is available for CWH's concrete poles and no other condition parameters were available, a HI for concrete poles was not calculated. The industry's best practices include considering corrosion of rebars, defects, and the pole being out of plumb when evaluating a concrete pole's health state. Instead an age assessment was undertaken for the poles, Additionally end of life ("EOL") analysis was carried out, with the typical useful life ("TUL") of a concrete pole being identified as 60 years[4]. Data related to the service age of concrete poles are available for all assets, meaning that the average DAI for concrete poles is 100%.

CWH owns 35 concrete poles within its service territory. The installation date is known for the total in-service population. Figure 4-4 presents the age distribution for concrete poles. All the assets are below their TUL and will not reach their end of useful life within the next five years.

Figure 4-4: Concrete Pole Age Demographics



Through the EOL analysis, all 35 concrete poles are below their TUL and zero poles are at or past their TUL or will reach their end of useful life within the next five years.

[4] Asset Depreciation Study for the Ontario Energy Board - Kinectrics Inc.

4.1.3 Overhead Primary Conductors

Overhead conductors transmit electricity from substations to customer premises and are supported by poles. The HI for the overhead primary conductor is calculated by considering a combination of end-of-life criteria summarized in Table 4-3.

Table 4-3: Overhead Primary Conductor HI Formulation

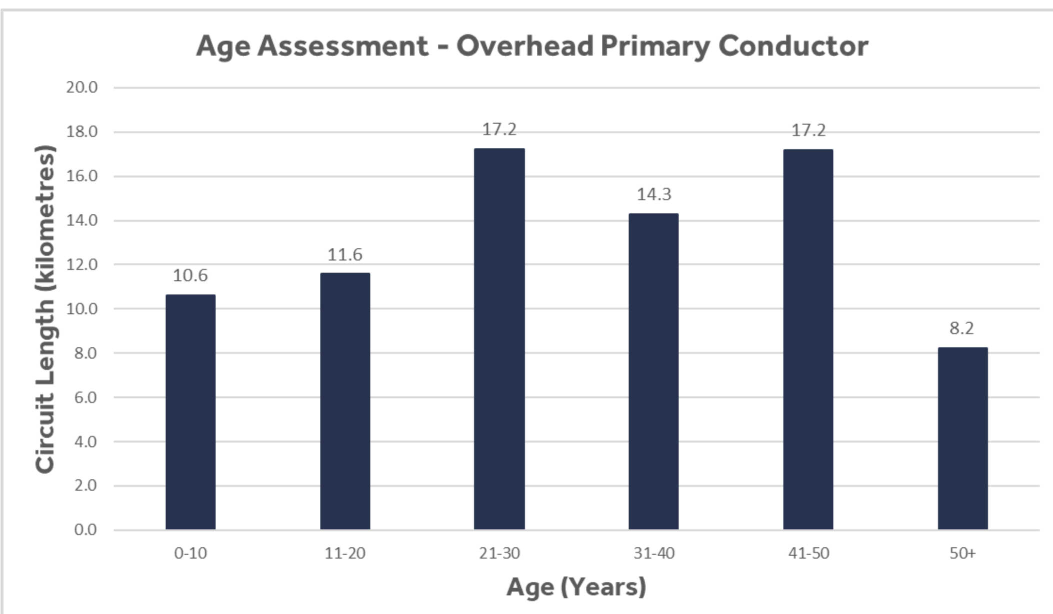
Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Service Age	5	A,B,C,D,E	4,3,2,1,0	20
Small Conductor Risk	5	A,E	4,0	20
			Total Score	**40**

The condition parameters used in the HI formulation are based on the industry's best practices for health state evaluation. In relation to the small conductor risk, 4CU and 6CU conductors are considered small-sized conductors with an elevated risk of degradation.

Although laboratory tests are available to determine the tensile strength and assess the remaining useful life of conductors, distribution line conductors rarely require testing. An appropriate proxy for the tensile strength of the conductor and to determine the remaining life of the asset is the use of service age.

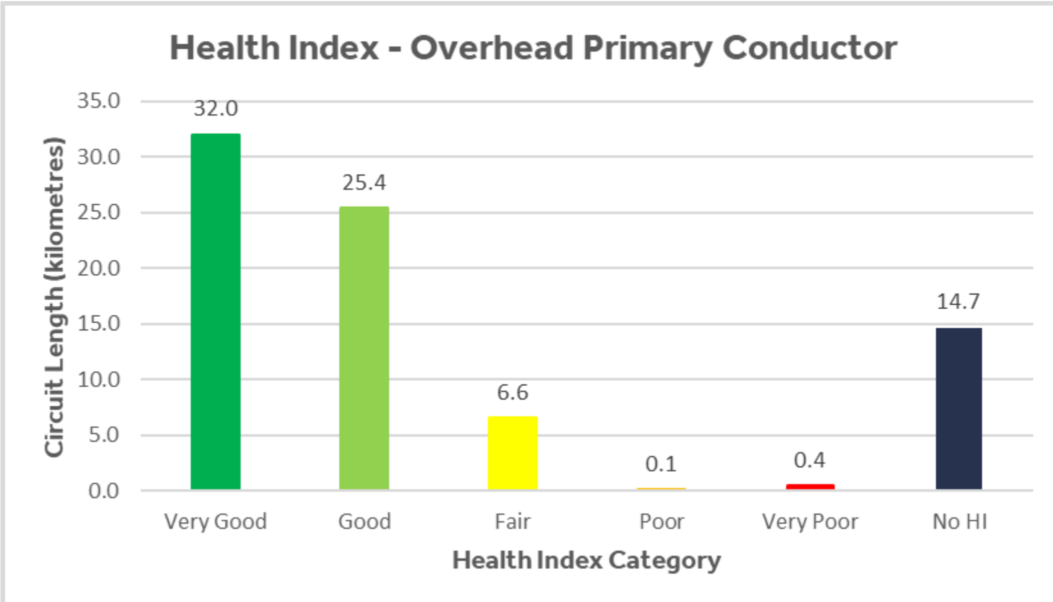
CWH owns approximately 79.2 km of the overhead primary conductor within its service territory, with 82% of the conductor having age data found in CWH's GIS. Figure 4-5 presents the overall overhead primary conductor age demographics.

Figure 4-5: Overall Overhead Primary Conductor Age Demographics



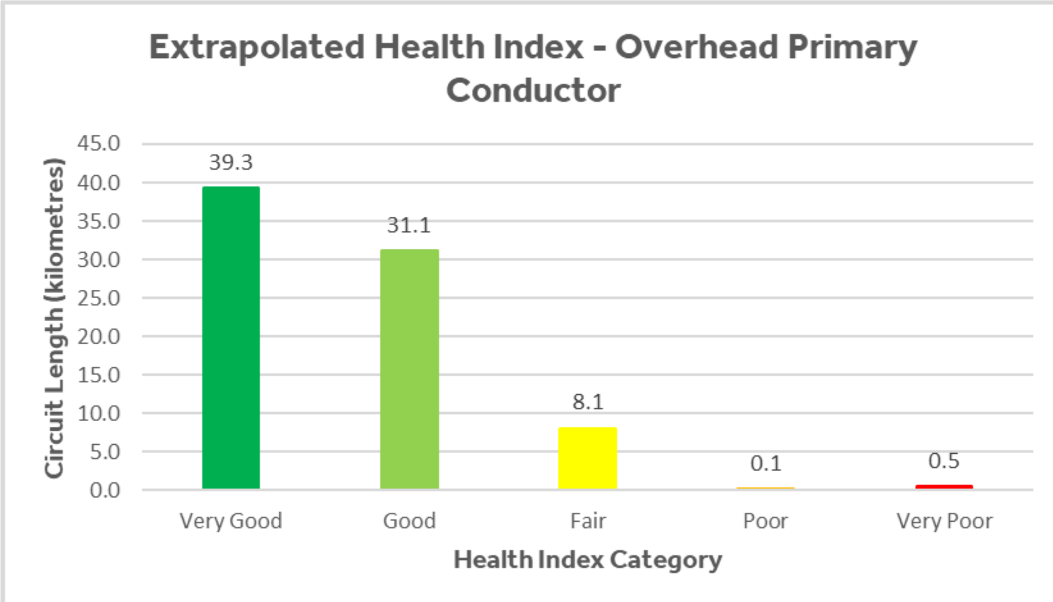
As shown in Figure 4-6, a valid Health Index was calculated for 81% of the conductors.

Figure 4-6: Overhead Primary Conductor HI Results



To complete the full analysis, the Health Index for the remaining 19% has been extrapolated based on the Health Index distribution of the asset population with a valid Health Index score. Most of the primary conductors are in Very Good and Good condition with approximately 1% in Poor and Very Poor condition. The overall Health Index for overhead primary conductors is illustrated in Figure 4-7.

Figure 4-7: Extrapolated Overhead Primary Conductor HI Results



The availability of data is very high for both condition parameters considered in the analysis. Table 4-4 shows the data availability index for each degradation factor. The average DAI for the overhead conductor is 91%.

Table 4-4: Overhead Conductor's Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Service Age	82%
Small Conductor Risk	100%

4.1.4 Underground Primary Cables

Like overhead conductors, underground cables also transmit electricity along the electrical distribution system; however, they are located below ground. All underground cables operated by CWH are XLPE cables. The HI for the overhead primary conductor is calculated by considering a combination of end-of-life criteria summarized in Table 4-5.

Table 4-5: Underground Primary Cable HI Formulation

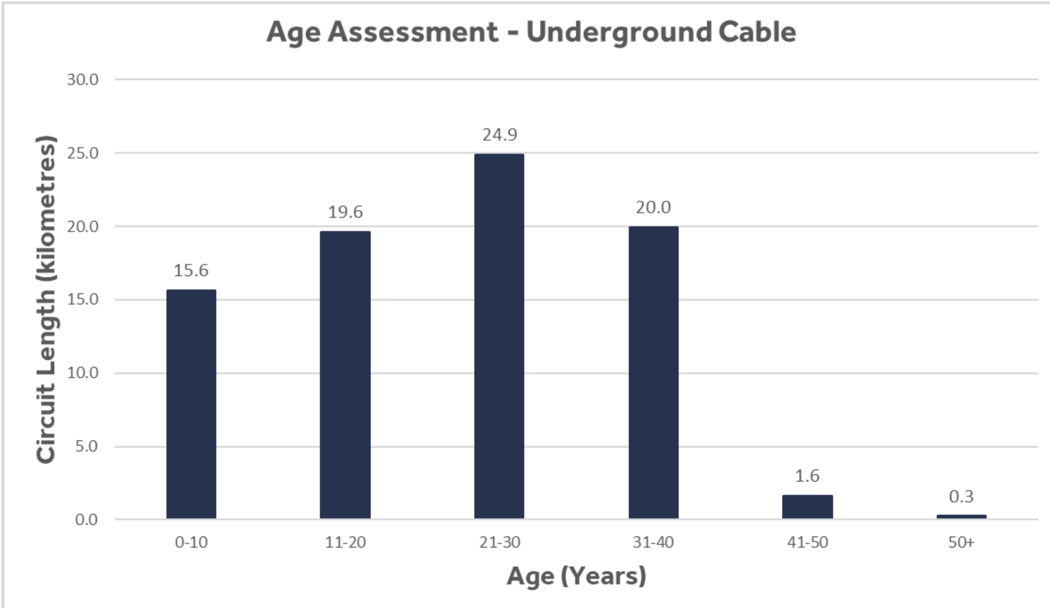
Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Service Age	10	A,B,C,D,E	4,3,2,1,0	40
Outage Records in Last 5 Years	8	A,B,C,D,E	4,3,2,1,0	32
			Total Score	**72**

The industry's best practices include the above condition parameters as well as field testing, loading history, concentric neutral condition, and splice and termination. However, CWH do not currently undertake all these testing methodologies, and therefore these condition parameters have been omitted when calculating the HI.

Compared to overhead lines, underground cables can be more reliable since they are not exposed to severe weather conditions, tree contacts, or foreign interference. However, the underground cables are more expensive and are one of the more challenging assets in electricity systems from a condition assessment and AM viewpoint. Several test techniques such as partial discharge ("PD") and water tree diagnostic testing have become available over recent years to identify the condition and performance of the asset class. Some tests can be destructive to the asset and hence are used less frequently. Accordingly, the preference is given to non-destructive testing. In the absence of test results, the cable age and the historical outage data are used for medium-term and long-term planning to predict quantities of cables that are expected to reach end-of-life.

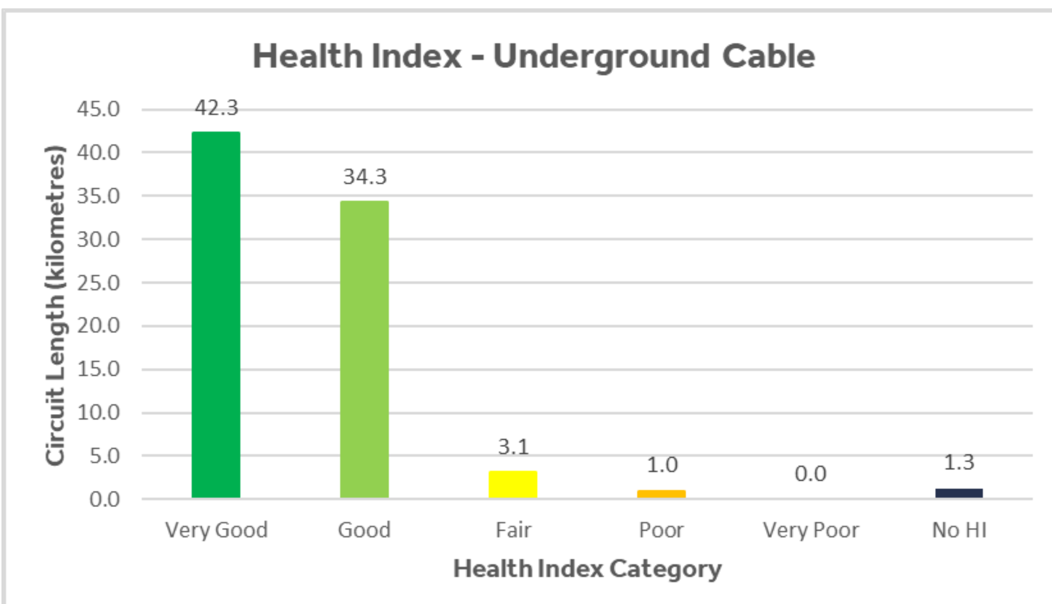
CWH owns approximately 82 km of underground primary cable within its service territory. CWH's GIS contains the cable installation year for all its cables. Figure 4-8 presents the total length of underground primary cables for each age band.

Figure 4-8: Overall Underground Primary Cable Age Demographics



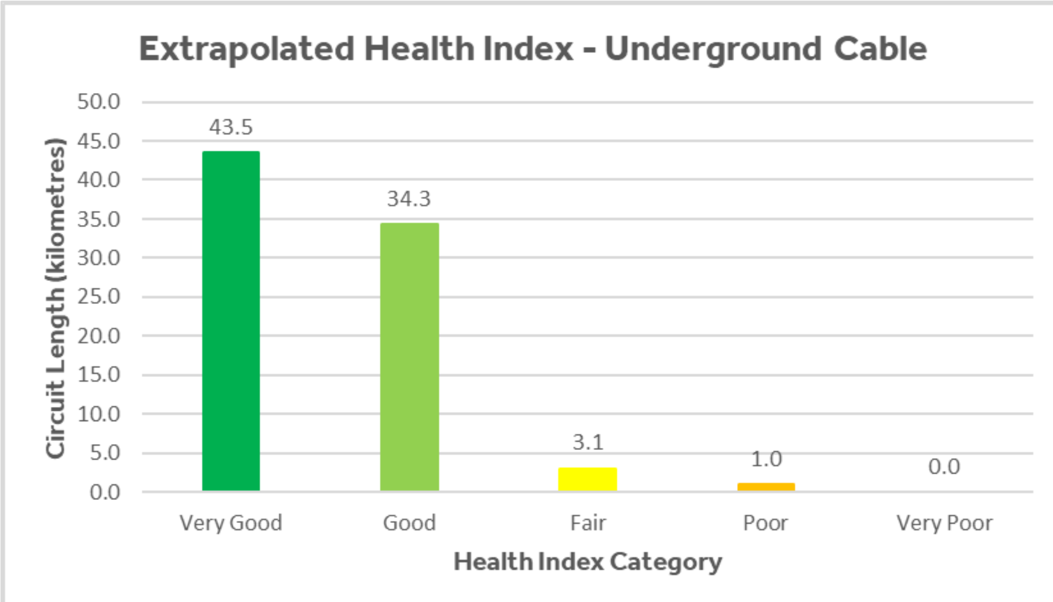
As shown in Figure 4-9, a valid Health Index was calculated for over 98% of the cables.

Figure 4-9: Underground Primary Cable HI Results



To complete the full analysis, the Health Index for the remaining ~2% has been extrapolated based on the Health Index distribution of the asset population with a valid Health Index score. Most of the primary cables are in Very Good and Good condition. A little over one percent of primary cables are in Poor condition, with none being deemed Very Poor. The overall Health Index for underground primary cables is illustrated in Figure 4-10.

Figure 4-10: Extrapolated Underground Primary Cable HI Results



The availability of data is very high for both condition parameters considered in the analysis. Table 4-6 shows the data availability index for each condition parameter. The average DAI for underground primary cable is 99%.

Table 4-6: Underground Primary Cable's Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Service Age	100%
Outage Records in Last 5 Years	98%

4.1.5 Pole Mount Transformers

Overhead (pole mount) transformers are installed on service poles above ground with the primary function to step down power from the medium-voltage distribution system to the voltage rating for customer use. The HI for pole mount transformers is calculated by considering a combination of end-of-life criteria summarized in Table 4-7.

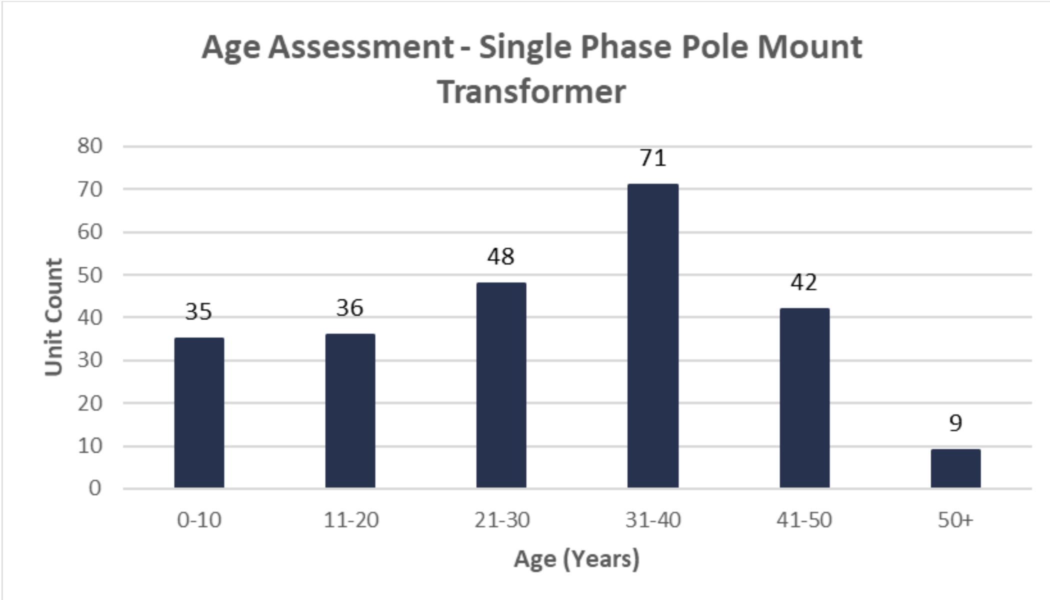
Table 4-7: Pole Mount Transformer HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Service Age	3	A,B,C,D,E	4,3,2,1,0	12
Peak Loading	3	A,B,C,D,E	4,3,2,1,0	12
Infrared Scanning	4	A,B,C,E	4,3,2,0	16
			Total Score	**40**

In addition to service age, peak loading and infrared scanning is used as a condition parameter. CWH undertake IR scanning on all its transformers on an annual basis and if any issues are detected, CWH keeps a record and takes appropriate action to mitigate any risk. The IR scanning have four parameters, no issues detected, beginning of a fault, typical overheating, dangerous overheating. CWH carry out IR scanning of their assets on an annual basis. If no issues are detected it is assumed the asset is in good condition. With respect to the peak loading condition parameter, load unbalances or peak loading reduces the useful life of a distribution transformer.

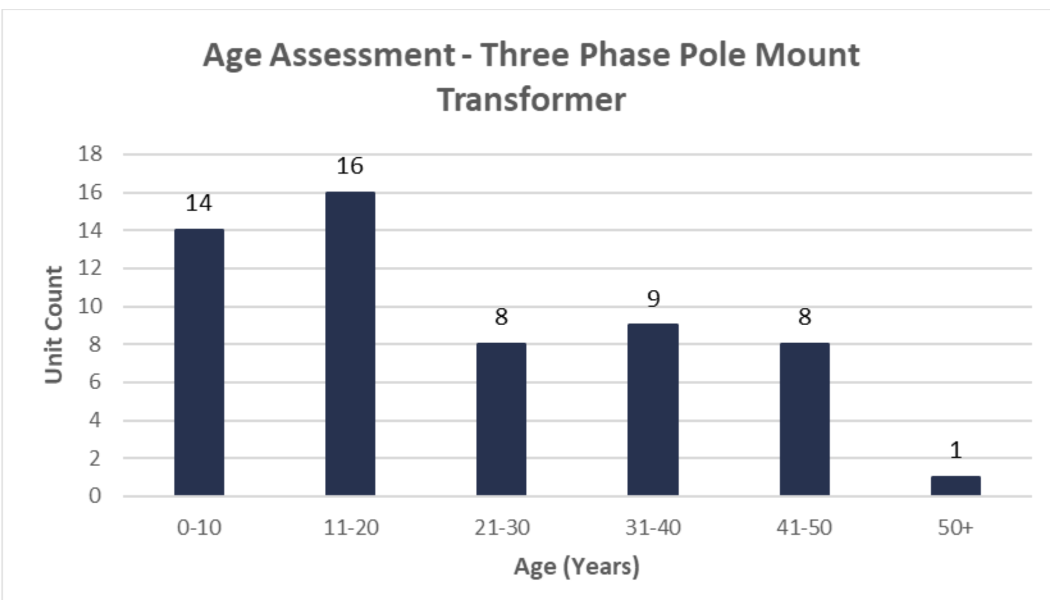
CWH owns 297 pole mount transformers. Of these 241 are single-phase pole mount transformers. Installation dates are known for almost 100% of the total in-service population. For unknown installation dates, the age is estimated to be the average age of in-service pole mount transformers. Figure 4-11 presents the age distribution for pole-mount transformers.

Figure 4-11: Single-phase Pole Mount Transformer Age Demographics



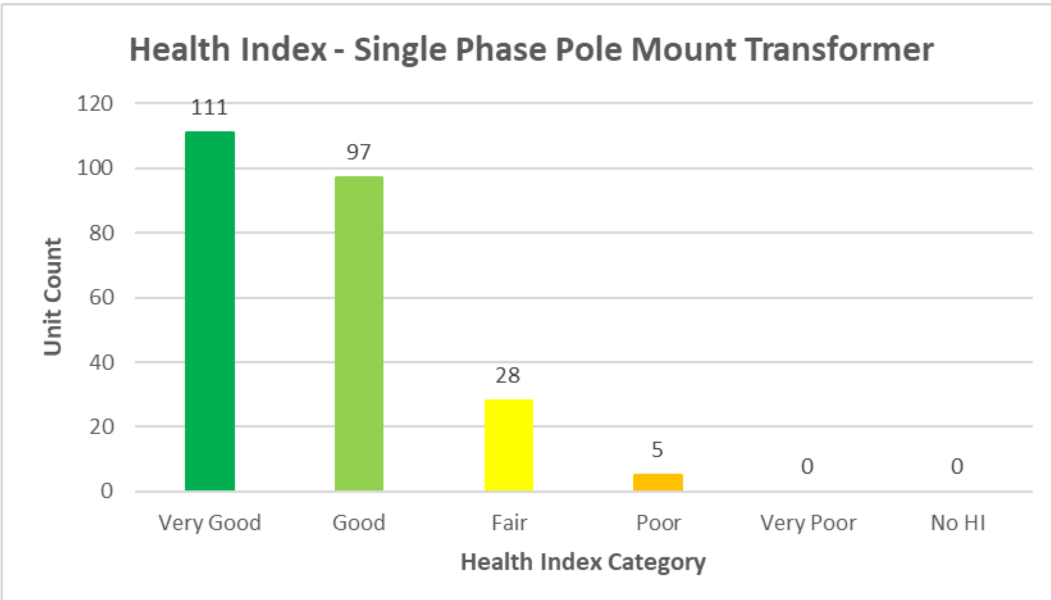
CWH owns 56 three-phase pole mount transformers within its service territory. The installation dates were known for the entire three-phase pole mount transformer population. Figure 4-12 presents the age distribution for three-phase pole-mount transformers.

Figure 4-12: Three-phase Pole Mount Transformer Age Demographics



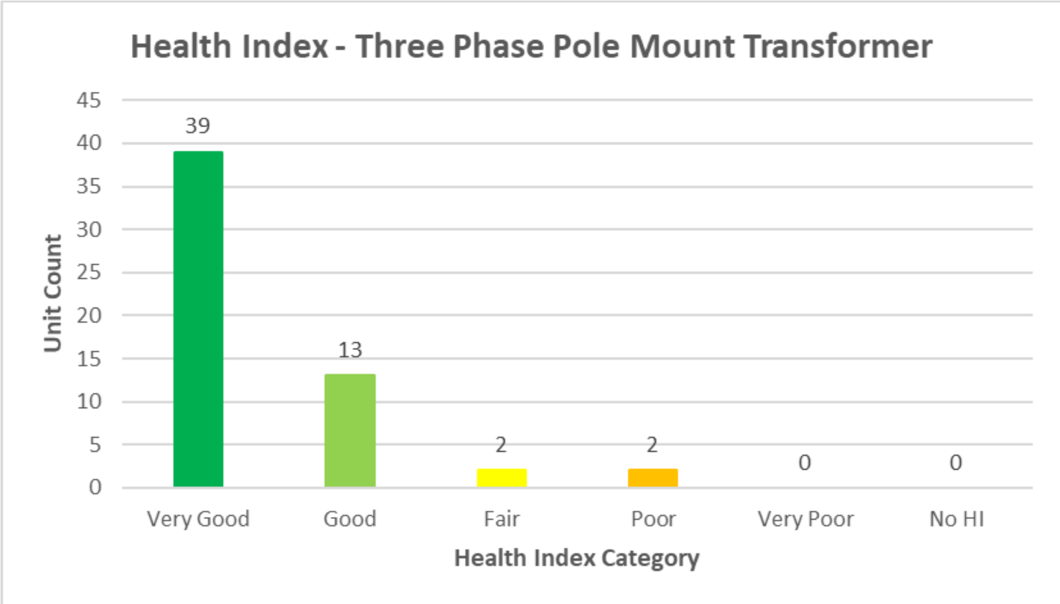
CWH's nameplate information and operating loading data were used to calculate the HI based on the criteria listed in Table 4-7. A valid HI was calculated for all of the single-phase overhead transformers, as can be seen in Figure 4-13. Most of the single-phase pole mount transformers are in a Good condition or better. Only five single-phase pole mount transformers are in a Poor condition.

Figure 4-13: Single-phase Pole Mount Transformer HI Results



A valid HI was calculated for all the three-phase overhead transformers. As can be seen in **Error! Not a valid bookmark self-reference.**, most three-phase pole mount transformers are in a Very Good or Good condition. Only two three-phase pole mount transformers are considered to be in Poor condition.

Figure 4-14: Three-phase Pole Mount Transformer HI Results



The availability of data is very high for both condition parameters considered in the analysis. Table 4-8 shows the data availability index for each condition parameter. The average DAI for pole mount transformer is 100%.

Table 4-8: Pole Mount Transformers' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Service Age	100%
Peak Loading	99%
Infrared Scanning	100%

4.1.6 Pad Mount Transformers

Pad mount distribution transformers are utilized for similar functionalities as pole-mount transformers. They step down power from the medium-voltage distribution system to the final utilization voltage for the customer; however, they are located on the ground level.

The HI for underground distribution transformers is calculated by considering a combination of end-of-life criteria summarized in Table 4-9.

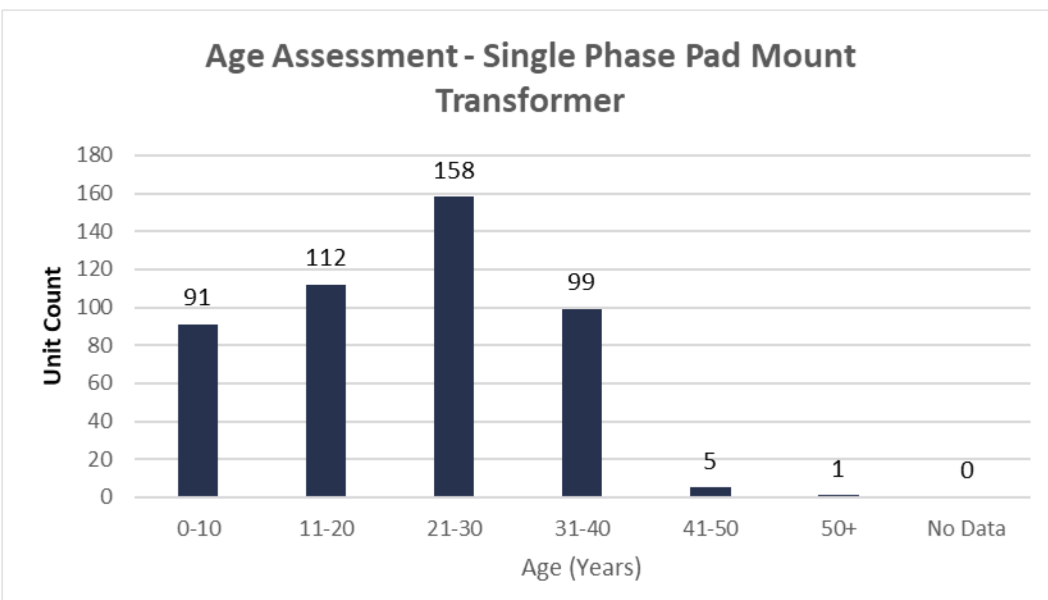
Table 4-9: Underground Distribution Transformer HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Visual Inspection	4	A,B,C,D,E	4,3,2,1,0	16
Service Age	3	A,B,C,D,E	4,3,2,1,0	12
Peak loading	3	A,B,C,D,E	4,3,2,1,0	12
			Total Score	**40**

Visual inspections identify defects related to the presence of oil leaks, vegetation interference, presence of rust on the components, and evidence of animal intrusion. Additionally, peak loading and service age are used as condition parameters.

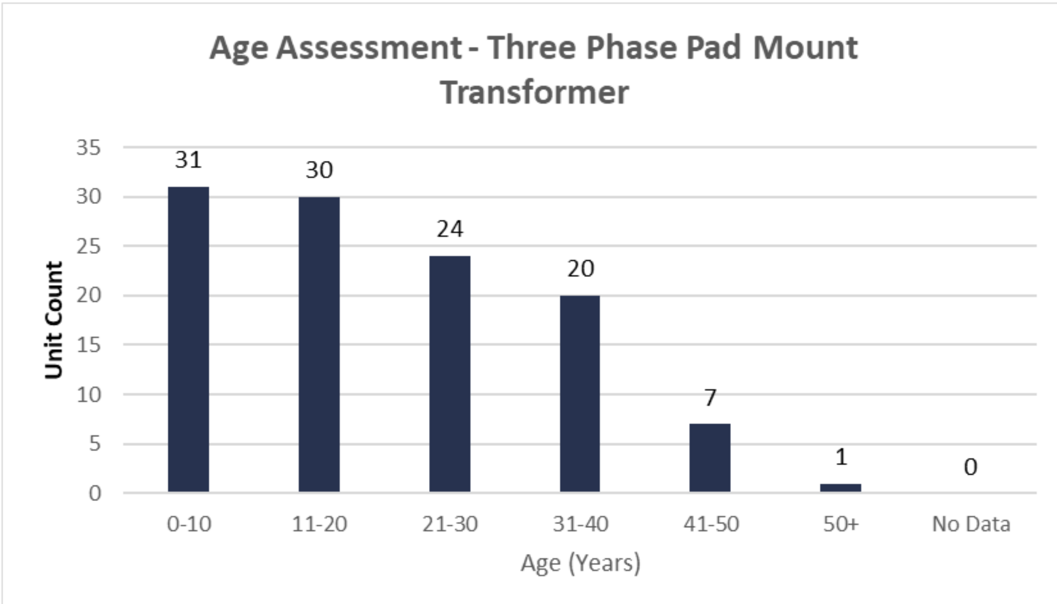
CWH owns 466 single-phase pad mount transformers within its service territory. Installation dates were provided for the entire asset population. Figure 4-15 presents the age distribution for single-phase pad mount transformers.

Figure 4-15: Single-phase Pad Mount Transformer Age Demographics



CWH owns 113 three-phase pad mount transformers within its service territory. Installation dates were provided for the entire asset population. Figure 4-16 presents the age distribution for three-phase pad mount transformers.

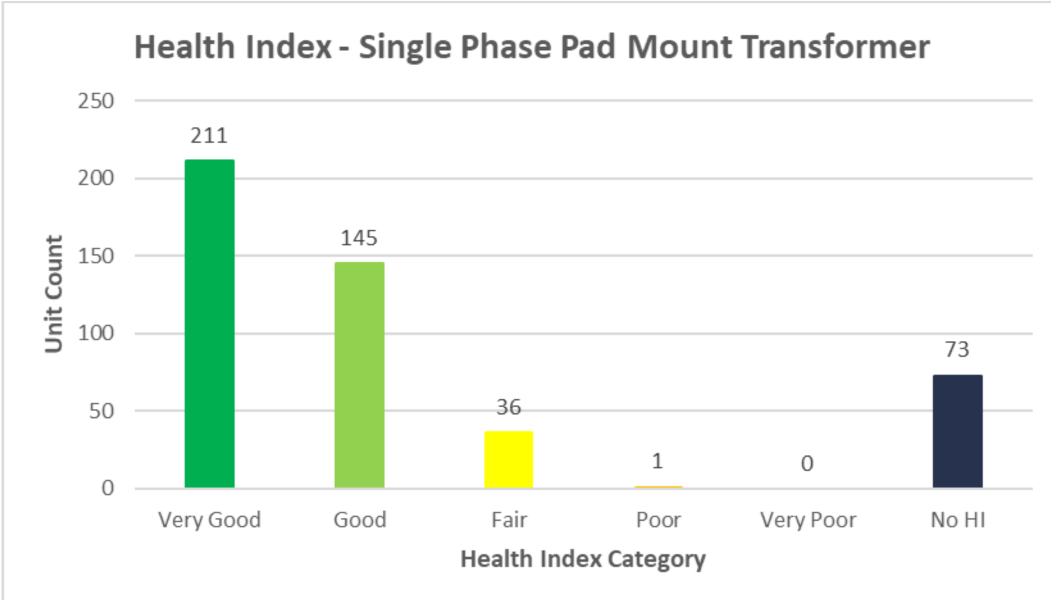
Figure 4-16: Three-phase Pad Mount Transformer Age Demographics



CWH's transformer maintenance records, nameplate information, and operational loading data were used to calculate the HI results based on the criteria provided in Table 4-9. The HI distribution for single-phase pad mount transformers is presented in Figure 4-17 and Figure 4-18, while the HI distribution for three-phase pad mount transformers is presented in As illustrated in Figure 4-20, most of the three-phase pad mount transformer population are in Very Good or Good condition.

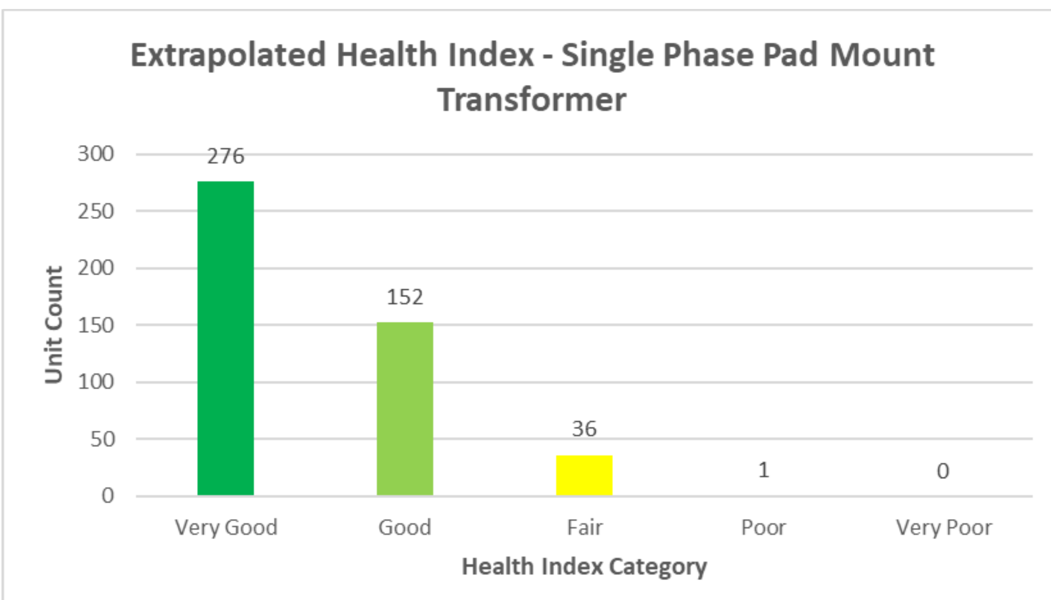
Figure 4-19 and Figure 4-20.

Figure 4-17: Single-phase Pad Mount Transformer HI Results



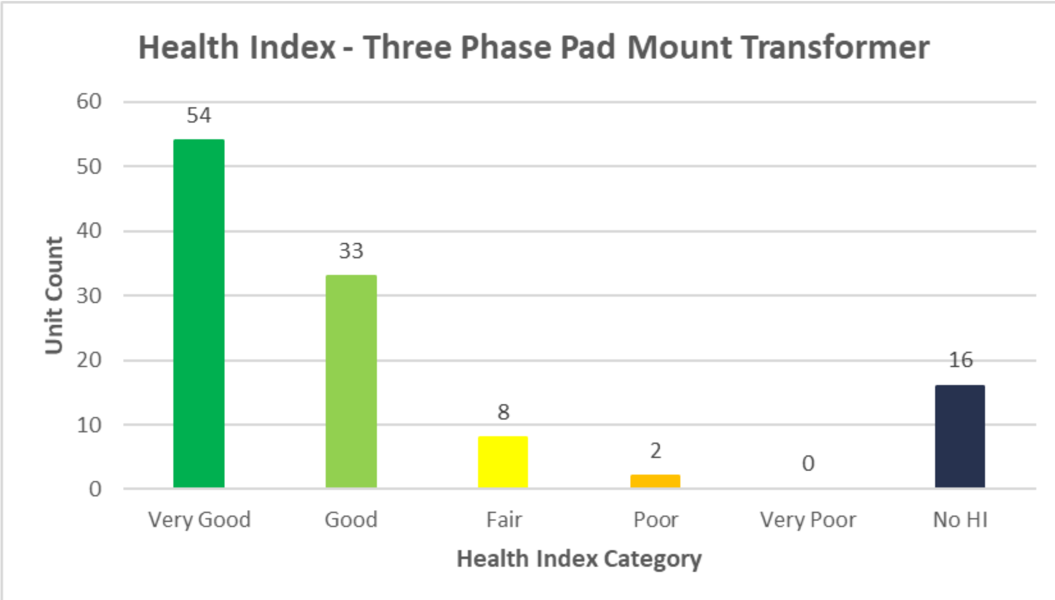
To complete the full analysis, the HI for the remaining population (16%) of single-phase pad mount transformers was extrapolated based on the HI distribution of the asset population with a valid HI score. As illustrated in Figure 4-18, most of the single-phase pad mount transformer population are in Very Good or Good condition.

Figure 4-18: Extrapolated Single-phase Pad Mount Transformers HI Results



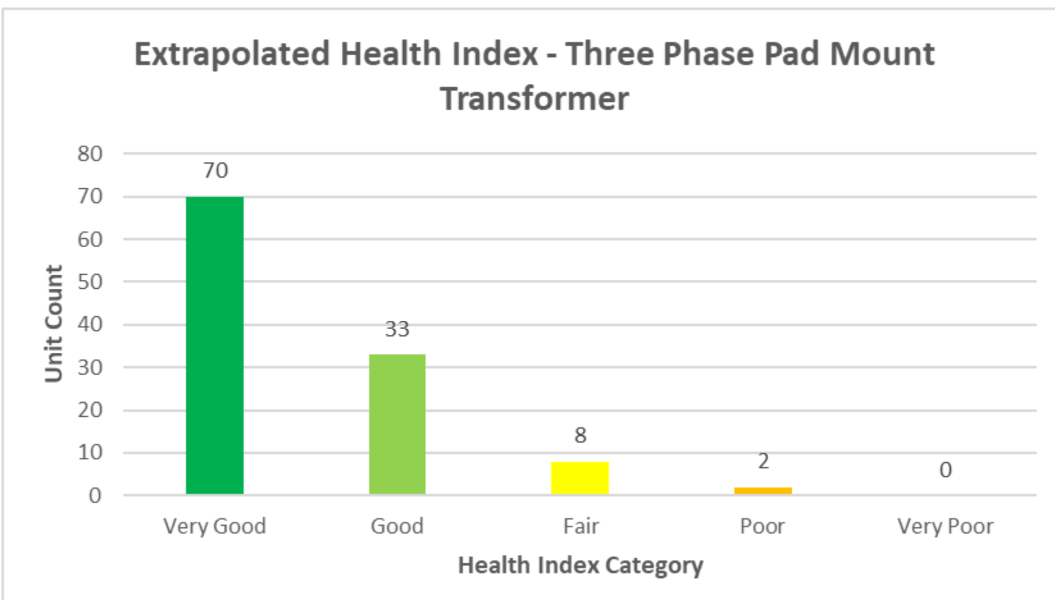
As illustrated in Figure 4-20, most of the three-phase pad mount transformer population are in Very Good or Good condition.

Figure 4-19: Three-phase Pad Mount Transformer HI Results



To complete the full analysis, the HI for the remaining population (16%) was extrapolated based on the HI distribution of the asset population with a valid HI score.

Figure 4-20: Extrapolated Three-phase Pad Mount Transformers HI Results



The availability of data is very high for all three condition parameters considered in the analysis. Table 4-10 shows the data availability index for each condition parameter. The average DAI for pad mount transformer is 93%.

Table 4-10: Pad Mount Transformers' Condition Parameters' Data Availability

Degradation Factor	% of Assets with Data
Service Age	100%
Peak Loading	97%
Visual Inspection	85%

4.1.7 Distribution Switches

CWH's distribution switch types include fused, solid, and air-break switches. Air-break switches are operated to sectionalize the circuit during a restoration procedure by breaking all three phases of load with a single operation and are operated manually. Fused switches provide over-current protection during overload conditions or short circuits. The HI for overhead switches is calculated by considering a combination of end-of-life criteria summarized in Table 4-11.

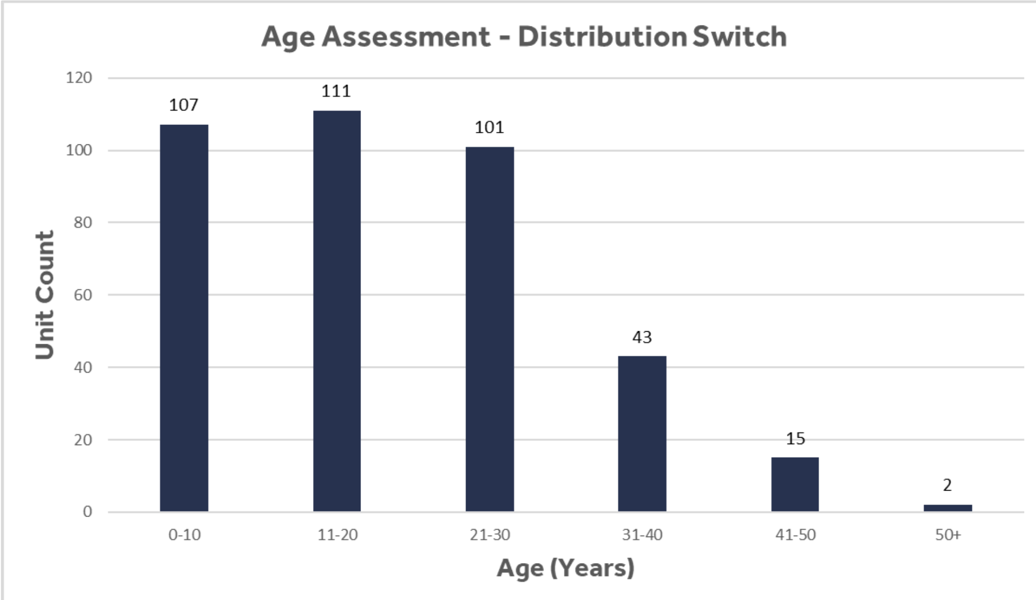
Table 4-11: Distribution Switch HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Service Age	4	A,B,C,D,E	4,3,2,1,0	16
Infrared Scanning	4	A,B,C,E	4,3,2,0	16
			Total Score	**32**

In addition to service age, the industry's best practices also include using the conditions of insulators, blades, and the operating mechanism in HI formulation. However, due to the unavailability of information relating to these condition parameters, they were omitted from the formulation. IR scan results represent an important condition parameter for condition assessment of overhead switches since they identify hotspots (i.e., high temperatures) on the asset. Assets operating continuously at high temperatures can cause accelerated degradation of the asset and may experience premature failure. CWH carry out IR scanning of their distribution switches on an annual basis. Additionally, in this case, the TUL of an overhead switch is 45 years[4] and is used in determining the service age condition.

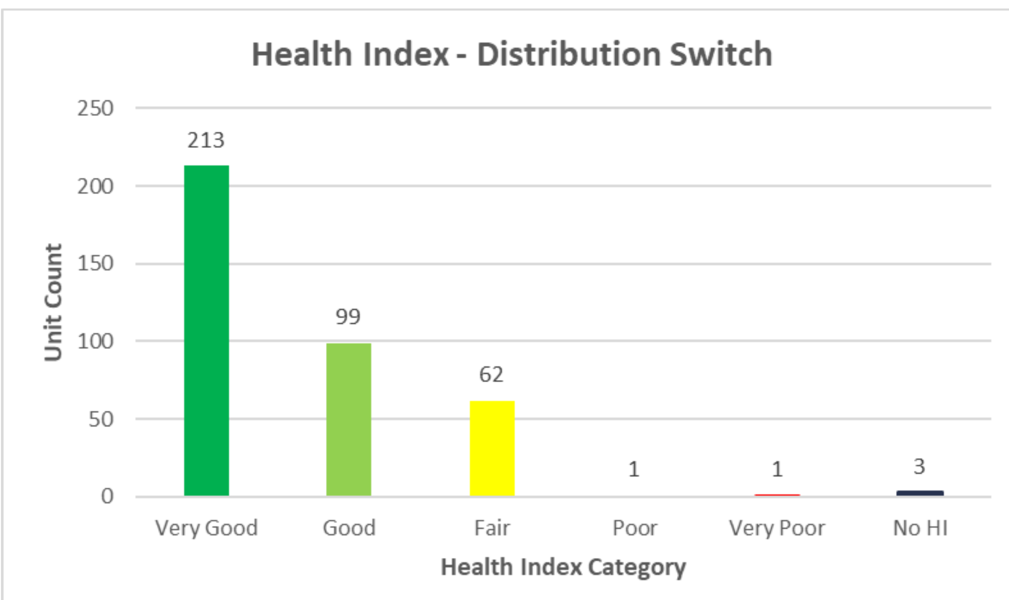
CWH owns 379 distribution switches within its service territory. Nearly the entirety of the distribution switches' population (99%) has known installation dates. For assets with unknown installation dates, the assumption made was to use the average age of distribution switches with known installation dates. Figure 4-21 presents the age distribution for distribution switches to show an approximate representation of the age distribution. Approximately 2% of the assets are above their TUL and another 2% will reach their end of useful life within the next five years.

Figure 4-21: Distribution Switch Age Demographics



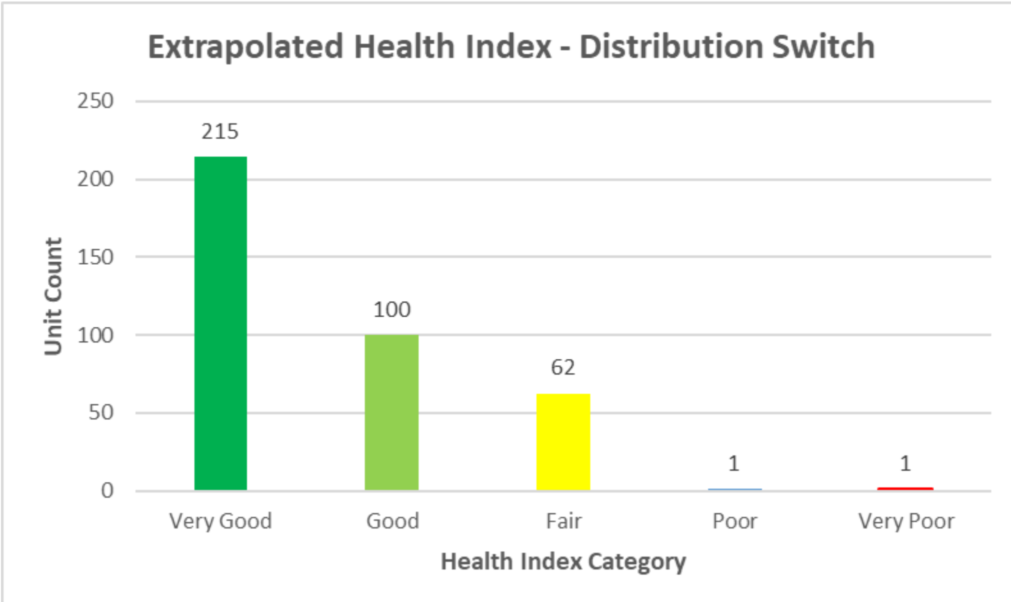
CWH's service age records were used to calculate the HI results based on the criteria provided in Table 4-11. A valid HI was calculated for 99% of the distribution switches, as shown in Figure 4-22.

Figure 4-22: Distribution Switch HI Results



To complete the full analysis, the HI for the remaining population was extrapolated based on the HI distribution of the asset population with a valid HI score. As shown in Figure 4-23, most switches are in Very Good or Good condition, with 16% of distribution switches in Fair condition. Only 1% of switches are in Poor or Very Poor condition.

Figure 4-23: Extrapolated Distribution Switch HI Results



The availability of data is very high for the two condition parameters considered in the analysis. Table 4-12 shows the data availability index for each condition parameter. The average DAI for distribution switches is almost 100%.

Table 4-12: Pad Mount Transformers' Condition Parameters' Data Availability

Degradation Factor	% of Assets with Data
Service Age	99%
Infrared Scanning	100%

4.2 Station Assets

This subsection introduces the calculated HI of CWH's station assets. If an asset's DAI is less than 60%, a valid HI cannot be calculated. These assets are placed in the "No HI" category and are not extrapolated due to low volume of assets. In CWH's case two substations have not had maintenance performed recently due to CWH's maintenance cycles. However, the assets on these two stations have assets that are relatively new and are considered to be in Very Good and Good condition. If a degradation factor's data availability is less than 30% across the asset class population, the degradation factor is excluded from the framework.

4.2.1 Power Transformers

Power transformers are key station assets owned by CWH that are used to step down the voltage from the 44-kV sub-transmission system to distribution levels. Computing the HI for a power transformer requires the combination of various end-of-life criteria for its components. Table 4-13 summarizes the HI formulation used for oil-type power transformers. The HI score for a transformer is composed of eighteen condition parameters, each of which represents an aspect of a power transformer with a direct impact on the operational health of the asset.

Table 4-13: Power Transformer HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Dissolved Gas Analysis	10	A,B,C,D,E	4,3,2,1,0	40
Service Age	6	A,B,C,D	4,3,2,1	24
Load History	10	A,B,C,D,E	4,3,2,1,0	40
Insultation Power Factor	10	A,B,C,D,E	4,3,2,1,0	40
Oil Quality	8	A,C,E	4,2,0	32
Insulation Resistance	4	A,B,C,D,E	4,3,2,1,0	16
Dissipation Factor	4	A,B,C,D,E	4,3,2,1,0	16
Turns Ratio Test	4	A,B,C,D,E	4,3,2,1,0	16
Winding Resistance	4	A,B,C,D,E	4,3,2,1,0	16
Gaskets and Seals Condition	1	A,C,E	4,2,0	4
Cooling Equipment Condition	2	A,C,E	4,2,0	8
Bushing Condition	5	A,C,E	4,2,0	20
Gas Pressure Relief and Gas Pressure Relay Condition	1	A,C,E	4,2,0	4
Control Condition	1	A,C,E	4,2,0	4
Tap Changer Condition	1	A,C,E	4,2,0	4
Grounding Condition	1	A,C,E	4,2,0	4
Oil Level	1	A,C,E	4,2,0	4
Gauges Condition	1	A,C,E	4,2,0	4
			Total Score	**296**

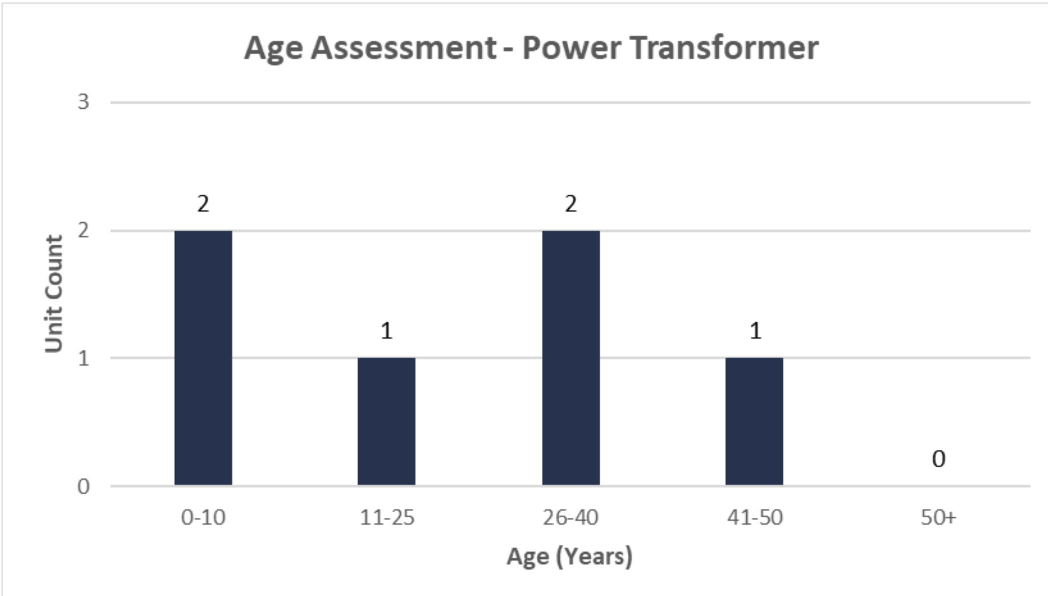
By performing the dissolved gas analysis ("DGA"), it is possible to identify internal faults, partial discharge, low-energy sparking, severe overloading, and overheating in the insulating medium. Insulation power factor measurements are an important source of data to monitor transformer and bushing conditions. Lower scores for one or a combination of these condition parameters strongly indicate progressed degradation of the asset, hence their larger weights.

Power transformer peak loading is a good indication of loss of insulation life. The rate of insulation degradation is directly related to the operating temperature which is directly related to transformer loading levels. The peak loading level of the transformers is expressed in a percentage of the nameplate rating. CWH collects the substation load history monthly, recording the monthly peak.

Besides the condition parameters listed in Table 4-13, the industry's best practices for HI formulation include degree of polymerization as degradation factors. Due to the unavailability of the necessary data, the degradation factor wasn't included in the formulation.

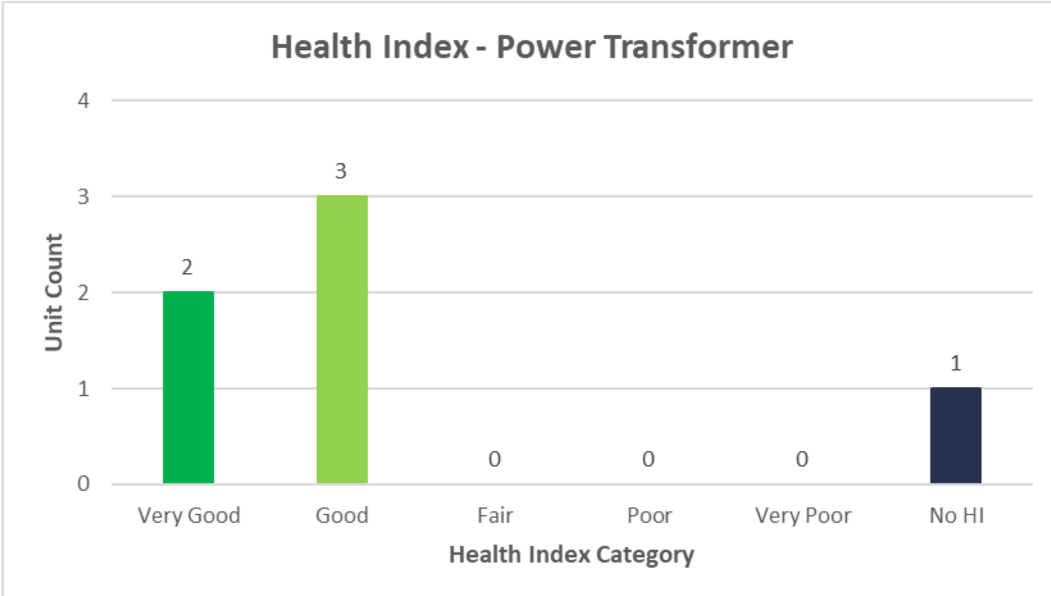
CWH owns six power transformers. The installation years of the entire power transformers population are known. Figure 4-24 presents the age profile of power transformers in-service.

Figure 4-24: Power Transformer Age Demographics



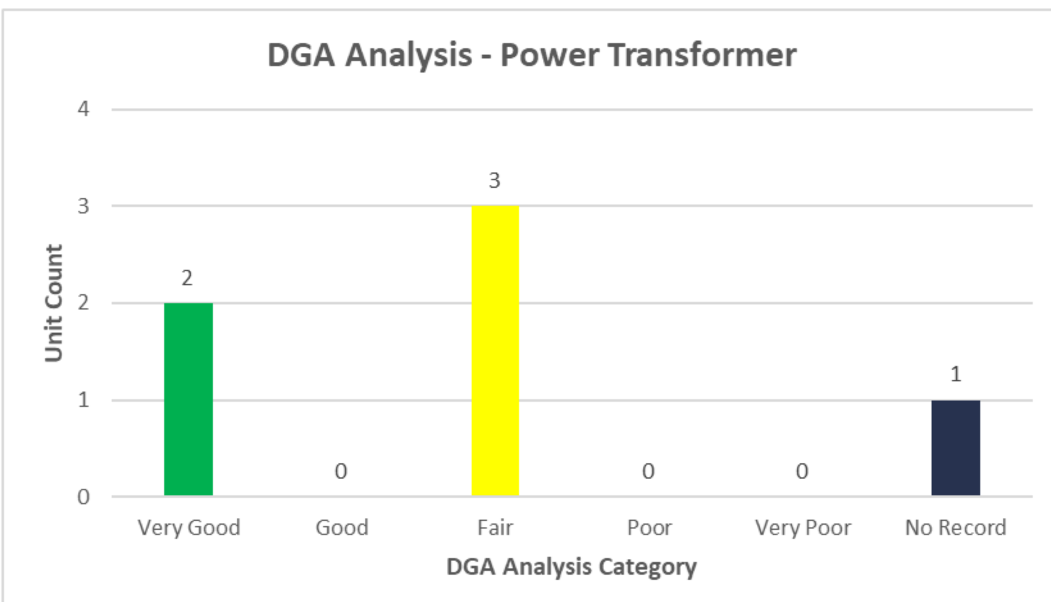
CWH's power transformer inspections, test results, service age, and loading history were used to calculate the HI based on the criteria provided in Table 4-13. The HI distribution for the in-service power transformers is presented in Figure 4-25. All the power transformers are in Very Good or Good condition. The average HI of power transformers is 82%, which is considered Good. For the power transformer that a HI could not be calculated, this asset was installed in 2019 and has not had a full inspection and maintenance performed yet. However, as it is a relatively new asset it could be considered as being in Very Good condition.

Figure 4-25: Power Transformer HI Results



DGA can be a leading indicator as to how the power transformer's internal condition is before experiencing unfavorable results. Figure 4-26 illustrates the DGA results for CWH's power transformers. Three power transformers are in fair condition based on the DGA results which may require follow-up investigation even though their overall HI are classed as Very Good or Good.

Figure 4-26: Power Transformers DGA Analysis Results



The availability of data for power transformers is high with an average DAI of 82%. Table 4-14 shows the data availability index for each condition parameter.

Table 4-14: Power Transformers' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Dissolved Gas Analysis (DGA)	83%
Service Age	100%
Load History	100%
Insultation Power Factor	100%
Oil Quality	83%
Insulation Resistance	67%
Dissipation Factor	50%
Turns Ratio Test	67%
Winding Resistance	67%
Gaskets and Seals Condition	67%
Cooling Equipment Condition	67%
Bushing Condition	67%
Gas Pressure Relief and Gas Pressure Relay Condition	67%
Control Condition	67%
Tap Changer Condition	67%
Grounding Condition	67%
Oil Level	100%
Gauges Condition	67%

4.2.2 Station Switchgear

Station switchgear consists of breakers, fuses, and switches that control and regulate the current flowing through the distribution system. During a fault, the switchgear can isolate and clear the fault. It is also used to de-energize equipment during maintenance and testing. The details of the HI formulation are summarized in Table 4-15.

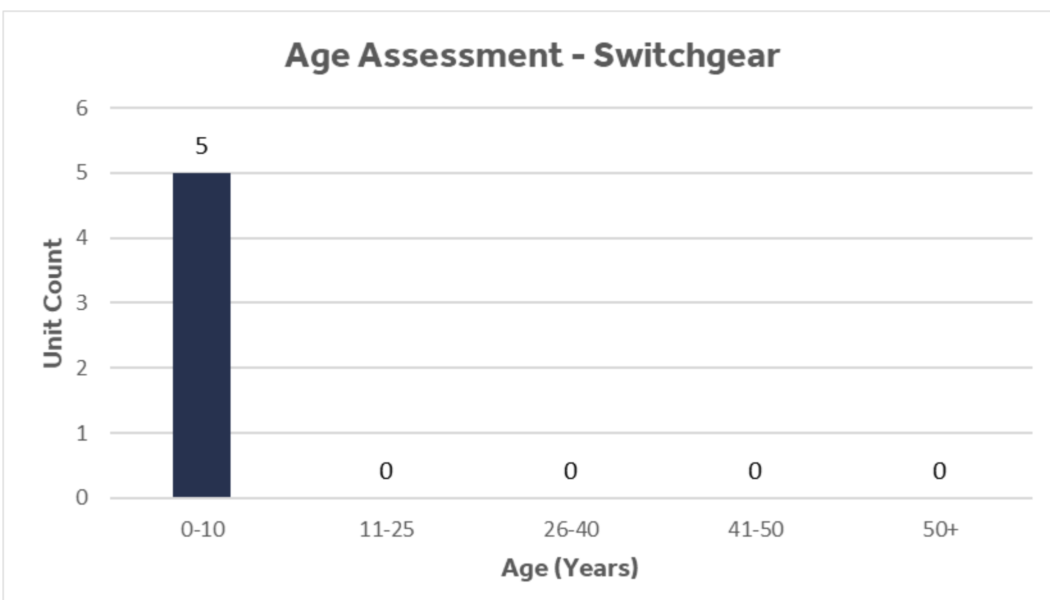
Table 4-15: Switchgears HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Enclosure & Components	3	A,C,E	4,2,0	12
Control & Operating Mechanism	3	A,C,E	4,2,0	12
Overall Condition	3	A,C,E	4,2,0	12
Insulation Resistance	4	A,B,C,D,E	4,3,2,1,0	16
			Total Score	**52**

As well as the mentioned degradation factors found in Table 4-15, other degradation factors used by the industry are breaker truck condition, time/travel tests, contact resistance tests, vacuum bottle integrity. However, these degradation factors were not included in the formulation due to insufficient data.

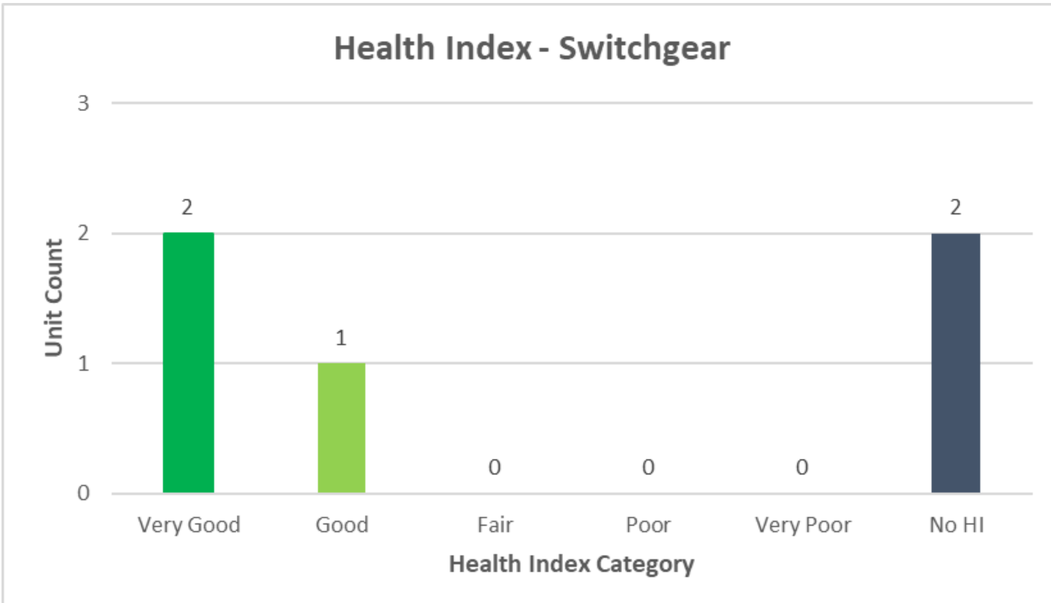
CWH owns five station 4.16kV switchgears across five of their six stations. The installation years for the entire station switchgears population are known. Figure 4-27 presents the age profile of station switchgears in-service.

Figure 4-27: Switchgears Age Demographics



CWH's inspection and maintenance records were used to calculate the HI based on the criterium listed in Table 4-15. The HI distribution of station switchgear is presented in Figure 4-28. Two out of the three switchgears with a valid HI were assessed to be in Very Good condition, while the remaining switchgear was assessed to be in Good condition.

Figure 4-28: Switchgear HI Results



The availability of data related to the degradation factors varies from one factor to another. Table 4-16 shows the degradation factors as well as the associated data availability index. The overall average DAI for station switchgears is 69%.

Table 4-16: Station Switchgears' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Enclosure & Components	60%
Control & Operating Mechanism	60%
Overall Condition	100%
Insulation Resistance	60%

4.2.3 Reclosers

Reclosers are electrical devices that operate automatically during a fault. All CWH's stations, except Elora MS-2, have G&W Viper St vacuum reclosers in pad mount whereas Elora MS-2 has Nova-TS single reclosers. The reclosers protect other electrical assets from damage due to short-circuit current. They operate when a fault is detected and can be programmed to automatically restore the connection once the fault is cleared or can be reset manually based on the severity of the fault. Reclosers are equipped with a control unit for single or multi-shot reclosing of the feeder.

Computing the HI of a recloser considers end-of-life criteria for its various components. Each criterion represents a factor critical in determining the component's condition relative to potential failure. The HI for reclosers is calculated by considering a combination of test results, number of operations, and visual inspections as summarized in Table 4-17.

Table 4-17: Recloser HI Formulation

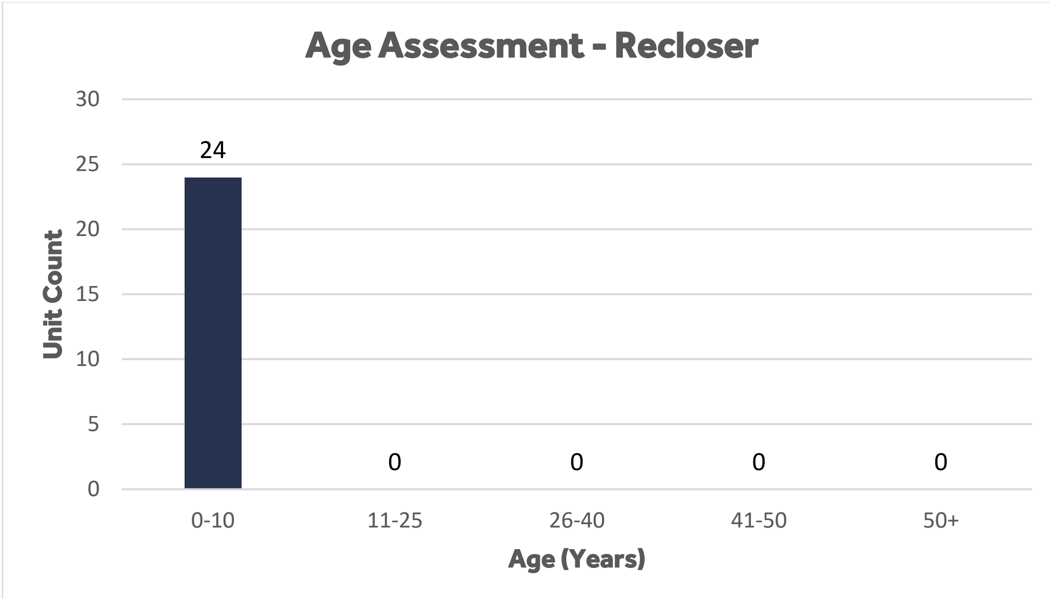
Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Control & Operating Mechanism	1	A,C,E	4,2,0	4
Contacts Condition	1	A,C,E	4,2,0	4
Bushings	1	A,C,E	4,2,0	4
Connections & Terminals	1	A,C,E	4,2,0	4
Tank & Head Casting Condition	1	A,C,E	4,2,0	4
Grounding	1	A,C,E	4,2,0	4
Overall Condition	3	A,C,E	4,2,0	12
Counter Reading	1	A,B,C,D,E	4,3,2,1,0	4
Contact Resistance	2	A,B,C,D,E	4,3,2,1,0	8
Insulation Resistance	4	A,B,C,D,E	4,3,2,1,0	16
			Total Score	**64**

Maintenance tests, such as the contact resistance test and insulation resistance test, are weighted among the highest because they are considered the best indicator of the asset's condition and performance.

Besides the condition parameters listed in Table 4-17, the industry's best practices for HI formulation include counter reading, and timing/travel tests as degradation factors. Due to the unavailability of the necessary data, the three degradation factors were not included in the formulation.

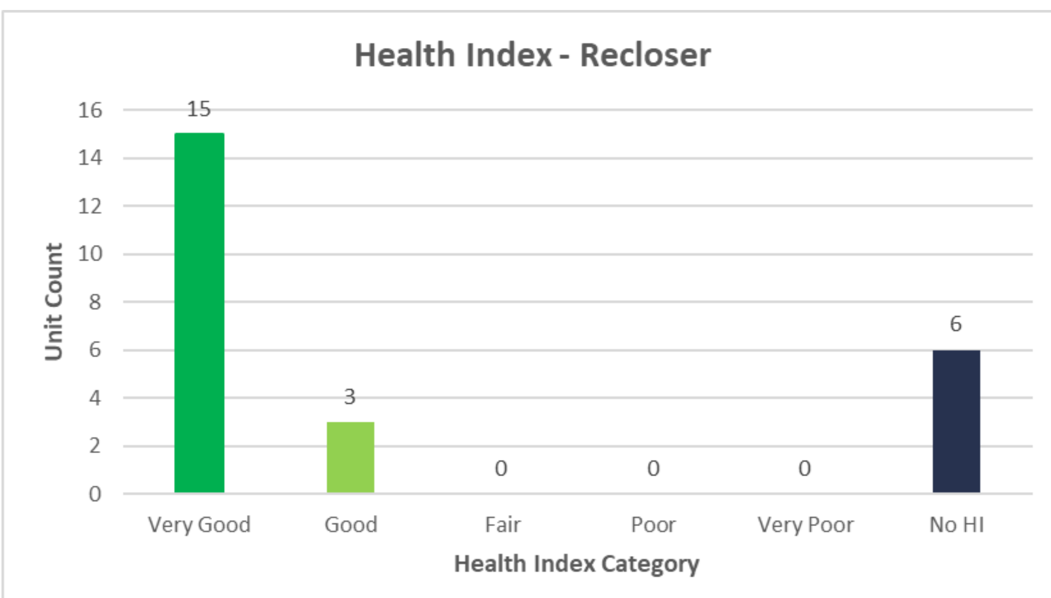
CWH has 24 reclosers within its stations. The age of the reclosers is known for the total population. Figure 4-29 presents the age distribution for reclosers.

Figure 4-29: Recloser Age Demographics



CWH's maintenance records, operation data, and nameplate information were used to calculate the Health Index based on the criteria provided in Table 4-17. A valid HI was calculated for 75% of the total population, as shown in Figure 4-30. Fifteen of the eighteen reclosers with a valid HI are in Very Good condition, while the remaining three are in Good condition.

Figure 4-30: Reclosers HI Results



The availability of data related to the degradation factors varies from one factor to another. Table 4-18 shows the degradation factors and the associated data availability index. The overall average DAI for reclosers is 77%.

Table 4-18: Reclosers' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Control & Operating Mechanism	67%
Contacts Condition	67%
Bushings	67%
Connections & Terminals	67%
Tank & Head Casting Condition	50%
Grounding	67%
Overall Condition	100%
Counter Reading	100%
Contact Resistance	67%
Insulation Resistance	50%

4.2.4 Station Switches (44 kV)

Station switches provide isolation and can make or break load. This ACA includes the 44 kV station switches. Table 4-19 summarizes the HI formulation and condition parameter used for assessing CWH's station switches.

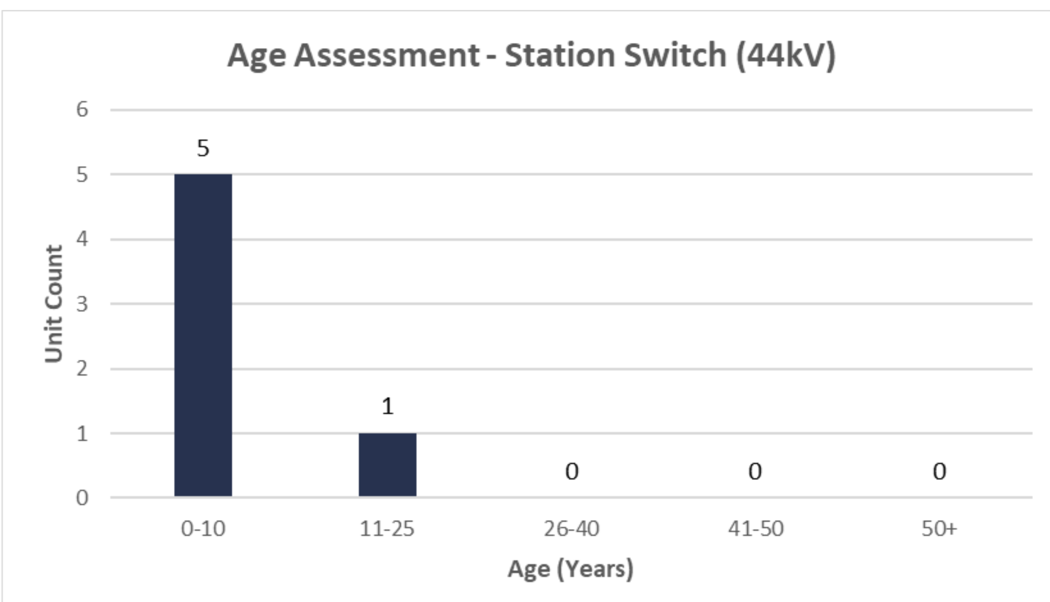
Table 4-19: Station Switch HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Power Train Drive Assembly	4	A,C,E	4,2,0	16
Contacts	2	A,C,E	4,2,0	8
Connectors	4	A,C,E	4,2,0	16
IR Scanning	3	A,B,C,E	4,3,2,0	12
Insulators/Porcelains	3	A,C,E	4,2,0	12
Foundation/Support Steel/Grounding	3	A,C,E	4,2,0	12
Contact Resistance	3	A,B,C,D,E	4,3,2,1,0	12
			Total Score	**88**

CWH owns six 44 kV station switches within its stations. The installation date is known for the entire population. The age distribution for station switches is shown in Figure 4-31.

As well as the mentioned degradation factors found in Table 4-19, other degradation factors used by the industry are switch operator controls and insulation resistance. However, these degradation factors were not included in the formulation due to insufficient data.

Figure 4-31: Station Switch (44 kV) Age Demographics



The HI distribution for in-service 44 kV station switches is presented in Figure 4-32. Two 44 kV station switches have valid HI's, one of which is deemed to be in Good condition while the other is in Very Good condition.

Figure 4-32: 44 kV Station Switches HI Results

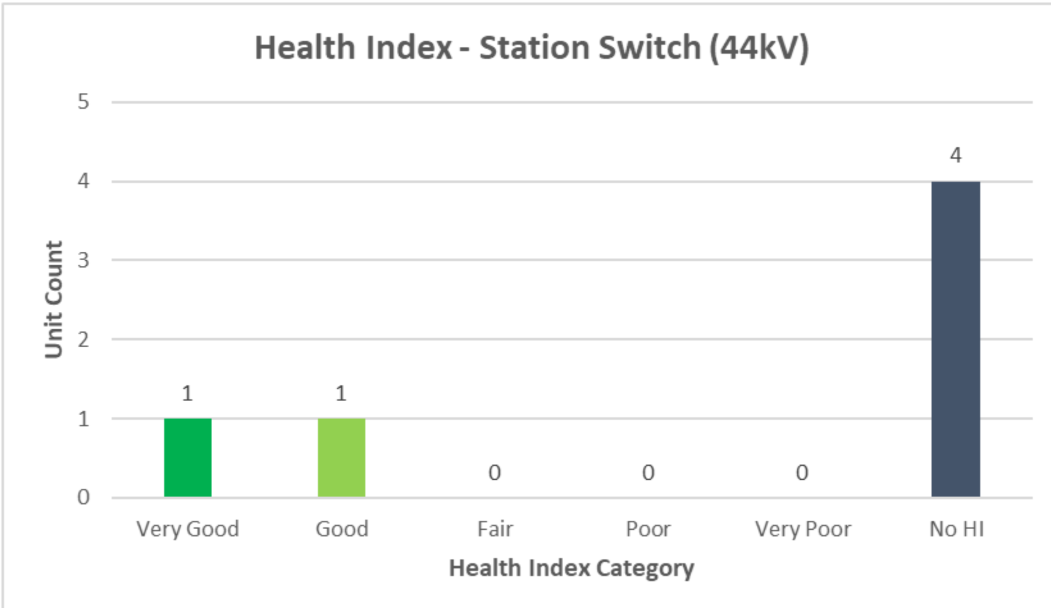


Table 4-20 shows the degradation factors as well as the associated data availability index. The availability of data related to the degradation factors is relatively low for all degradation factors associated with 44 kV station switches. The overall average DAI for 44 kV station switches is 40%.

Table 4-20: 44 kV Station Switches' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Power Train Drive Assembly	33%
Contacts	33%
Connectors	33%
IR Scanning	100%
Insulators/Porcelains	33%
Foundation/Support Steel/Grounding	33%
Contact Resistance	33%

4.2.5 Station Service Transformers

Station service transformers supply power to auxiliary equipment in the station including lights and security systems. Often, these assets can be encased in enclosures and are difficult to assess or read the nameplate without taking an outage. Table 4-21 summarizes the HI formulation used by METSCO to assess CWH's station service transformers.

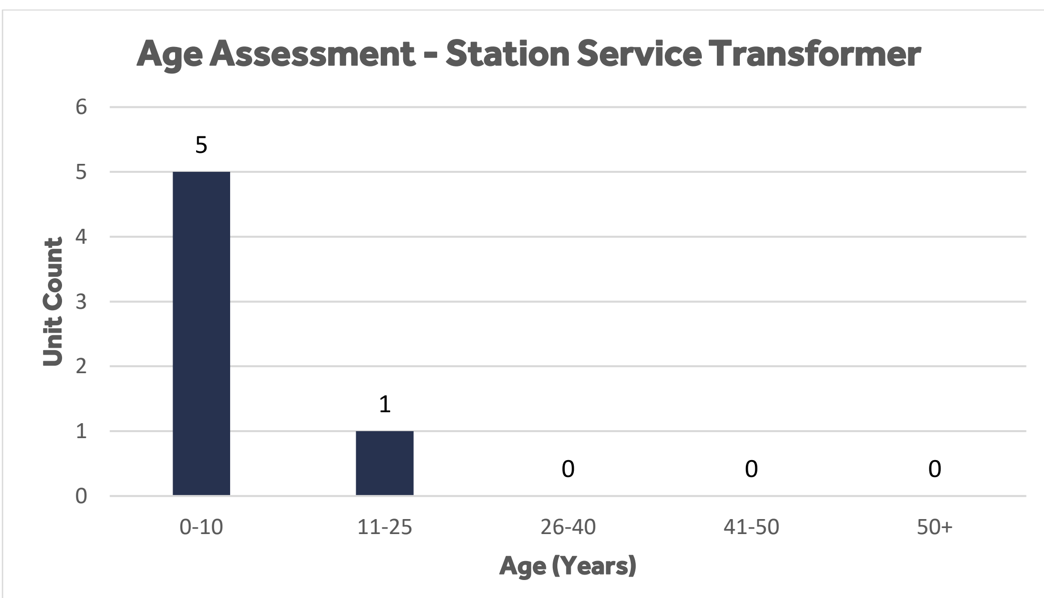
Table 4-21: Station Service Transformer HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Service Age	3	A,B,C,D	4,3,2,1	12
Insulation Resistance	4	A,B,C,D,E	4,3,2,1,0	16
Turns Ratio Test	4	A,B,C,D,E	4,3,2,1,0	16
Winding Resistance	4	A,B,C,D,E	4,3,2,1,0	16
Bushing Condition	2	A,C,E	4,2,0	8
Grounding Condition	2	A,C,E	4,2,0	8
			Total Score	**76**

Besides the condition parameters listed in Table 4-19, the industry's best practices for HI formulation include dissipation factor, connection condition, and enclosure condition as degradation factors. Due to the unavailability of the necessary data, the four degradation factors were not included in the formulation.

CWH owns six station service transformers. Installation dates are known for all the station service transformers. The age distribution of the station service transformer is illustrated in Figure 4-33.

Figure 4-33: Station Service Transformer Age Demographic



The HI distribution for the in-service station service transformer is presented in Figure 4-34. Three station service transformers' conditions could be assessed, one of which was considered to be in Good condition while the other two were deemed Fair.

Figure 4-34: Station Service Transformer HI Results

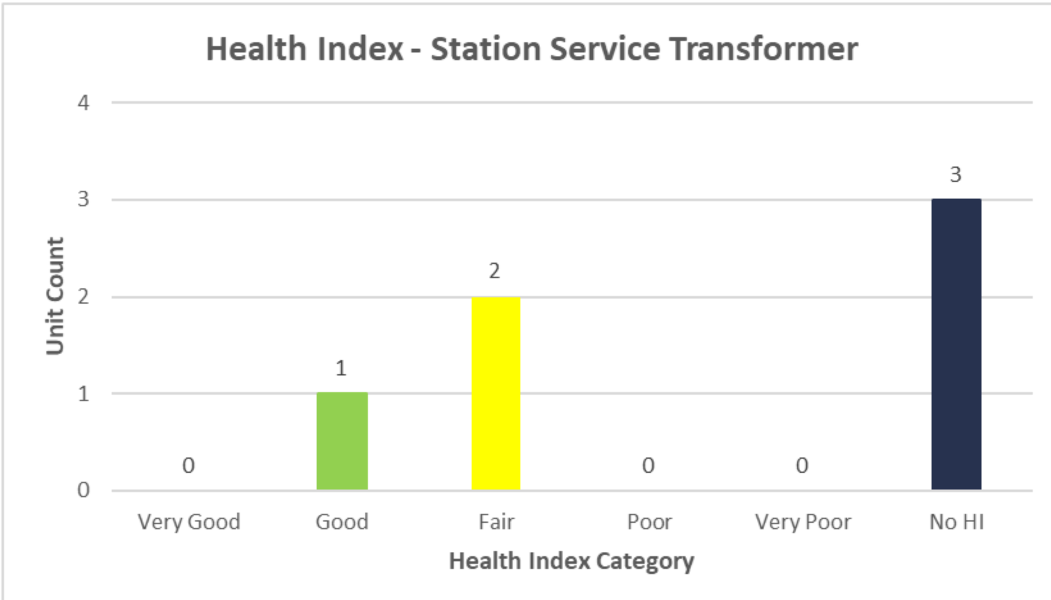


Table 4-22 shows the degradation factors as well as the associated data availability index. The availability of data related to the degradation factors varies between degradation factors. The overall average DAI for station service transformers is 58%.

Table 4-22: Station Service Transformers' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Service Age	100%
Insulation Resistance	67%
Turns Ratio Test	50%
Winding Resistance	33%
Bushing Condition	50%
Grounding Condition	50%

4.2.6 Station Power Cables

Station power cables are a key part of the medium-voltage system. Station power cables could either be cables that carry the entire phase load for the feeder, connect the feeders to the ground, or are connected to power transformers. Degradation modes of power cables include thermal and electrical degradation of the insulation. The insulation resistance test helps find crushed insulation, terminal spacing problems, stray wire strands or braided shielding, and conductive or corrosive contaminants around the cables. Table 4-23 summarizes the HI formulation used to assess CWH's station power cables.

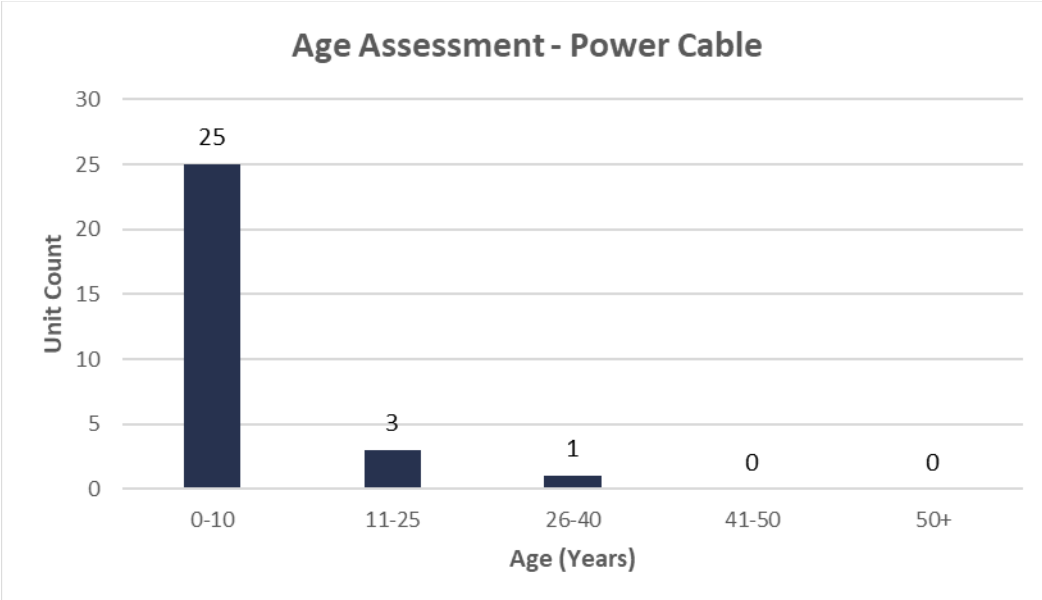
Table 4-23: Station Power Cable HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Insulation Resistance	10	A,B,C,D,E	4,3,2,1,0	40
Service Age	10	A,B,C,D,E	4,3,2,1,0	40
Loading History	5	A,B,C,D,E	4,3,2,1,0	20
			Total Score	**100**

As well as the mentioned degradation factors found in Table 4-23, other degradation factors used by the industry are cable failure statistics, field/laboratory testing, condition of concentric neutral, visual inspection of splice and termination, and condition of armor/sheath/jacket. However, these degradation factors were not included in the formulation due to insufficient data.

CWH owns 29 station power cables. Installation dates are known for the entire population. The age distribution of station power cables is illustrated in Figure 4-35.

Figure 4-35: Station Power Cable Age Demographics



The HI for station power cables is presented in Figure 4-36. The entire population of power cables has a valid HI. Of the 29 station power cables with a valid HI, 16 are in Very Good condition, seven are in Good condition, and the remaining six are in Fair condition.

Figure 4-36: Station Power Cable HI Results

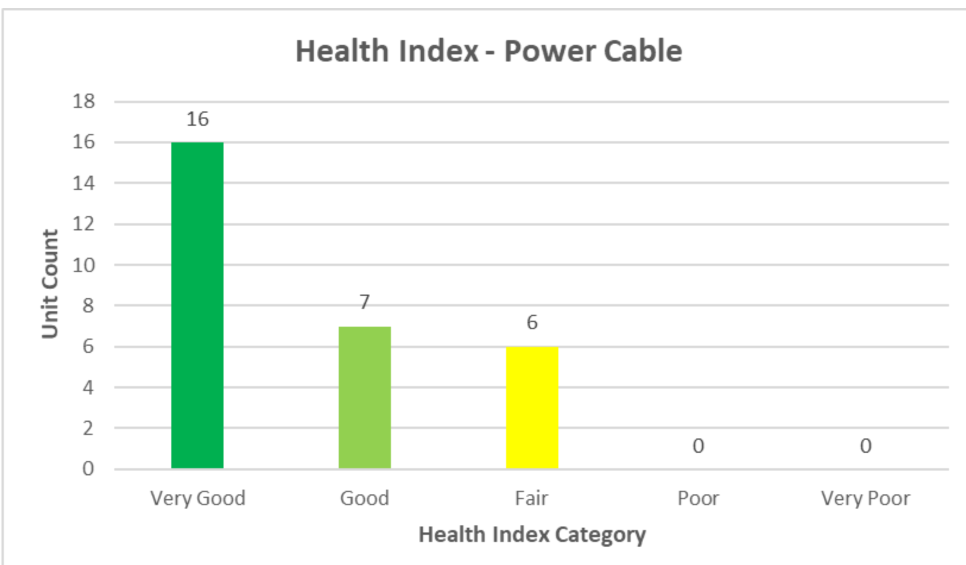


Table 4-24 shows the degradation factors as well as the associated data availability index. The availability of data related to the degradation factors varies between degradation factors but is generally sufficient. The overall average DAI for station power cables is 84%.

Table 4-24: Station Power Cables' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Service Age	100%
Loading History	62%
Insulation Resistance	79%

4.2.7 Station Facilities

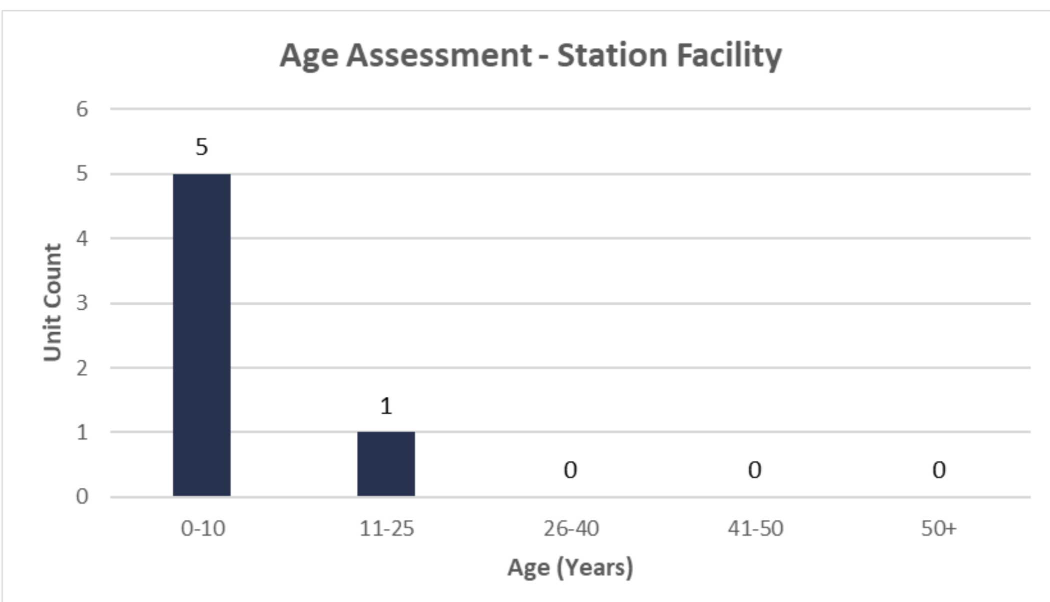
The integrity of the station building, fence, gate, and yard contribute to the safety of the station and the performance of the assets therein. The HI for station facilities is calculated by using the visual inspection results from monthly station inspections. Table 4-25 summarizes the HI formulation for station facilities.

Table 4-25: Station Building HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Building – Signage	1	A,E	4,0	4
Building – HVAC	2	A,E	4,0	8
Fence – Condition	3	A,E	4,0	12
Fence – Tampering	3	A,E	4,0	12
Fence – Coverage	3	A,E	4,0	12
Fence – Signage	1	A,E	4,0	4
Fence – Grounding	2	A,E	4,0	8
Gate Operational	3	A,E	4,0	12
Yard – Condition	1	A,E	4,0	4
Yard – Debris	1	A,E	4,0	4
			Total Score	**80**

CWH owns six stations within its service territory. The age of all station facilities is known. Figure 4-37 presents the age distribution of these stations.

Figure 4-37: Station Age Demographics



CWH's maintenance records were used to calculate the HI based on the criteria listed in Table 4-25. The HI distribution for station facilities is presented in Figure 4-38. All of the population are in Very Good condition.

Figure 4-38: Station Facility HI Results

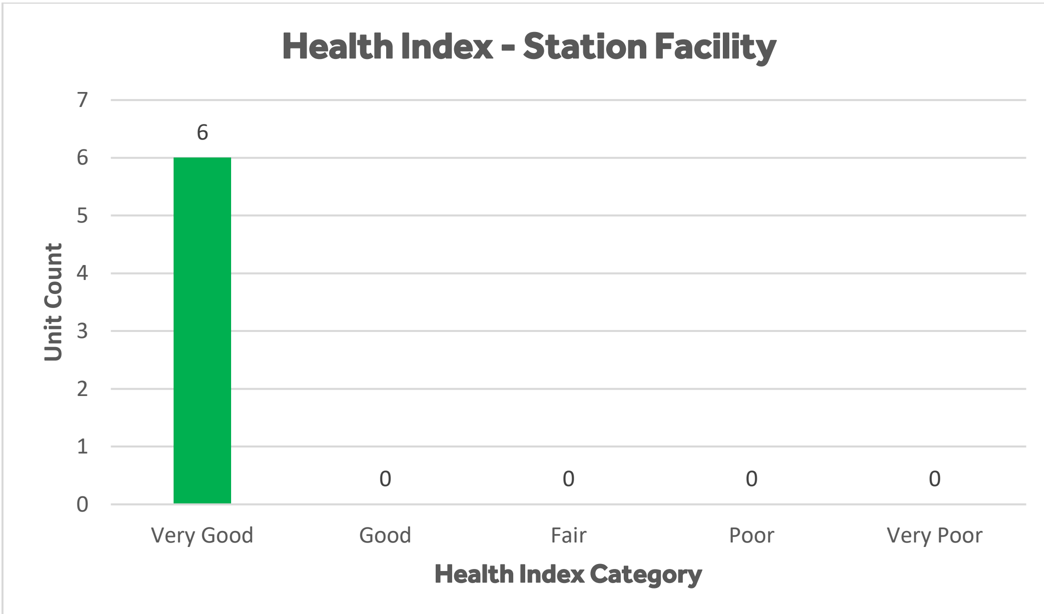


Table 4-26 shows the data availability index for each condition parameter. The availability of data is very high for most condition parameters considered in the analysis. The average DAI for station facilities is 90%.

Table 4-26: Station Facilities' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Building - Signage	33%
Building - HVAC	33%
Fence - Condition	100%
Fence - Tampering	100%
Fence - Coverage	100%
Fence - Signage	100%
Fence - Grounding	100%
Gate Operational	100%
Yard - Condition	100%
Yard - Debris	100%

4.2.8 Protection Relays

The function of protection relays in distribution systems is to detect abnormal operating conditions and initiate a recloser trip to isolate faulty circuits from healthy circuits. Protection relays obtain their input from instrument transformers, process the information, and automatically take corrective action with adequate speed and selectivity. Table 4-27 summarizes the methodology and condition parameters used to generate the Health Index for protective relays.

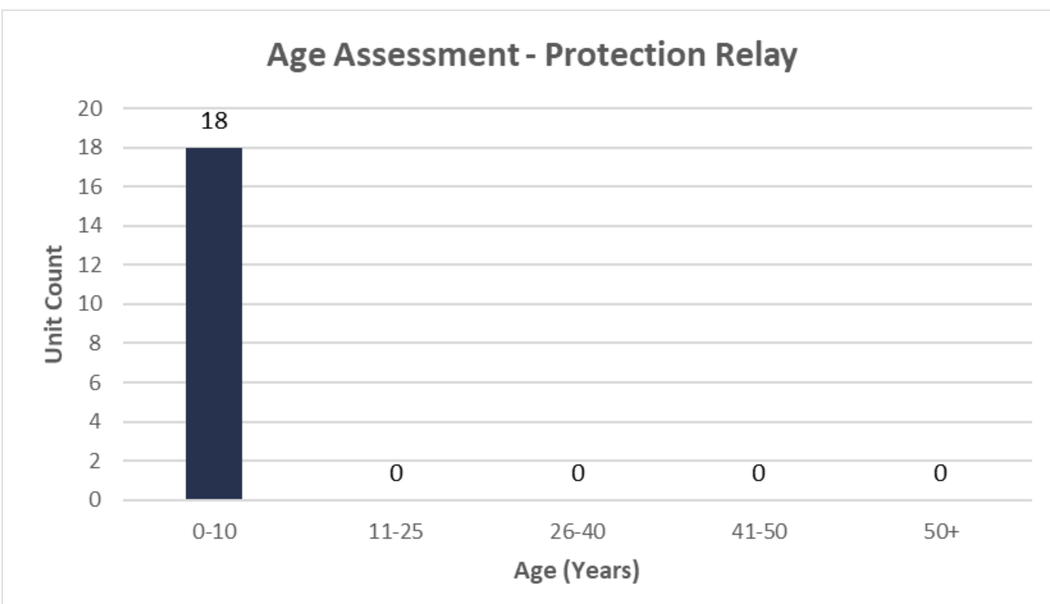
Table 4-27: Protection Relays HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Service Age	4	A,B,C,D,E	4,3,2,1,0	16
Defect and Test Reports	4	A,B,C,D,E	4,3,2,1,0	16
			Total Score	**32**

As well as the mentioned degradation factors found in Table 4-27, other degradation factors used by the industry are visual inspections, mean time between failures, non-discretionary obsolescence, and discretionary obsolescence. However, these degradation factors were not included in the formulation due to insufficient data.

CWH operates 18 protection relays among their stations. The installation dates for all protection relays are known. Figure 4-39 shows the age distribution of protection relays.

Figure 4-39: Protection Relay Age Demographics



The service age and performance reports were used to calculate the HI of protection relays, as Table 4-27 shows. Eleven of eighteen protection relays have a valid calculated HI, all of which were placed in the Very Good category. Figure 4-40 presents the HI distribution for protection relays.

Figure 4-40: Protection Relays HI Results

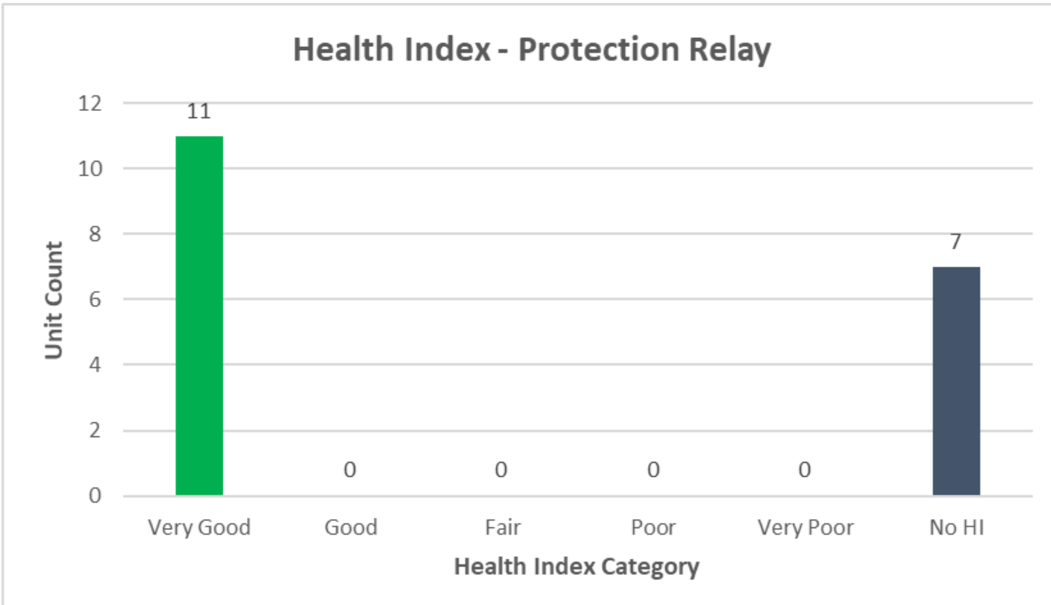


Table 4-28 shows the degradation factors as well as the associated data availability index. The availability of data related to the degradation factors varies between the two degradation factors. The overall average DAI for protection relays is 81%.

Table 4-28: Protection Relays' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Service Age	100%
Defect and Test Reports	61%

4.2.9 Lightning Arresters

Lightning arresters are used in stations to protect electric systems from the damaging effects of lightning. Table 4-29 summarizes the methodology and condition parameters used to generate the Health Index for lightning arresters.

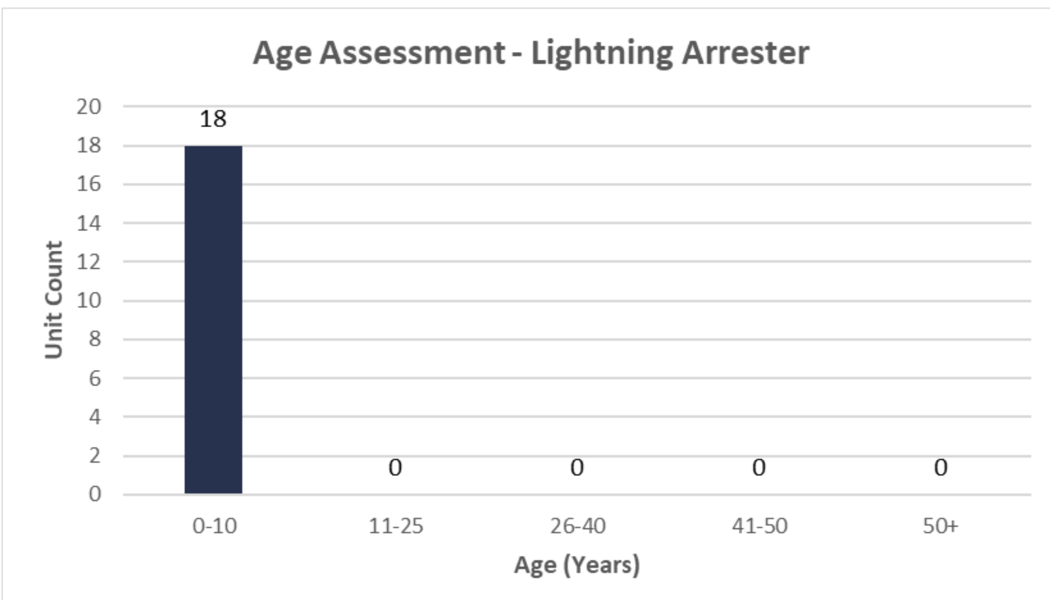
Table 4-29: Lightning Arresters HI Formulation

Condition Parameter	Weight	Ranking	Numerical Grade	Max Score
Insulator Surface Condition	2	A,B,C,D,E	4,3,2,1,0	8
Connector Condition	2	A,B,C,D,E	4,3,2,1,0	8
Grounding Condition	2	A,B,C,D,E	4,3,2,1,0	8
Support Structure	2	A,B,C,D,E	4,3,2,1,0	8
Insulation Resistance	4	A,B,C,D,E	4,3,2,1,0	16
			Total Score	**48**

Besides the condition parameters listed in Table 4-29, the industry's best practices for HI formulation include arrester design type, condition of arrester housing and pressure relief, and condition of auxiliary components, as degradation factors. Due to the unavailability of the necessary data, those degradation factors were not included in the formulation.

CWH has 18 lightning arresters within their stations, all of which have known installation dates. Figure 4-41 shows the age distribution of lightning arresters.

Figure 4-41: Lightning Arresters Age Demographics



To calculate the HI of lightning arresters, the condition parameters shown in Table 4-29 were used. Of the eighteen lightning arresters owned by CWH, twelve had valid HI's. Eleven were considered to be in Very Good condition while one was considered to be in Good condition. The HI results for lightning arresters can be seen in Figure 4-42.

Figure 4-42: Lightning Arrester HI Results

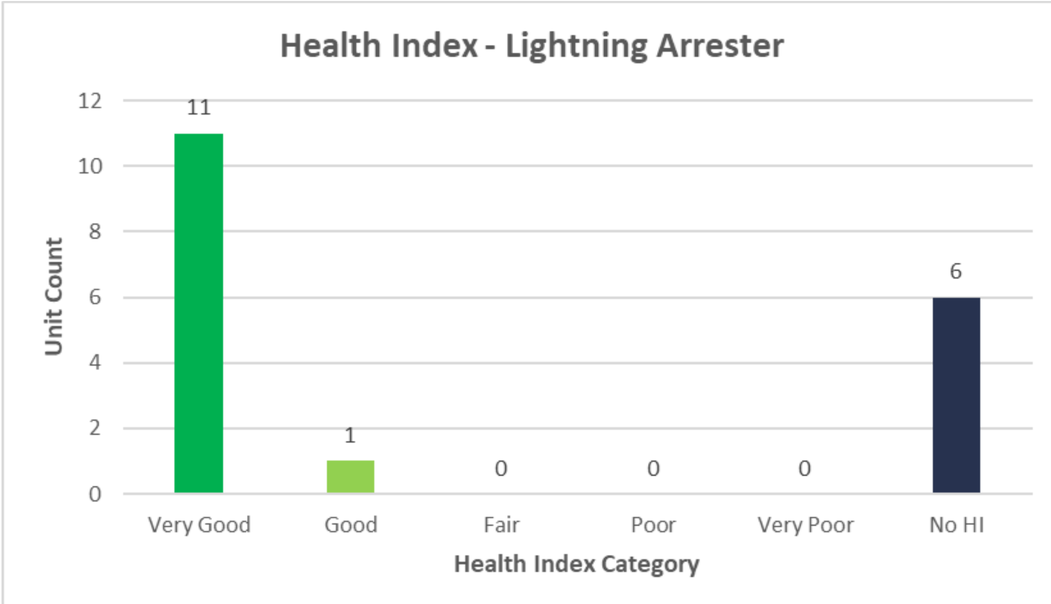


Table 4-30 shows the degradation factors as well as the associated data availability index. The availability of data related to the degradation factors is the same across all degradation factors. The overall average DAI for lightning arresters is 67%.

Table 4-30: Lightning Arresters' Condition Parameters' Data Availability

Condition Parameter	% of Assets with Data
Insulator Surface Condition	67%
Connector Condition	67%
Grounding Condition	67%
Support Structure	67%
Insulation Resistance	67%

5 Conclusions

As Figure 5-1 indicate, most assets across CWH's distribution asset classes analyzed are in Fair condition or better, with a significant portion of asset populations in Good or Very Good condition. Notably, wood poles have a noticeable portion of assets in Poor or Very Poor conditions.

Figure 5-1: Distribution Asset Health Index Results

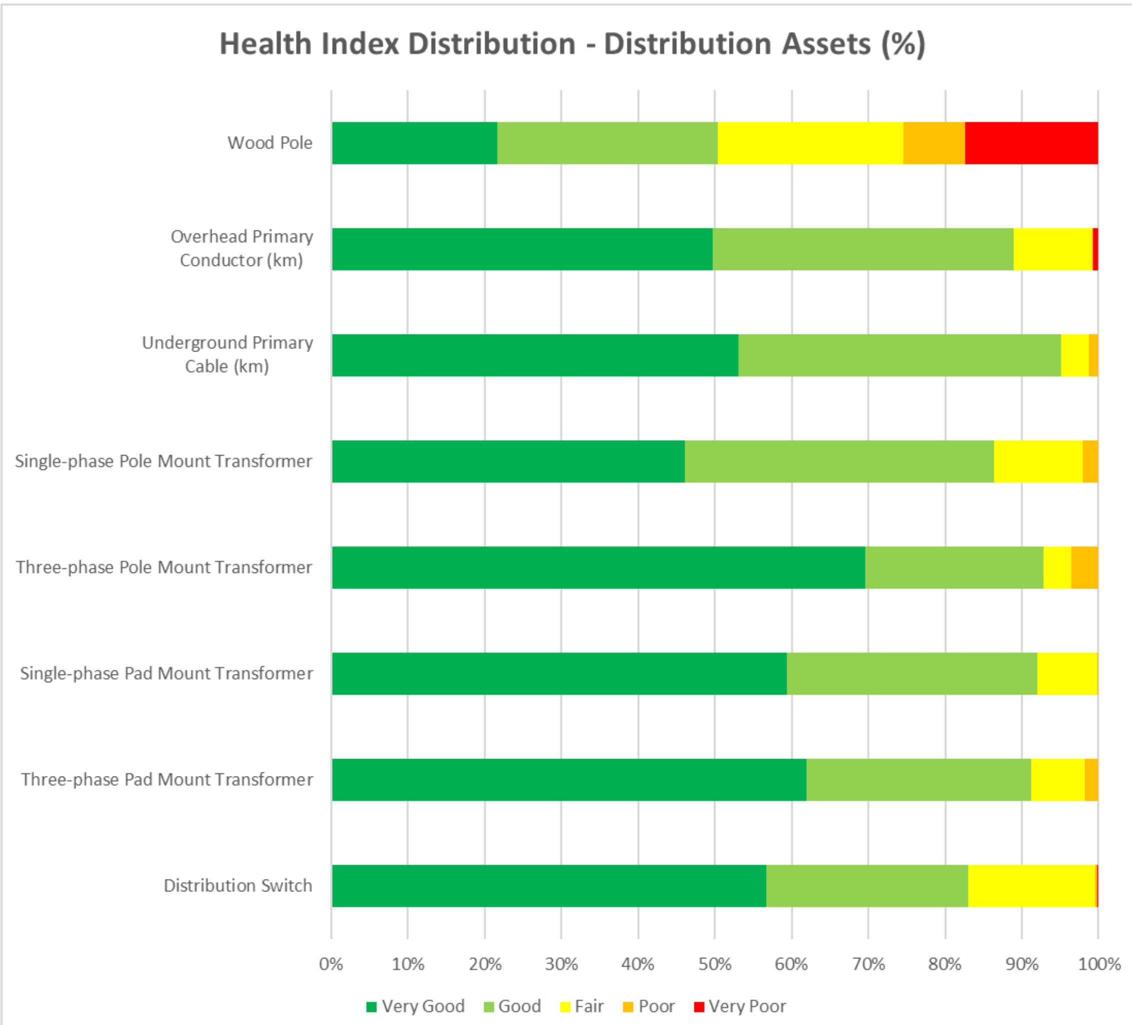
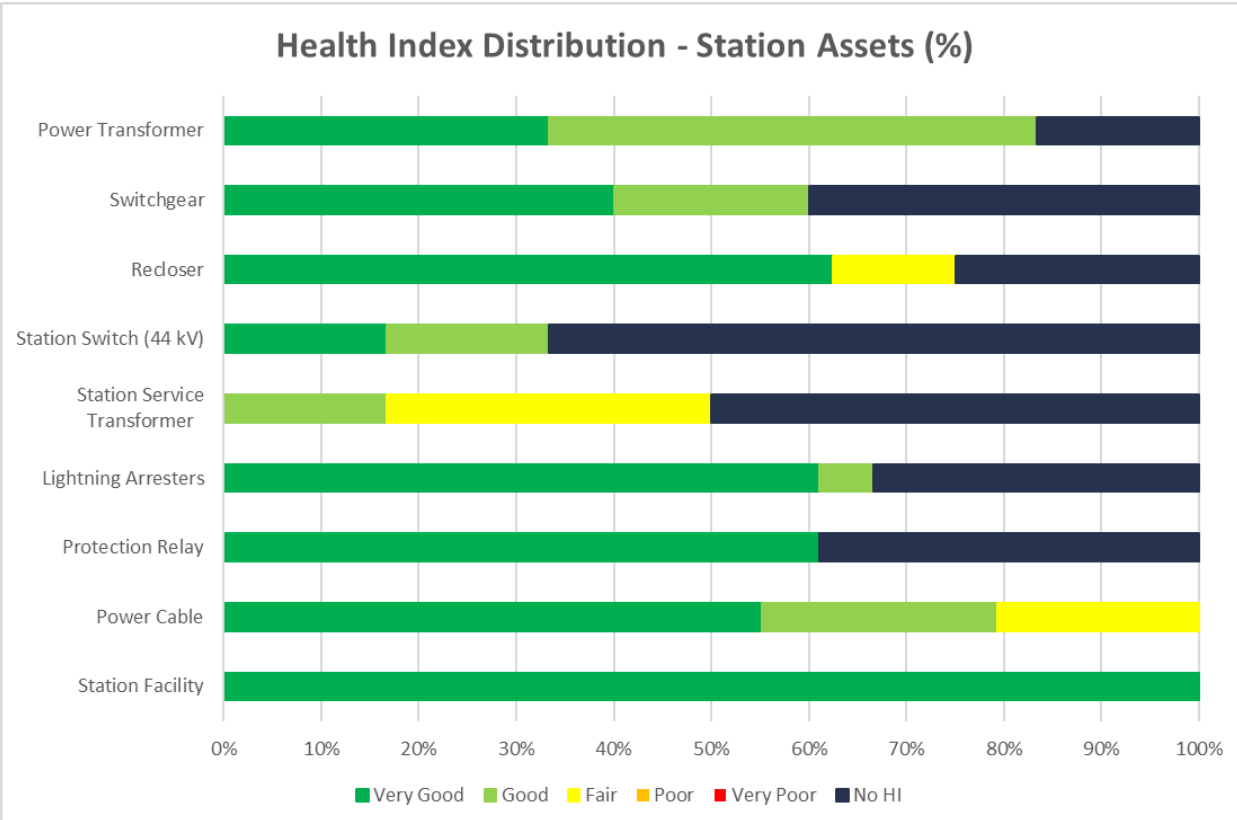


Figure 5-2 presents the HI distribution of station assets. As the figure indicates, the majority of CWH's station assets with valid HI's are in either a Good or Very Good condition. However, several the station assets have invalid HI's. This is mainly due to two of CWH's stations have had their asset replaced and renewed recently. Due to CWH's maintenance cycles, these assets have not yet been inspected to collect the necessary data to enable a HI to be calculated for the assets. However, as these assets are fairly new, they can be considered as being in Very Good and Good condition. To enable full HI calculation in CWH's next Asset Condition Assessment, it is recommended to improve data collection for these assets, as detailed in Section 6.

Figure 5-2: Station Asset Health Index Results



Overall, the results across both the distribution and station assets indicate CWH has taken steps in the past to manage its asset health and performance for the benefit of its customers. As with every system, however, there are areas that require CWH's attention in the coming years where asset populations contain material portions of equipment in or approaching Poor condition or worse.

6 Recommendations

A complete ACA framework for CWH represents an integral component of its broader AM framework, enabling it to proactively manage its assets and ensure that the right actions are taken for the right assets at the right time. This framework leveraged the information captured from maintenance programs and other utility records, creating an essential linkage between the ongoing maintenance activities and the capital investment decision-making process. Leveraging the HI insights allows for CWH's investment decision-making to be further enhanced with the current information regarding the condition of its assets. There are also further opportunities to introduce new data collected, improve data availability, and continuously improve the ACA framework.

This section breaks down METSCO's recommendations into the following categories:

1. HI improvements; and
2. Data availability improvements.

6.1.1 Health Index Improvements

For select asset classes, a recommended HI formulation was used for CWH's ACA framework. The following set of recommendations target additional condition parameters that can be incorporated for specific asset classes to improve the HI formulation and provide CWH with additional data to refine its asset condition calculations. The recommendations are based on improving the ACA framework over time and should not be interpreted as suggesting that immediate action is warranted. The following tables highlight the condition parameter name, a short description of the reasoning to include the condition parameter, and a priority of importance to include it into the specific asset's class HI framework. The priority is dependent on the condition parameter's weighting in comparison to the current HI framework condition parameter's weights.

1. Concrete Poles

CWH only currently record the service age of their concrete poles. No other condition parameters are currently recorded. To be able to calculate a HI in the future information on additional parameters as listed in Table 6-1should be considered to be collected by CWH.

Table 6-1: Data Collection Recommendation for Concrete Poles

Criteria	Reasoning	Priority
Corrosion of Rebars/Concrete Spalling	Corrosion of Rebars is a good indicator of when the concrete poles may be starting to lose some of its structural integrity. By monitoring this, early intervention can be made to mitigate further deterioration.	**Low**
Defects	To identify any defects on the poles due to vandalism, vehicular accidents, or cracking	**Medium**
Pole Out of Plumb	To identify if there is any significant displacement of footings and/or major disorientation of the pole. (i.e., if pole if significantly leaning or has significant damage to base of pole)	**High**

2. Underground Primary Cables

CWH has not reported many cable failures on its system to date; however, should their rate of occurrence increase, then it would be prudent to track these. The condition of the concentric neutral and cable loading can also be assessed.

Table 6-2: Data Collection Recommendation for Underground Primary Cable

Criteria	Reasoning	Priority
Condition of Concentric Neutral	Corrosion of concentric neutrals is another mode of degradation. Insulation degradation and cable failures can be accelerated if the cable jacket is damaged allowing moisture to enter into the insulation system. Concentric neutral corrosion is a major problem particularly on unjacketed cables or when the neutrals of the cable are exposed to excessive moisture over time. The corrosion can lead to premature cable failures and/or cause touch potential risks. Time Domain Reflectometry (TDR) tests are performed to determine the degree of corrosion on concentric neutral cables.	**Medium**
Loading History	Cable degradation can also occur due to overheating under overloading or short circuit conditions. Over-stressing insulation during voltage surges can also lead to cable failures.	**Low**

3. Pole Mount Transformers

While CWH visually inspects its overhead distribution (pole mount) transformers, the results are not digitized and thus could not be used in this analysis. For future ACA's, CWH should look to digitize the results which will enable it to be included in the HI calculation.

Table 6-3: Data Collection Recommendation for Overhead Distribution Transformer

Criteria	Reasoning	Priority
Visual Inspection	To identify if the transformer is subject to any physical damage, oil leak, or corrosion.	**Medium**

4. Overhead Switches

While CWH visually inspects its overhead distribution switches, the results are not digitized and thus could not be used in the analysis. For future ACA's, CWH should look to digitize the results which will enable it to be included in the HI calculation.

Table 6-4: Data Collection Recommendation for Overhead Switch

Criteria	Reasoning	Priority
Visual Inspection	To identify the condition of insulators, blades, and operating mechanisms. The conditions help assess the life expectancy of the switch which affects the operability of the switch. Identification of this condition parameter over time provides degradation information of an asset.	**Medium**

5. Station Switchgear

Another condition parameter that can help further enhance the health index analysis is the breaker truck condition.

Table 6-5: Data Collection Recommendation for Station Switchgear

Criteria	Reasoning	Priority
Overall Breaker Truck Condition	To identify the condition of wiring, terminal blocks, relays and contactors. To identify the condition of the breakers inside the switchgear.	**Low**

6. Reclosers

Recloser timing/travel tests provide a means to exercise the reclosers and ensure it operates within specifications. As CWH carry out IR scanning on other assets within their system, CWH may want to consider performing IR scanning on the components of the recloser.

Table 6-6: Data Collection Recommendation for Reclosers

Criteria	Reasoning	Priority
Infrared Scanning	To identify if the recloser is operating within normal temperature ranges – excess temperature would require further investigation.	**Medium**

7. Protection Relay

Condition parameters such as Mean Time Between Failures (MTBF), information can further enhance the health index analysis and more accurately represent the actual condition of the relays.

Table 6-7: Data Collection Recommendations for Protection Relay

Criteria	Reasoning	Priority
Mean Time Between Failures	To identify mean time between failure of the relays. Lower priority for newer relays, but important as relays become older.	**Low**

6.1.2 Data Availability Improvements

Data availability is critical to producing prudent, accurate, and justified decision-making outputs. It represents the single most important element that can influence the degree to which the AM decision-making relies on objective factors. Companies understand that it is critical to executing continuous improvement procedures through an AM data lifecycle, such that data gaps and inaccuracies can be addressed and mitigated. In the case of this ACA, the quality of the HI is dependent on the available data. For condition parameters with low data availability, METSCO recommends that CWH continue collecting the information related to these data points.

Additionally, for an asset to have a valid HI, it must meet a minimum of 70% of available data across the condition parameters used in the HI formulation for distribution assets and 60% for station assets. As part of future improvement opportunities, it is recommended that CWH continue capturing asset data for condition parameters that are currently available for a small proportion of the asset population, such that valid Health Indices can be produced across the population. It is expected that with every passing year, the inspection record database will continue to grow, allowing for Health Indices to be calculated for the remaining population.

Lastly, METSCO noticed that condition parameters recorded by CWH have a three-tier grade (e.g., OK, Fair, and Poor). METSCO recommends for CWH to evaluate options of changing the condition parameters recorded to a five-level grade (e.g., Very Good, Good, Fair, Poor, and Very Poor), as doing so can provide more defined segregation between assets that need immediate attention and those that can still be in-service without intervention in the short term.

METSCO recommends that CWH continue to work on mitigating the existing data gaps, such that more degradation parameters can be assigned actual grades, thus expanding the sample size of valid HI and capturing all possible degradation of the evaluated assets. CWH's testing, inspection, and maintenance programs are well-positioned to continue to capture this information using processes and technologies in place within the organization.

Appendix A – METSCO Company Profile

METSCO Energy Solutions Inc. is a Canadian corporation which started its operations on the market in 2006. METSCO is engaged in the business of providing consulting and project management services to electricity generating, transmission, and distribution companies, major industrial and commercial users of electricity, as well as municipalities and constructors on lighting services, asset management, and construction audits. Our head office is located in Toronto, ON and our western office is located in Calgary, AB. Through our network of associates, we provide consulting services to power sector clients around the world. A small subset of our major clients is shown in the figure below.

Figure A-0-1: METSCO Clients

METSCO has been leading the industry in Asset Condition Assessment and Asset Management practices for over ten years. Our founders are the pioneers of the first Health Index methodology for power equipment in North America as well as the most robust risk-based analytics on the market today for high-voltage assets. METSCO has since completed hundreds of asset condition assessments, asset management plans, and asset management framework implementations. Our collective record of experience in these areas is the largest in the world, with ours being the only practice with widespread acceptance across regulatory jurisdictions. METSCO has worked with over 100 different utilities through its tenure, and as such, has been exposed and introduced to practices and unique challenges from a variety of entities, environments, and geographies. When a client chooses METSCO to work on improving Asset Management practices, it is choosing the industry-leading standard, rigorously tested and refined on a continued basis. Our experts have developed, supported, managed, led and sat on stand defending their own DSPs as utility staff giving METSCO the qualified expertise to provide its service to CWH.

In addition to our work in the area of asset health assessments and lifecycle enhancement, our services span a broad common utility issue area, including planning and asset management, design, construction supervision, project management, commissioning, troubleshooting operating problems, investigating asset failures and providing training and technology transfer.

Our founders and leaders are pioneers in their respective fields. The fundamental electrical utility-grade engineering services we provide include:

- Power sector process engineering and improvement
- Fixed Asset Investment Planning – development of economic investment plans
- Regulatory Proceeding Support
- Power System Planning and Studies – identifying system constraints
- Smart Grid Development – from planning to implementation of leading technologies
- Asset Performance and Asset Management
- Distribution and Transmission System Design
- Mentoring, Training, and Technical Resource Development
- Health Index Validation and Development
- Business Case Development
- Owners Engineering Services
- Risk Modeling – Asset Lifecycle and Risk Assessment

Appendix E

CWH Distribution Maintenance Plan

Distribution Maintenance Program

Revised by Matthew Aston
December 2023

Table of Contents

Contents

1. Overhead Visual Inspection Program

1.1 Introduction:

This program outlines the inspection schedule, recording and follow up actions associated with the Centre Wellington Hydro (CWH) overhead system. This program covers the inspection of:

- Poles/Supports
- Overhead Transformers
- Switches and Protective Devices
- Hardware and Attachments
- Conductors and Cables
- Third Party Plant
- Vegetation Control

1.2 Inspection Schedule:

The overhead system will be fully inspected on a schedule that meets the requirements of the Distribution System Code. For the purpose of this program the "urban" population density schedule in the Distribution System Code will be utilized.

On-going inspection requires the entire system to be **reviewed every three years**.

For the purpose of this program, a minimum of one-third of the overhead system will be inspected annually.

The Overhead Visual Inspection Program will be completed during:

- Day to Day work activities
- Line Clearing Program
- Infrared Inspection Program
- Pole Testing & Inspection Program

1.3 Visual Inspection Expectations:

It is expected that the visual inspection will identify obvious structural and electrical problems and hazards.

Where the inspection notices problems that require more detailed inspection, arrangements will be made to perform the work in a safe manner with the results reported in the inspection form; "CWH Overhead Inspections" (See form in Appendix A1).

1.4 Corrective Action:

The results of the visual inspection will be utilized to schedule any repair work required, or where appropriate, capital work on a planned basis.

Where the inspection determines there is an immediate hazard to the public, immediate follow up action will be taken.

Work orders will be issued for the repair work and when the work has been completed the work orders will be filed in the Operation Manager's Office or within the corporation's work order software.

The expectation is that corrective action will be completed in the year that the inspection was completed. In this way a backlog of deficiencies will not occur.

1.5 Details to Include in Visual Inspection:

For the various components of the overhead system the items listed below should be included in the visual inspection.

While this list is fairly detailed it cannot cover all conditions in the field.

While completing the visual inspections staff are encouraged to note any conditions they believe impact on the safety or integrity of the system.

1.5.1 Poles/Supports:

Bent, cracked or broken poles
Excessive surface wear or scaling
Loose, cracked or broken cross arms and brackets
Woodpecker or insect damage, bird nests
Loose or unattached guy wires or stubs
Guy strain insulators pulled apart or broken
Guy guards out of position or missing
Grading changes, or washouts
Indications of burning

1.5.2 Transformers:

Paint condition and corrosion
Phase indicators and unit numbers match operating map (where used)
Leaking oil
Flashed or cracked insulators
Contamination/discolouration of bushings
Ground lead attachments
Damaged disconnect switches or lightning arresters
Ground wire on arresters unattached

1.5.3 Switches and Protective Devices:

Bent, broken bushings and cut outs
Damaged lighting arresters
Ground wire on arresters unattached

1.5.4 Hardware and Attachments:

Loose or missing hardware
Insulators unattached from pins
Conductor unattached from insulators
Insulators flashed over or obviously contaminated (difficult to see)
Tie wires unraveled
Ground wire broken or removed
Ground wire guards removed or broken

1.5.5 Conductors and Cables:

Low conductor clearance
Broken/frayed conductors or tie wires
Exposed broken ground conductors

Broken strands, bird caging, and excessive or inadequate sag
Insulation fraying on secondary

1.5.6 Third Party Plant:
Attachment not secure
Infringing on clearances
Compromising access to electrical equipment
Unapproved/unsafe occupation or secondary use

1.5.7 General Conditions & Vegetation:
Leaning or broken "danger" trees
Growth into line of "climbing" trees
Accessibility compromised
Vines or brush growth interference (line clearance)
Bird or animal nests

1.6 Cost Tracking:
1.6.1 Inspection Labour will be tracked using 5020
1.6.2 Inspection Supplies & Expenses will be tracked using 5025

2. Underground Visual Inspection Program

2.1 Introduction:
This program outlines the inspection schedule, recording and follow up actions associated with the CWH underground system. This program covers the inspection of:

- Pad Mounted Transformers & Switching Kiosks
- Vegetation and Right of Way.

2.2 Inspection Schedule:
The underground system will be fully inspected on a schedule that meets the requirements of the Distribution System Code. For the purpose of this program the "urban" population density schedule in the Distribution System Code will be utilized.

On-going inspection requires the entire system to be **reviewed every three years**.

For the purpose of this program **one-third** of the underground system will be inspected annually.

The Underground Visual Inspection Program will be completed during:

- Day to Day work activities
- Infrared Inspection Program
- Padmount Equipment Refinishing Program

2.3 Visual Inspection Expectations:
It is expected that the visual inspection will identify obvious structural & electrical problems and hazards.

Where the inspection notices problems that require more detailed inspection, arrangements will be made to perform the work in a safe manner with the results reported in the inspection forms.

2.4 Corrective Action:
The results of the visual inspection will be utilized to schedule any repair work required, or where appropriate, capital work on a planned basis.

Where the inspection determines an immediate hazard to the public immediate follow up action will be required.

Work orders will be issued for the repair work and when the work has been completed the work orders will be filed in the Operation Manager's Office or within the corporation's work order software.

The expectation is that corrective action will be completed in the year that the inspection was completed. In this way a backlog of deficiencies will not occur.

2.5 Details to Include in Visual Inspection:
For the various components of the underground system the items listed below should be included in the visual inspection.

While this list is fairly detailed it cannot cover all conditions in the field.

While completing the visual inspections staff are encouraged to note any conditions they believe impact on the safety or integrity of the system.

2.5.1 Pad Mounted Transformers and Switching Kiosks:
Paint condition and corrosion
Placement on pad or vault
Check for lock and penta bolt in place or damage
Grading changes
Access changes (Shrubs, trees, etc.)
Phase indicators and unit numbers match operating map (where used)
Leaking oil
Lid damage, missing bolts, cabinet damage
Cable connections
Ground connections
Nomenclature
Animal nests/damage
General conditions

2.5.2 Vegetation and Right of Way:
Accessibility compromised
Grade changes that could expose cable
Excessive vegetation on right of way

2.6 Cost Tracking:
2.6.1 Inspection Labour will be tracked using 5040
2.6.2 Inspection Supplies & Expenses will be tracked using 5045

3. Substations Visual Inspection Program

3.1 Introduction:
This program outlines the inspection schedule, recording and follow up actions associated with the CWH substations. This program covers the inspection of Distribution Substations.

3.2 Schedule:
Each substation will be inspected on a schedule that meets the requirements of the Distribution System Code. For the purpose of this program the "urban" population density schedule in the Distribution System Code will be utilized.

Station Inspections are completed monthly on all 6 stations using the CWH Substation Audit report form.

At the time of this report, CWH owns six Outdoor Open Distribution Stations and no Customer Specific Substations.

CWH's Line Staff will complete the monthly visual inspections.

Additional visual inspections will be completed by a Contractor annually to assist Centre Wellington Hydro. The Contractor will also take oil samples to complete *Dissolved Gas Analysis* and *Chemical Analysis* of each substation transformer.

3.3 Visual Inspection Expectations:
It is expected that the visual inspection will identify obvious structural & electrical problems and hazards.

Where the inspection notices problems that require more detailed inspection, arrangements will be made to perform the work in a safe manner with the results reported in the inspection forms.

3.4 Corrective Action:
The results of the visual inspection will be utilized to schedule any repair work required or where appropriate capital work on a planned basis.

Where the inspection determines an immediate hazard to the public immediate follow up action will be required.

Work orders will be issued for the repair work and when the work has been completed the work orders will be filed in the Operation Manager's Office or within the corporation's work order software.

The expectation is that corrective action will be completed in the year that the inspection was completed. In this way a backlog of deficiencies will not occur.

3.5 Field Records:
Each inspection will require a record to be generated to fully record the results of the inspection, any follow up action required, and a record that the action was taken.

The records will also form a source of information for planned rehabilitation of the substations over time.

For the purpose of recording the inspections the "CWH Substation Audits" Report form will be used (See form in Appendix A2).

3.6 Filing of Records:
The Record of Field Inspection form will be kept on file and be maintained in the Manager of Operations Office.

3.7 Details to Include in Visual Inspection:

For the various components of the substations the items listed below should be included in the visual inspection.

While this list is fairly detailed it cannot cover all conditions in the field.

While completing the visual inspections staff are encouraged to note any conditions, they believe impact on the safety or integrity of the system.

3.7.1 Transformers:

Paint condition and corrosion
Phase indicators and unit numbers match operating map (where used)
Leaking oil
Flashed or cracked insulators
Contamination/discolouration of bushings
Ground lead attachments

3.7.2 Switches and Protective Devices:

Bent, broken bushings and cutouts
Damaged lighting arresters
Ground wire on arresters unattached

3.7.3 Hardware and Attachments:

Loose or missing hardware Insulators unattached from pins
Conductor unattached from insulators
Insulators flashed over or obviously contaminated (difficult to see)
Tie wires unraveled
Ground wire broken or removed
Ground wire guards removed or broken

3.7.4 Switchgear:

Paint condition and corrosion
Placement on pad or vault
Check for locks
Grading changes
Leaking oil

3.7.5 Vegetation and Right of Way:

Accessibility compromised
Grade changes that could expose cable
Leaning or broken “danger” trees in proximity of station
Growth into line of “climbing” trees
Vines or brush growth interference (line or fence clearance)
Bird or animal nests

3.8 Cost Tracking:

3.8.1 Inspection Labour will be tracked using 5114
3.8.2 Inspection Supplies & Expenses will be tracked using 5114
3.8.3 Maintenance Labour, Supplies, and Expenses will be tracked using 5114

4. Substations Preventative Maintenance

4.1 Introduction:

This program outlines the detailed inspection, testing, recording and follow up actions associated with the CWH Substation Maintenance. This program covers the:

- Testing of Substation Transformers
- Arrestor testing
- Protection Testing and Maintenance
- General station maintenance

4.2 Maintenance Schedule:

Distribution station maintenance will be completed on each station approximately once every six years. With the current population of substations (6 stations) one substation will be maintained every year.

Station	Rebuilt/New	Last Maintenance	Planned Maintenance
FMS-1	2013	2020	2025
FMS-2	2012	New TX, 2019	2024
FMS-3	2015	2022	2027
FMS-4	2016	2023	2028
EMS-1	2014	2021	2026
EMS-2	2016	N/A	2024 New TX

4.3 Maintenance Expectations:

To perform the scheduled maintenance on each station a services agreement will be provided from a substation maintenance contractor.

Conditions of the contract will require the following testing to be completed:

1. Inspect, clean and service the following components (including insulators and stand-offs):
   - Main HV disconnect switch and secondary fused switches in metal clad gear in station. Adjust switch operations as required.
   - Contact surfaces, coat with a non-oxidizing agent and lubricate the pivot points.
   - Primary fuses – coat with non-oxidizing agent. Perform contact resistance tests on switch and fuse contacts.
   - Verify fuse link sizes - All insulators and bushings in structure and enclosure to be inspected and tested

2. Inspect and perform insulation resistance tests on Lightning Arresters mounted on 44kV feeder on tower structure and any that may exist on the secondary feeders either in the gear or cable end on poles.

3. Inspect station grounding. Perform a three-point ground resistance test. Inspect enclosures to ensure they meet ESA requirements. Pull major weeds, etc. as required, to meet ESA requirements.

4. Fully test and inspect main distribution transformer. Tests to include:
   a. Dielectric absorption (insulation resistance test) (3-10 min. tests consisting of: High to Low and Ground, Low to High and ground, High and Low to

Ground)
   b. Capacitance and dissipation factor
   c. Turns ratio test. (exercise tap changer and perform ratio test on each tap position)
   d. Winding Resistance Test

5. Secondary gear would be inspected throughout and cleaned plus visual checks. Switches would be exercised and contacts on fuses and switches cleaned. Tests of each cell to include contact resistance testing of fuse and switch contacts. Insulation resistance testing of gear at 5000 volts dc. Verify operation of cell heaters in gear and demand load meter operations. Test distribution lightning arresters in gear if present and if not, recommendations would be made to add.

6. Secondary feeder testing to include Polarization Index (PI) testing (10 minute per cable non-destructive test).

The inspection is followed up with a report on findings and recommendations.

4.4 Corrective Action:
The results of the maintenance and testing will be utilized to schedule any repair work required or, where appropriate, capital work on a planned basis.

Where the inspection determines an immediate hazard to the public immediate follow up action will be required.

Work orders will be issued for the repair work and when the work has been completed will be filed in the Operation Manager's Office or within the corporation's work order software.

The expectation is that corrective action will be completed on the schedule indicated in the maintenance report.

4.5 Maintenance Records:
Each maintenance will require a record to be generated to fully record the results of the maintenance and testing, any follow up action required and a record that the action was taken. The records will also form a source of information for planned rehabilitation or replacement of the substation equipment over time.

4.6 Filing of Records:
The reports provided by the contractor and any follow up action will be maintained in the substation files in the Manager of Operations Office.

4.7 Cost Tracking:

4.7.1 Maintenance Labour, Supplies and Expenses will be tracked using 5114.

5. Line Clearing Program

5.1 Introduction:
Maintaining lines free from interference of vegetation and other obstructions is an important element to ensure the safety and reliability of the distribution system. This section outlines CWH's line clearing program.

5.2 Line Clearing Schedule:

Line clearing will be completed using a three year cycle: Elora, Fergus – South and Fergus – North.

Line clearing includes:

1. All 3 phase and single-phase Primary Feeders both express and radial feeds (44kV and 4.16kV)
2. Roadside secondary bus
3. Rear lot construction secondary bus

Individual overhead services are part of the annual program, although low priority, and mainly addressed only when required while inspected during regularly scheduled trimming activities or in response to a homeowners' request.

5.3 Cost Tracking:

5.3.1 Labour, Supplies, and Expenses will be tracked using 5135

6. Load Balance Program

6.1 Introduction:

This program outlines the measurement, recording and actions associated with CWH's Station and Feeder loading and load balancing program.

6.2 Measurement:

All CWH Stations and feeder loading is measured real time through an automated SCADA System and historical loading is saved on an on-going basis.

6.3 Corrective Action:

If the phase loading of the various feeders is out of balance by more than 10%, work orders will be issued for the transfer of load from the higher loaded phase to the lightly loaded phase.

Where loading measurements indicate that the feeder loading is reaching capacity levels transfer of load to feeders with more capacity will be undertaken.

Maintenance work orders will be issued to complete any load transfers.

6.4 Field Records:

Load transfer activities will be recorded, and CWH's SCADA system and GIS system will be updated in a timely manner accordingly.

6.5 Cost Tracking:

6.5.1 Inspection Labour will be tracked using 5010
6.5.2 Operation Labour, Supplies, and Expenses will be tracked using 5010

7. Infrared Inspection Program

7.1 Introduction:

This program outlines the inspection schedule, recording and follow up actions associated with the CWH Infrared Program. This program covers the inspection of:

- Overhead Transformers
- Overhead Switches and Protective Devices
- Overhead Primary Conductor Splices and Terminations
- Underground Express Primary Cable Termination and Elbows
- Padmount Express Switchgear Cubicles
- Secondary Bus Connections

7.2 Inspection Schedule:

The overhead primary system will be fully inspected on a schedule that meets the requirements of the Distribution System Code. For the purpose of this program the "urban" population density schedule in the Distribution System Code will be utilized.

For the purpose of this program **all** of the overhead primary system, underground ingress/egress (risers and pad mount switches), and Substations including CWH and customer owned will be inspected **annually**.

For the purpose of this program the infrared contractor shall provide a report of all thermal anomalies found by paper and digital format.

7.3 Infrared Expectations:

It is expected that the infrared inspection will identify thermal anomaly conditions on the electrical distribution equipment that suggest any unwanted condition exists.

In addition to the Infrared Inspection, it is expected that a visual patrol will be completed. It is expected that the visual inspection will identify obvious structural and electrical problems and hazards; as identified in *Overhead Visual Inspection Program* and *Underground Visual Inspection Program* sections of this document.

Where the inspection notices problems that require more detailed inspection, arrangements will be made to perform the work in a safe manner with the results reported in the inspection forms.

7.4 Corrective Action:

The results of the infrared inspection will be utilized to schedule any repair work required or where appropriate capital work on a planned basis.

Where the inspection determines an immediate hazard to the public immediate follow up action will be required.

Work orders will be issued for the repair work and when the work has been completed the work orders will be filed in the Manager of Operations Office.

The expectation is that corrective action will be completed within 12 months from the date that the inspection was completed. In this way a backlog of deficiencies will not occur.

7.5 Field Records:

Each inspection will require a record to be generated to fully record the results of the inspection, any follow up action required and a record that the action was taken.

The records will also form a source of information for planned rehabilitation of the overhead system over time.

For the purpose of recording the inspections the Infrared Contractor shall provide a report for all thermal anomalies detected.

7.6 Filing of Records:

The Infrared Contractor Report and associated records will be kept on file and will be maintained in the Operation Manager's Office.

7.7 Cost Tracking:

7.7.1 Inspection Labour & Material Expenses will be tracked using 5025
7.7.3 Maintenance Labour, Supplies, and Expenses will be 5025

8. Pole Testing & Inspection Program

8.1 Introduction:

This program outlines the inspection schedule, recording and follow up actions associated with the CWH Pole Testing & Inspection Program.

This program covers the inspection of:

- CWH Owned Poles
- Hardware and Attachments
- Third party plant
- Vegetation Control

This program covers the testing of:

- CWH Owned Wooden Poles

8.2 Testing & Inspection Schedule

CWH and/or a Contractor will Test & Inspect a minimum of 600 poles each year. The oldest poles will be tested prior to retesting pole schedule "begins". This will ensure no poles are missed for an extended period of time.

Year	Minimum Quantity of Poles
2021	600
2022	600
2023	600
2024	600
2025	600
2026	600
2027	600

8.3 Pole Testing & Inspection Expectations

It is expected that the pole testing & inspection will identify significant decay and degradation of the wood fibers.

Acceptable non-destructive test methods are Resistograph and Polux.

In addition to the Infrared Inspection, it is expected that a visual patrol will be completed. It is expected that the visual inspection will identify obvious structural and electrical problems and hazards; as identified in *Overhead Visual Inspection Program*.

Where the inspection notices problems that require more detailed inspection, arrangements will be made to perform the work in a safe manner with the results reported in the inspection forms.

8.4 Corrective Action

The results of the testing and inspection will be utilized to schedule any repair work required or where appropriate capital work on a planned basis.

Where the inspection determines an immediate hazard to the public immediate follow up action will be required.

Work orders will be issued for the repair work and when the work has been completed the work orders will be filed in the Operation Manager's Office.

The expectation is that corrective action will be completed within 12 months of the inspection. In this way a backlog of deficiencies will not occur.

8.5 Field Records

Each inspection will require a record to be generated to fully record the results of the inspection, any follow up action required and a record that the action was taken.

The records will also form a source of information for planned rehabilitation of the overhead system over time.

For the purpose of recording the inspections, a Field Inspection: Pole Inspection Report shall be completed for all poles tested and inspected. (See form in Appendix A4)

The Contractor shall provide a Detailed Report with the test results for all poles that were considered to have failed the test.

8.6 Filing of Records

The Inspection and Testing Reports will be kept on file until the specific poles inspected again. These records will be maintained in the Operation Manager's Office.

8.7 Cost Tracking:

- **8.7.1 Inspection Labour** will be tracked using 5025
- **8.7.2 Inspection Supplies & Expenses** will be tracked using 5025
- **8.7.3 Maintenance Labour, Supplies and Expenses** will be tracked using 5160

9. Padmount Equipment Refinishing Program

9.1 Introduction:

This program outlines the schedule associated with the CWH Padmount Equipment Refinishing Program. This program covers the refinishing of:

- Transformers
- Switching Cubicles (PME & KABARS)

9.2 Refinishing Schedule:

CWH and/or a Contractor will refinish approximately 45 pieces of equipment annually, within approved budget.

9.3 Refinishing Expectations:

It is expected that the refinishing process will remove damaged paint, remove surface rust by sanding/grinding/sand blasting, prime and paint the exterior of the equipment.

In addition to the refinishing, it is expected that a visual patrol will be completed. It is expected that the visual inspection will identify obvious structural and electrical problems and hazards; as identified in the *Underground Visual Inspection Program*.

Where the patrol notices problems that require more detailed inspection, arrangements will be made to perform the work in a safe manner with the results reported.

9.4 Cost Tracking:

9.4.1 **Inspection Labour** will be tracked using 5160

9.4.2 **Maintenance Labour**, Supplies, and Expenses will be tracked using 5160

10. Revenue Metering

10.1 Introduction:

This program outlines the inspection program and record keeping associated with CWH's Metering infrastructure.

CWH's revenue and wholesale metering record keeping, installation, and maintenance practices comply with Measurement Canada regulations and meet the requirements of the Distribution System Code.

For the purpose of CWH's Wholesale meter points an accredited Meter Service Provider (MSP) contractor is used.

10.2 Annual reverification schedule:

All of CWH's meter population records including stock and active meters will be reviewed annually in a timely manner to allow for future (next year minimum) resealing requirements.

This review will be completed by the Billing and Operations department staff. It is expected that the review will determine potential for sampling of seal extension groups as well as 100% meter changeouts for all other active meters in the field requiring a new seal.

10.3 Inspection Program:

All complex, single phase and polyphase metering installations will be installed as per the following steps:

- A Measurement Canada type record of installation is completed for new installs and updated for existing installs at time of meter exchanges for reverification (resealing) purposes.
- All new polyphase instrument transformer rated metering is cross phase tested within the year of installation/energization by an accredited MSP contractor and installation wiring, and record of installation verified.
- Pictures of the meter and installation are also taken at time of new installs and filed
- The above noted testing and verification process will be completed in any service that requires replacing/upgrading of the wiring, test block, adaptors, connections, or Instrument Transformers.

10.4 Filing of Records:

All meter records including Stock, Active, and Scrapped meters are stored within CWH's Customer Information System (CIS) and managed by the Customer Service Department.

All Record of Installation forms are filed with the Customer Service Department and updated accordingly in the field by Operations staff while completing work orders.

All records of cross phase tests and installation verification by contractors are filled and maintained by the Operations department.

10.5 Cost Tracking:

10.5.1: Meter maintenance, due to failure, changes, damages etc. 5065
10.5.2 : **Meter contracts**, x-phase testing, support, etc. 5065
10.5.3 : **Meter reverification**, Labour to exchange meters 5065
10.5.4 : **AMI maintenance**, Gate Keeper trouble shooting and repair 5065

11. Overhead and Underground Rebuilds

11.1 Introduction

This program outlines the annual process for the renewal of the CWH distribution system.

This program covers the:

- Recording of system inspections
- Evaluation of system rehabilitation needs
- Planned rehabilitation projects

11.2 Planning Expectations:

Annual recommendations will be made for capital work on the overhead and underground systems.

Recommendations will be made based on the results of the Inspections throughout the year and on any special investigations completed to address specific concerns. Reliability statistics will also be used to determine suspect feeders and locations where equipment failure statistics (outage cause code) indicate primary feeder or secondary circuit degradation.

11.3 Rehabilitation Expectations:

The expectation is to keep the general condition of the systems in good shape to prevent the need for extensive maintenance and to limit system outages due to failures. The amount of work recommended will vary depending on the conditions found in the field.

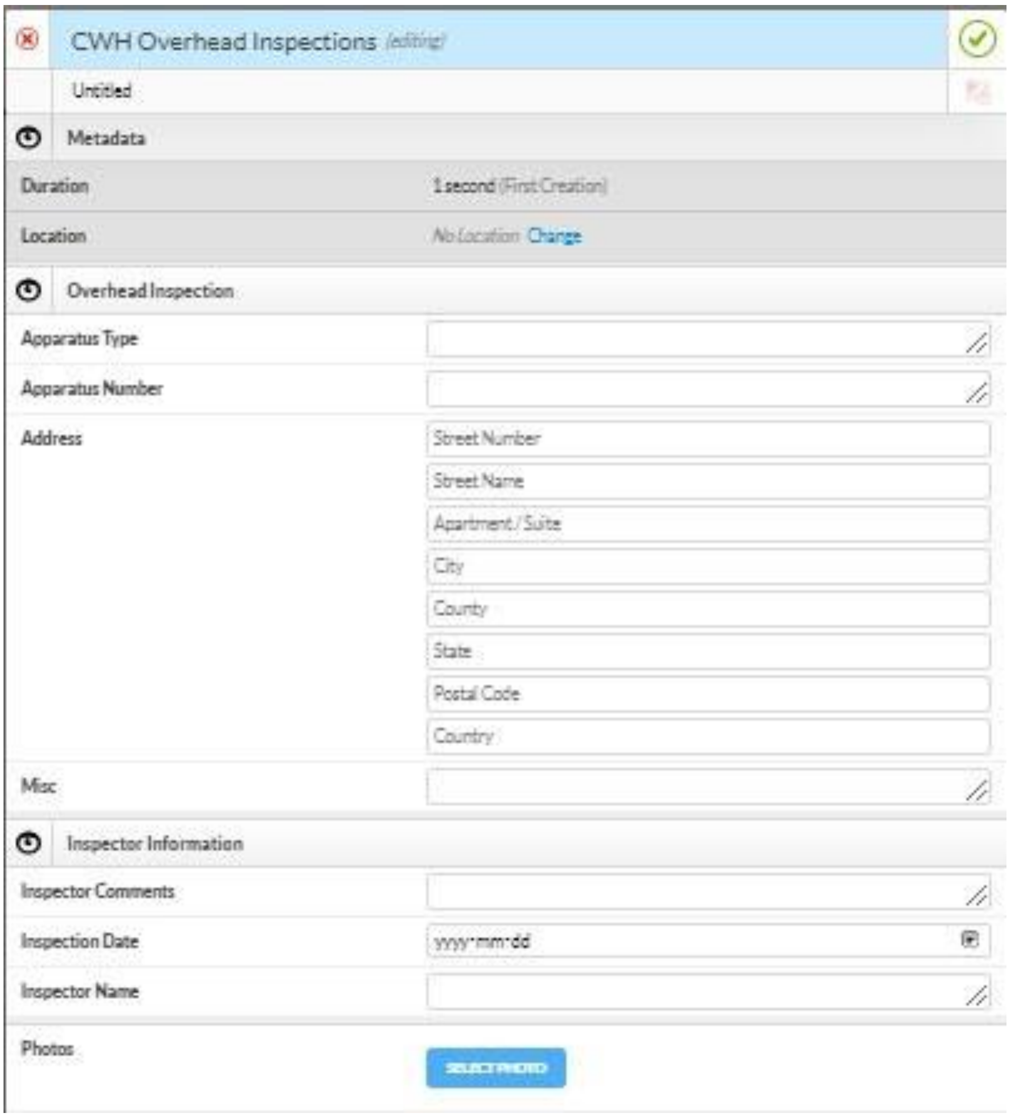
11.4 Rebuild Projects:

Approved projects will be completed through the capital works program.

11.5 Project Records:

Each project will require an approved design to be developed and recorded. Upon completion of the projects, “as constructed drawings” will be produced, and the system drawings updated.

Appendix A1 – Field Inspection: CWH Overhead Inspections Report



Appendix A2 – Field Inspection: CWH Substation Audit

CWH Substation Audits (editing)

Untitled

Duration	1 second (First Creation)
Location	No Location Change

Substation Information

Hydro Substation	
Date	yyyy-mm-dd
Inspector Name	
Inspection Frequency	
Voltage Primary	
Voltage Secondary	
Station MT Program Here	YES / NO
Snow Build Up	YES / NO
Rodent Evidence	YES / NO

Check Condition Of:

Gates	PROBLEM / NO PROBLEM
Locks	PROBLEM / NO PROBLEM
Yard lights	PROBLEM / NO PROBLEM
Overhanging Tree Branches	PROBLEM / NO PROBLEM
Gravel - Minimum 150 mm Thickness	PROBLEM / NO PROBLEM
Gravel at Fence	PROBLEM / NO PROBLEM
Fence Shape or Condition (50mm mesh - 9 gauge)	PROBLEM / NO PROBLEM
Grounding complete (at 12 meter intervals)	PROBLEM / NO PROBLEM
Condition of Barbed Wire	PROBLEM / NO PROBLEM
Height of Fence Line (8' with 3' barbed wire)	PROBLEM / NO PROBLEM
Condition of ground rod clamp in canisters	PROBLEM / NO PROBLEM
Sign on fence posted (number) - WHO TO CALL	PROBLEM / NO PROBLEM
Debris - outside/inside	PROBLEM / NO PROBLEM
Weeds	PROBLEM / NO PROBLEM
Vines / Bushes	PROBLEM / NO PROBLEM
Structure	PROBLEM / NO PROBLEM
Procedure in place to lock and close the gate when working inside this compound	YES / NO
Are procedures reviewed with all employees?	YES / NO
Number of Spare Fuses	
Fuse Size	
Check Heaters	ON / OFF
Check Battery Reading	
Inspection Comments	
Photos	SELECT PHOTO

Appendix A3 – Field Inspection: CWH Pole Testing Report

Identification	ID		9
	Zone		CWH-016
	Line		1
Pole	Pole number		4124
	Tag		1
	Length	[ft]	45
	Circumference	[in]	45
	Species		Lodgepole Pine
	Year		2003
Inspection	Date		6/4/2020
	Time		8:30:05 AM
	Inspector		Tech1
	Temperature	[°F]	85
	Rain		None
Location	Latitude		43.70155196
	Longitude		-80.37852986
Visual inspection	Wet ground		no
	Woodpecker		no
	Cracks		Light
	Insects		no
	Knots		4
	Mech. damage	[in]	0
	Surface decay	[in]	0
Polux measurement	Device		PX05-03-0085
	Measurement 1		PX003020
	Force 1		156
	Moisture 1	[%]	42
	Sigma 1	[PSI]	5,238.23
	Analysis 1		
	Result 1		Green
	Measurement 2		PX003021
	Force 2		128
	Moisture 2	[%]	56
	Sigma 2	[PSI]	4,645.84
	Analysis 2		
	Result 2		
	Analysis 3		
	Analysis 4		
Result	Nominal	[PSI]	6,000.00
	Sigma average	[PSI]	4,942.03
	Sigma ratio	[%]	82
	Result average		Green
	Result correction		
	Final result		Green
Remarks			
Pictures			file name
Charts			file name

Appendix A4 – Field Inspection: CWH Padmount Inspection Report

CWH Padmount Transformer Inspections (editing)

Untitled

Metadata

Duration	1 second (First Creation)
Location	No Location Change
Address	Street Number Street Name Apartment / Suite City County State Postal Code Country
Bank	
MFG	
KVA	
MFG Year	
Local	
Serial	
Voltage	

Items to check:

Apperance (Rust, Needs Paint, etc.) *	YES	NO
Arresters *	YES	NO
Installed New Arresters *	YES	NO
Barriers *	YES	NO
Bushings *	YES	NO
Connections *	YES	NO
Elbows *	YES	NO
Enclosure (Cleaning, Vegetation Removal Etc.) *	YES	NO
Gates (Condition) *	YES	NO
Levelling *	YES	NO
Markings (Replace Missing IDs, Bank #, Cable IDs, etc) *	YES	NO
Obstructions (Trees, Rocks, Lattice Needs to be Raised etc.) *	YES	NO
Oil Leak *	YES	NO
Penta Bolt Lock *	YES	NO
Stress Cones (Tracking Etc.) *	YES	NO

Photos	SELECT PHOTO
Inspection Comments *	
Inspection Completed By *	

Appendix F

KWCG Needs Assessment Report April 2024

NEEDS ASSESSMENT REPORT

KWCG

[Date: April 09, 2024]

Needs Assessment Report

Final

KWCG

[Date: April 09, 2024]

Lead Transmitter:

Hydro One Networks Inc.

Prepared by: KWCG Technical Working Group

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Disclaimer

This Needs Assessment (NA) Report was prepared for the purpose of identifying potential needs in the KWCG region and to recommend which needs a) do not require further regional coordination and can be directly addressed by developing a preferred plan as part of the NA phase and b) require further assessment and regional coordination. The results reported in this NA are based on the input and information provided by the Technical Working Group (TWG) for this region. Updates may be made based on best available information throughout the planning process.

The TWG participants, their respective affiliated organizations, and Hydro One Networks Inc. (collectively, “the Authors”) shall not, under any circumstances whatsoever, be liable to each other, to any third party for whom the Needs Assessment Report was prepared (“the Intended Third Parties”) or to any other third party reading or receiving the Needs Assessment Report (“the Other Third Parties”). The Authors, Intended Third Parties and Other Third Parties acknowledge and agree that: (a) the Authors make no representations or warranties (express, implied, statutory or otherwise) as to this document or its contents, including, without limitation, the accuracy or completeness of the information therein; (b) the Authors, Intended Third Parties and Other Third Parties and their respective employees, directors and agents (the “Representatives”) shall be responsible for their respective use of the document and any conclusions derived from its contents; (c) and the Authors will not be liable for any damages resulting from or in any way related to the reliance on, acceptance or use of the document or its contents by the Authors, Intended Third Parties or Other Third Parties or their respective Representatives.

Executive Summary

REGION	**KWCG** Region (the "Region")		
LEAD	Hydro One Networks Inc. ("HONI")		
START DATE:	December 11, 2024	**END DATE:**	April 09, 2024

1. INTRODUCTION

The 2nd Regional Planning cycle for the KWCG Region was completed in December, 2021 with the publication of the Regional Infrastructure Plan ("RIP") report. This is the 3rd cycle of Regional Planning for the region.

The purpose of this Needs Assessment ("NA") is to:

a) Identify any new needs and reaffirm needs identified in the previous regional planning cycle; and,
b) Recommend which needs:
i) require further assessment and regional coordination (and hence, proceed to the next phases of regional planning); and,
ii) do not require further regional coordination (i.e., can be addressed directly between Hydro One and the impacted LDC(s) to develop a preferred plan and/or no regional investment is required at this time and the need may be reviewed during the next regional planning cycle).

The planning horizon for this NA assessment is ten years.

2. REGIONAL ISSUE/TRIGGER

In accordance with the Regional Planning process, the Regional Planning cycle should be triggered at least once every five years. Considering these timelines, the 3rd Regional Planning cycle was triggered in December 2023 for the KWCG Region.

3. SCOPE OF NEEDS ASSESSMENT

The scope of the KWCG Region NA and includes:

a) Review and reaffirm needs/plans identified in the previous regional planning cycle RIP (as applicable),
b) Identify any new needs resulting from this assessment,
c) Recommend which need(s) require further assessment and regional coordination in the next phases of the regional planning cycle; and,
d) Recommend which needs do not require further regional coordination (i.e., can be addressed directly between Hydro One and the impacted LDC(s) to develop a preferred plan and/or no regional investment is required at this time and the need may be reviewed during the next regional planning cycle).

The TWG may also identify additional needs during the next phases of the planning process, namely Scoping Assessment ("SA"), Integrated Regional Resource Plan ("IRRP"), and RIP, based on updated information available at that time.

The planning horizon for this NA assessment is ten (10) years.

4. REGIONAL DESCRIPTION AND CONNECTION CONFIGURATION

The KWCG Region covers the cities of Kitchener, Waterloo, Cambridge and Guelph, portions of Oxford and Wellington counties and the townships of North Dumfries, Puslinch, Woolwich, Wellesley and Wilmot. Electrical supply to the Region is provided from eleven 230 kV and thirteen 115 kV step-down transformer stations. The summer 2022 non-coincident regional loads were about 1436 MW.

5. INPUTS/DATA

The TWG comprises of representatives from Local Distribution Companies ("LDC"), the Independent Electricity System Operator ("IESO"), and Hydro One and provides input and relevant information for the KWCG Region regarding capacity needs, reliability needs, operational issues, and major high-voltage (HV) transmission assets requiring replacement over the planning horizon. The LDCs also capture input from municipalities in the development of their 10-year load forecast.

In accordance with the regional planning process, stakeholder engagement takes place during the IRRP phase.

6. ASSESSMENT METHODOLOGY

The assessment's primary objective is to identify the electrical infrastructure needs in the Region over the 10-year planning horizon. The assessment methodology includes a review of planning information such as load forecast (which factors various demand drivers and consideration of municipal energy plan(MEPs) and/or Community Energy plans (CEPs) where available), conservation and demand management ("CDM") forecast, distributed generation ("DG") forecast, system reliability and operation, and major HV transmission assets requiring replacement.

A technical assessment of needs is undertaken based on:

a) Current and future station capacity and transmission adequacy;
b) System reliability needs and operational concerns;
c) Major HV transmission equipment requiring replacement with consideration to "right-sizing"; and,
d) Sensitivity analysis to capture uncertainty in the load forecast as well as variability of demand drivers such as electrification.

7. NEEDS

I. Updates on needs identified during the previous regional planning cycle

The following needs and projects discussed in the 2nd cycle RIP report for KWCG region have been completed:

- Hanlon TS Transformers T1/ T2 Replacement (2022).

The following needs and projects discussed in the 2nd cycle RIP report for KWCG region are currently underway:

- **Burlington TS to CTS 1 Line Section:** The refurbishment of 115 kV B6C/ B6C line section from Burlington TS to Harper's Junction was completed in 2019. The refurbishment of line tap section from Harper's Junction to CTS1 is progressing slowly due to outage availability from the customer. This refurbishment work is currently forecasted to be completed in Q3/ Q4 2025 timeframe.

- **Kitchener MTS #5 – T9/T10 Transformers Replacement**: The existing 83 MVA T9/ T10 transformers are planned to be replaced with new 100 MVA units. This work is currently forecasted to be completed by Q1 2025.
- **Preston TS - T3/T4 Transformer Replacement:** Condition assessment of T3/ T4 transformers have identified these units for replacement. These units are currently planned to be replaced by the end of 2027 with similar Hydro One standard units. This replacement will also remove the existing supply capacity constraint due to a technical limitation in the existing units. The new LTR will be 180 MW

The remaining needs and projects discussed in the 2nd cycle RIP report for KWCG region are as follows:

- **Scheifele MTS - T1/T2 and T3/T4 Transformer Replacement**: These four (T1/T2/T3/T4) transformers are expected to approach end of life over the next 10 year horizon and are planned for replacement by Enova Power Corp. Enova Power Corp will continue monitoring the condition of these transformers with its maintenance program. The expected year of replacement is between 2029-2033.
- **Cedar TS - T7/ T8 Transformer Replacement**: Replacing the existing non-standard T7/T8 transformers with Hydro One standard units of higher capacity. Based on latest condition assessment of these units. These units are to be replaced beyond the study period (10 years) of this report. However, this transformer replacement may need to be advanced due to capacity needs.
- **Campbell TS - Breakers and Component replacement:** Replace breakers deemed to be approaching expected service life. This work is planned to be completed by 2032.
- **Fergus TS – T3/T4 Transformer Replacement:** Hydro One will continue monitoring the condition of these T3/T4 transformers and other components at Fergus TS. Hydro One will proceed with the replacement plan, if required. Otherwise, this need will be reassessed in the next regional planning cycle.
- **Galt TS – Breakers and Component Replacement:** Hydro One will continue monitoring the condition of these components at Galt TS and proceed with the replacement plan as required.

II. Newly identified needs in the region

Based on the new and updated information, a summary of the results of this Needs Assessment is provided below:

a. Asset Renewal for Major HV Transmission Equipment

- No new Asset Renewal Needs

b. Transformation Capacity

- The supply capacity needs at Preston TS, Energy + MTS, Cedar T7/T8 and Campbell TS (T3/T4) have been identified in the near term while the needs at Cedar TS T1/T2 DESN, Cedar T7/T8 DESN, Kitchner MTS #7, Waterloo MTS, and Rush MTS have been identified in the middle term.

c. Transmission System Capacity

- During the study period. Post contingency overload violations were observed on 230 kV M20D/M21D and 115 kV D11K/ D12K circuits for the loss of companion circuits.

d. System Reliability, Operation and Load restoration

- During the study period, post contingency voltage violations were observed on 230 kV M20D/M21D for the loss of companion circuits.
- Load restoration violations on 230 kV D6V/D7V circuits in the long term and system security and load restoration violation on the M21D/M20D circuit in the mid term and near term respectively, for a single tower contingency.

8. SENSITIVITY ANALYSIS

The objective of a sensitivity analysis is to capture uncertainty in the load forecast as well as variability of electric demand drivers to identify any emerging needs and/or advancement or deferment of recommended investments.

The impact of the sensitivity analysis for the high and low growth scenarios identified the following updates to need dates and/or new station/line capacity needs: These needs will be assessed again during the next phases of this Regional Planning cycle.

Sr. no	Need Identified	Normal Growth Scenario	High Growth Scenario	Low Growth Scenario
1	Preston TS - Capacity need	2026	2026	2029
2	Galt TS- Capacity need	Reaches capacity in 2032	2030	Long term
3	Energy Inc MTS - Capacity need	2023	2023	2023
4	Rush MTS - Capacity need	2030	2029	Long term
5	Waterloo North MTS #3 - Capacity need	2030	2030	Long term
6	Campbell TS (T3/T4)- Capacity need	2026	2025	2030
7	Cedar TS (T7/T8)- Capacity need	Immediate	Immediate	Immediate
8	Cedar TS (T1/T2)- Capacity need	2031	2029	Long term
9	Kitchener #7	2031	2030	Long term
10	M20D/M21D Transmission Circuit Supply	2026	2024	2026
11	D11K/D12K- Transmission Circuit Supply	2032	2030	Long term

12	D10H - Transmission Circuit Supply	Long term	2030	Long term
13	M20D/M21D Load Security	2032	2028	Long term
14	M20D/M21D Restoration Needs	2025	2023	2025
15	D6V/D7V Restoration Needs	Long term	2030	Long term
16	Voltage change violation on M20D/M21D	2026	2025	2026

9. RECOMMENDATIONS

The TWG recommendations are as follows:

I. Needs that require further assessment and regional coordination

These needs may have broader regional impacts and require further assessment and coordination during the next phases[1] of the regional planning cycle. These needs are as follows:

a. Transmission System Capacity

- M20D/M21D post contingency violation (Galt Jct x Cambridge #1 Jct)- Near term
- D11K/D12K post contingency violation (Detweiler x Kitchener #1 & 4 Jct) – Mid Term

b. System Reliability, Operation and Load restoration

- System security violation on the M21D/M20D circuit in the Mid term
- Load restoration for M20D/M21D – Near term
- Voltage violations on M20D or M21D due to outage on companion circuit -Near term

c. Transformation Capacity Needs

- Preston TS (T3/T4) – Near term
- Energy Inc MTS (T1/T2) – Near term

Transmission system capacity and restoration needs are likely to trigger system reinforcement needs in the KWCG region.

II. Needs that do not require further regional coordination

These needs are local in nature and do not have a regional impact. They can be addressed by a straightforward transmission and/or distribution wires solution. They do not require investment in any upstream transmission facility or Leave to Construct (i.e., Section 92) approvals. These needs generally impact a limited number of LDCs and can be addressed directly between Hydro One and the LDC(s) to develop a preferred local plan. A list of these needs are as follows:

[1] Non-wires options are further considered (i.e. incremental to CDM and DG that is considered in this NA) as potential options in addressing these needs during the IRRP phase.

a. Transformation Capacity Needs

- Campbell TS (T3/T4) – Mid term
- Cedar TS (T1/T2) – Mid term
- Kitchener MTS #7 (T14/T13) – Mid term
- Cedar (T7/T8) – Near term
- Rush MTS – Mid term
- Waterloo North MTS #3 - Mid term

List of LDC(s) to be involved in further regional planning activities:

- Grandbridge Energy
- Enova Power Corp

List of LDC(s) which are not required to be involved in further regional planning phases:

- Hydro One Networks Inc. (Distribution)
- Alectra Inc.
- Center Wellington Hydro
- Halton Hills Hydro Inc.
- Wellington North Power

Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

The second cycle of the Regional Planning process for the KWCG Region was completed in [December 10, 2021] with the publication of the Regional Infrastructure Plan ("RIP") Report The RIP report included a common discussion of all the options and recommended plans and preferred plans for wire infrastructure investments to address the near- and medium-term needs.

This Needs Assessment initiates the third regional planning cycle for the KWCG Region. The purpose of this Needs Assessment ("NA") is to:

a) Identify any new needs and reaffirm needs identified in the previous regional planning cycle; and,
b) Recommend which needs:
    ii) require further assessment and regional coordination (and hence, proceed to the next phases of regional planning); and,
    ii) do not require further regional coordination (i.e., can be addressed directly between Hydro One and the impacted LDC(s) to develop a preferred plan and/or no regional investment is required at this time and the need may be reviewed during the next regional planning cycle).

The planning horizon for this NA assessment is ten years. The flow chart of the Regional Planning Process is given below in Figure 1 below.

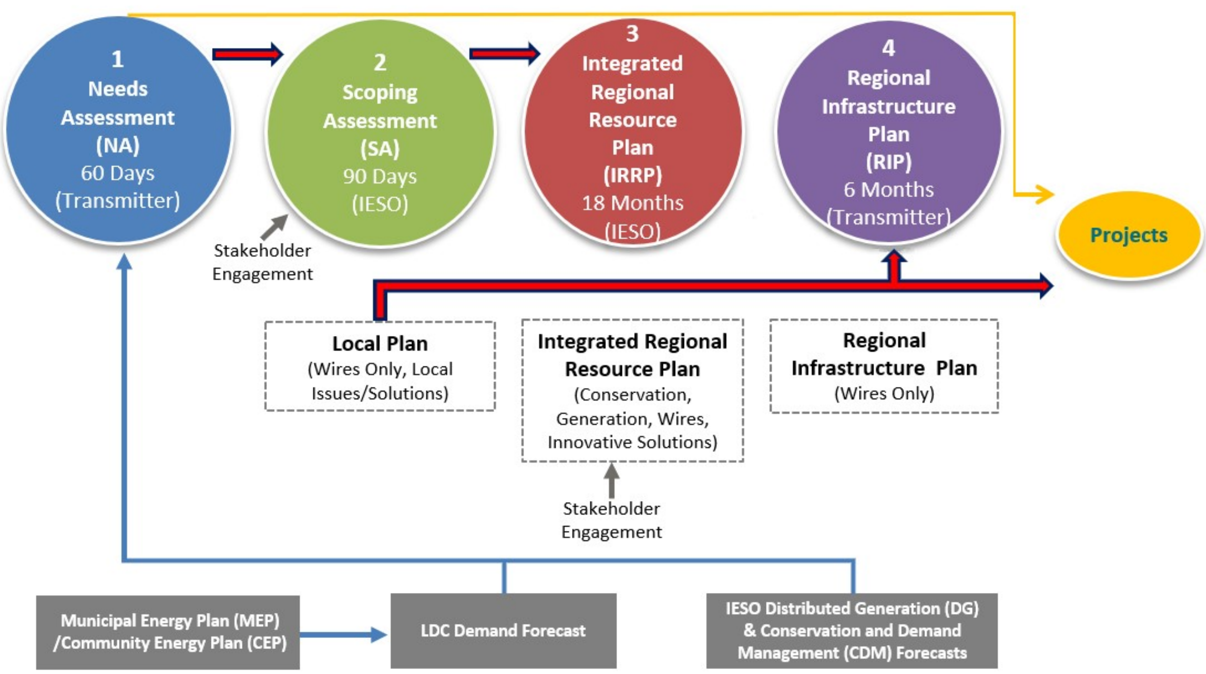

Figure 1: Regional Planning Process

This report was prepared by the KWCG Technical Working Group("TWG"), led by Hydro One Networks Inc. The report presents the results of the assessment based on information provided by the Hydro One, the Local Distribution Companies ("LDC") and the Independent Electricity System Operator ("IESO"). Participants of the TWG are listed below in Table 1.

Table 1: KWCG Region TWG Participants

Sr. no.	Name of TWG Participants
1	Hydro One Networks Inc. (Lead Transmitter)
2	Independent Electricity System Operator ("IESO")
3	Enova Power Corp.
4	Alectra Inc.
5	Grandbridge energy
6	Centre Wellington
7	Wellington North
8	Halton Hills Hydro Inc.
9	Hydro One Networks Inc. (Distribution)

2. REGIONAL ISSUE/TRIGGER

In accordance with the Regional Planning process, the Regional Planning cycle should be triggered at least once every five years. As such, the 3rd Regional Planning cycle was triggered for the KWCG region.

3. SCOPE OF NEEDS ASSESSMENT

The scope of this NA covers the KWCG region and includes:

- Review and reaffirm needs/plans identified in the previous cycle RIP (as applicable),
- Identify any new needs resulting from this assessment,
- Recommend which need(s) require further assessment and regional coordination in the next phases of the regional planning cycle; and,

- Recommend which needs do not require further regional coordination (i.e., can be addressed directly between Hydro One and the impacted LDC(s) to develop a preferred plan and/or no regional investment is required at this time and the need may be reviewed during the next regional planning cycle).

The Technical Working Group TWG may also identify additional needs during the next phases of the planning process, namely Scoping Assessment (“SA”), Integrated Regional Resource Plan (“IRRP”), Local plan (LP) and RIP, based on updated information available at that time.

The planning horizon for this NA assessment is 10 years.

4. REGIONAL DESCRIPTION AND CONNECTION CONFIGURATION

The KWCG Region covers the cities of Kitchener, Waterloo, Cambridge and Guelph, portions of Oxford and Wellington counties and the townships of North Dumfries, Puslinch, Woolwich, Wellesley and Wilmot. Electrical supply to the Region is provided from eleven 230 kV and thirteen 115 kV step-down transformer stations. The accumulative summer 2022 non-coincident loads were about 1477 MW. The approximate boundaries of the KWCG Region are shown below in Figure 1.

The main sources of electricity into the KWCG Region are from five Hydro One stations: Middleport TS, Buchanan TS, Detweiler TS, Orangeville TS and Burlington TS. At these stations electricity is transformed from 500 kV and 230 kV to 230 kV and 115 kV levels, respectively. Electricity is then delivered to the end users of LDCs and transmission connected industrial customers through 26 (supply transformer stations) step-down transformer stations. Figure 2 illustrates these stations as well as the four major regional sub-systems: Waterloo-Guelph 230 kV sub-system, Cambridge-Kitchener 230 kV sub-system, Kitchener Guelph 115 kV sub-system and South-Central Guelph 115 kV sub-system. The single line diagram of the KWCG region is shown in Figure 3 below.

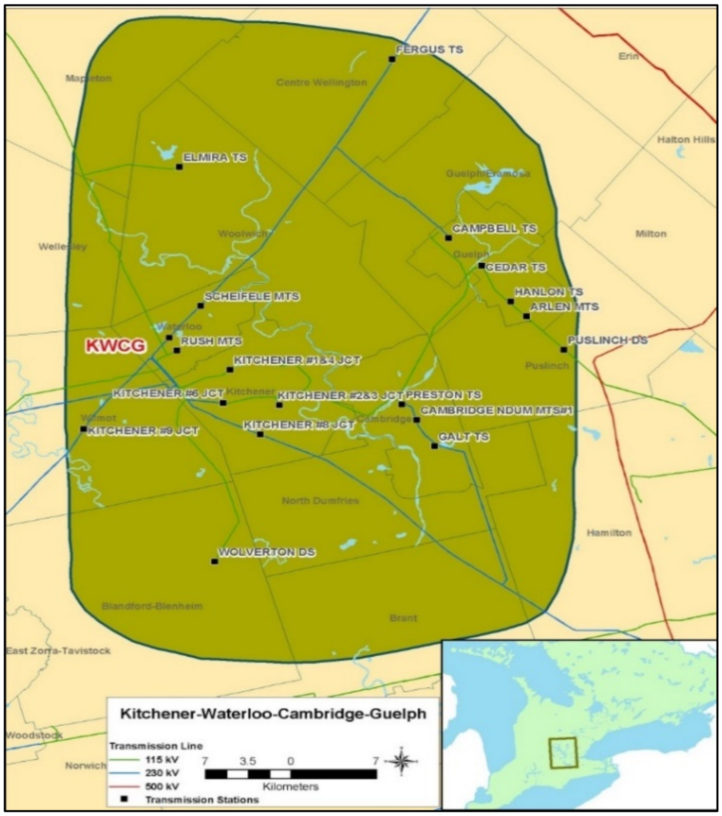

Figure 2: Map of KWCG Regional Planning Area

The circuits and stations of the area are summarized in the Table 2 below:

Table 2: Transmission Station and Circuits in the KWCG Region

115Kv circuits	230Kv circuits	Hydro One Transformer Stations	Generation Stations
B5C/B6C D7F/D9F F12C/F11C D11K/D12K D8S D10K	D4W/D5W D6V/D7V B22D/B23D M20D/M21D	*Detweiler TS , Fergus TS, *Cedar TS, Campbell TS, Galt TS, Elmira TS, Hanlon TS, Scheifele MTS, Waterloo North MTS#3, Energy MTS#1, Kitchener MTS #1, Kitchener MTS#3, Kitchener MTS#4, Kitchener MTS#5, Kitchener MTS#6, Kitchener MTS#7, Kitchener MTS#8, Kitchener MTS#9, Rush MTS, Wolverton DS, Puslinch DS, CTS 1, CTS 2, Preston TS*.	N/A

*Stations with Autotransformers installed

The single line diagram of the Transmission Network of KWCG region is shown in Figure 3 below.

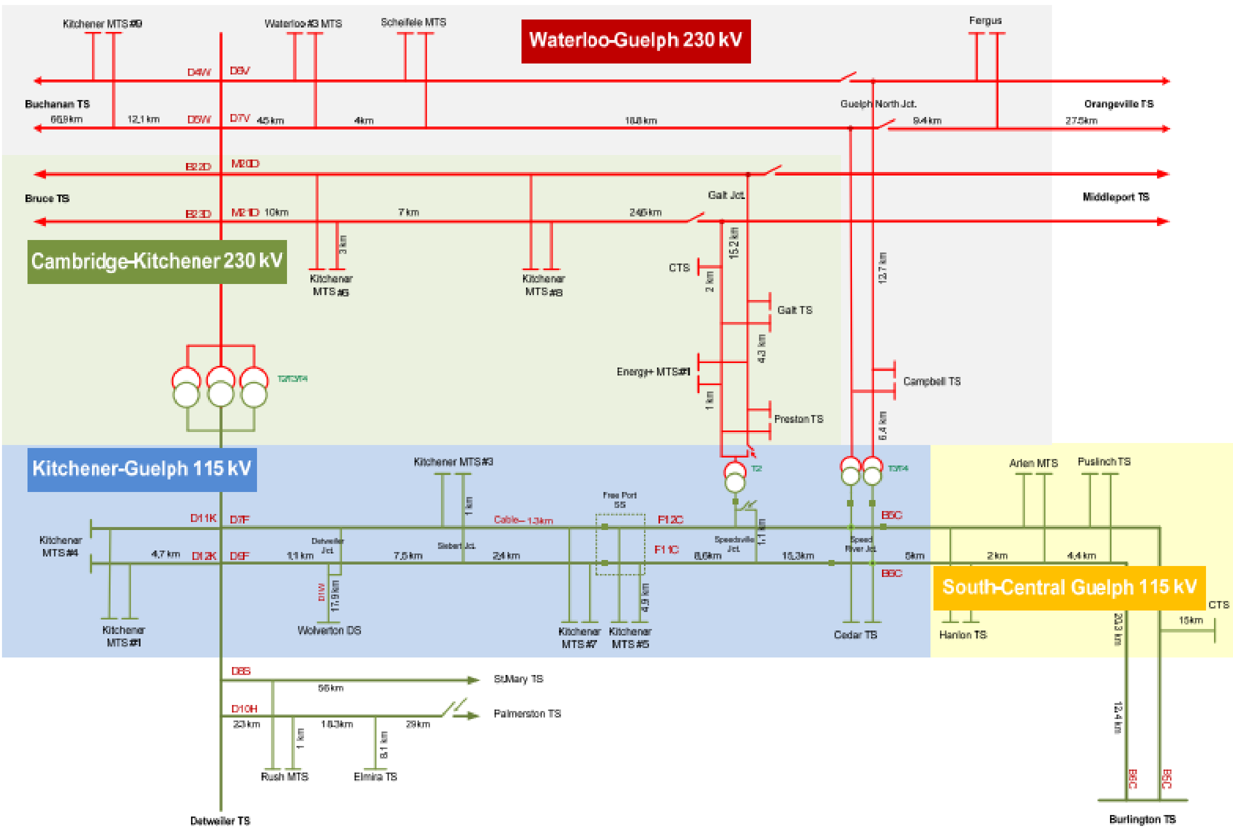

Figure 3: KWCG Transmission Single Line Diagram

5. INPUTS AND DATA

TWG participants, including representatives from LDCs, IESO, and Hydro One provided information and input for the KWCG NA. With respect to the load forecast information, the OEB Regional Planning Process Advisory Group (RPPAG) recently published a document called "Load Forecast Guideline for Ontario" in Oct. 2022. The objective of this document is to provide guidance to the TWG in the development of the load forecasts used in the various phases of the regional planning process with a focus on the NA and the IRRP. One of the inputs into the LDC's load forecast that is called for in this guideline is information from Municipal Energy Plans (MEP) and/or Community Energy Plans (CEP). The list of all the Municipalities falling under the geographical boundaries of the region are given in Appendix-E.

The information provided includes the following:

- KWCG 10-year Load Forecast for all supply stations inclusive of the inputs provided by the municipalities (e.g. through their MEPs & CEPs),
- Known capacity and reliability needs, operating issues, and/or major assets requiring replacement/ refurbishment; and
- Planned/foreseen transmission and distribution investments that are relevant to Regional Planning for the KWCG.
- Captured uncertainty in the load forecast as well as variability of electric demand drivers to identify any emerging needs and/or advancement or deferment of recommended investments.

6. ASSESSMENT METHODOLOGY

The following methodology and assumptions are made in development of this Needs Assessment:

6.1 Technical Assessments and Study Assumptions

The technical assessment of needs was undertaken based on:

- Current and future station capacity and transmission adequacy;
- System reliability and operational considerations;
- Asset renewal for major high voltage transmission equipment requiring replacement with consideration to “right-sizing”; and,
- Load forecast data was requested from industrial customers in the region, and
- This assessment is based on Summer peak loads. Three load forecasts were developed i.e. Normal Growth scenario, High & low Growth scenario. The High and low Growth scenario load forecast was developed to conduct a sensitivity analysis to cover unforeseen developments such as, fuel switching, Government policies, higher-than-expected EV charging trend during peak load conditions, etc.

The following other assumptions are made in this report.

- The study period for this Needs Assessment is 2023-2032.
- The Region is summer peaking, so this assessment is based on summer peak loads.
- Line capacity adequacy is assessed by using coincident peak loads in the area.
- Station capacity adequacy is assessed by comparing the non-coincident peak load with the station’s normal planning supply capacity, assuming a 90% lagging power factor for stations having no low-voltage capacitor banks and 95% lagging power factor for stations having low-voltage capacitor banks.

- Normal planning supply capacity for transformer stations is determined by the Hydro One summer 10-Day Limited Time Rating (LTR) of a single transformer at that station.
- Adequacy assessment is conducted as per Ontario Resource Transmission Assessment Criteria (ORTAC).

6.2 Information Gathering process

6.2.1. Load forecast:

The LDCs provided their load forecast for all the stations supplying their loads in the KWCG region for the 10-year study period including the inputs from the Municipalities such as MEPs and CEPs. The IESO provided a Conservation and Demand Management ("CDM") and Distributed Generation ("DG") forecast for the KWCG region. The region's extreme summer non-coincident peak gross load forecasts for each station were prepared by applying the LDC load forecast growth rates to the actual 2022 summer peak extreme weather corrected loads. The extreme summer weather correction factors were provided by Hydro One. The net extreme summer weather load forecasts were produced by reducing the gross load forecasts for each station by the percentage CDM and then by the amount of effective DG capacity for the contracted projects only provided by the IESO for that station. It is to be noted that as contracts for existing DG resources in the region begin to expire, at which point the load forecast has a decreasing contribution from local DG resources, and an increase in net demand. This extreme summer weather corrected net load forecast for the individual stations in the KWCG region is given in Appendix A.

A very few of the stations have winter peaks marginally higher than summer peaks. The higher winter transformer and line ratings are adequate to accommodate the marginally higher loads. Therefore, only the Summer Assessment was carried out.

Alectra recently advised the TWG that a revised forecast, to better account for their community's decarbonization activities, will soon be available. This updated forecast will be included in later stages of the regional planning process and may impact the area's overall needs and/or may require the creation of a regional winter forecast.

6.2.2. Sensitivity Analysis:

A sensitivity analysis was undertaken by the TWG to capture uncertainty in the load forecast as well as variability of drivers such as electrification. Hence, the NA recommendations are not necessarily linked to sensitivity scenarios; but rather are used to identify any emerging needs for consideration in developing recommendations. The impact of sensitivity analysis for the high and low growth scenarios are provided in section 8 of this report.

Relevant information regarding system reliability and operational issues in the region; and

6.2.3. Asset renewal Needs for Major HV Equipment:

List of major HV transmission equipment planned and/or identified to be refurbished and/or replaced based on asset condition assessment, relevant for Regional Planning purposes. This includes HV transformers, autotransformers, HV Breakers, HV underground cables and overhead lines. The scope of equipment considered is given in section 7.1; and

6.2.4. System Reliability and Operational Issues:

- Palmerston-to-Detweiler transfer during Hanover bank outages:
  With current load forecast, this issue does not exist.

TWG members identified the following bulk system issues in the KWCG region to be discussed outside of the RP process:

- Detweiler TS configuration and operating instruction asking for multiple equipment to be out of service during contingency
- Detweiler TS Station Service Auto-Transfer Issues
- Palmerston-to-Detweiler transfer during Hanover bank outages.

7. NEEDS

This section describes emerging new needs identified in the KWCG Region and/or updates on the previously identified needs since the completion of Previous Regional Planning cycle.

Needs that were identified and discussed in the previous regional planning cycle with associated projects that were recently completed and reaffirmed needs that are underway are briefly described below with relevant updates and will not be discussed further in the report. These projects include:

- Hanlon T1/T2 transformer replacement was completed in 2022.
- Kitchener MTS #5 project is currently underway, existing 83MVA transformers to be replaced by 100MVA units. The planned in-service date is Q3 2024 for T10 and Q1 2025 for T9.
- Preston TS: Project for like-for-like replacement of transformers T3/T4 is underway. The planned in-service date is 2027.
- B5C/B6C 115kV line section refurbishment: The Burlington TS to Harper junction line refurbishment was completed in 2019. The refurbishment of line tap from Harper junction to CTS-1 is progressing slowly due to outage availability from customer. Expected completion date is Q3/Q4 2025.
- Galt TS: The asset condition assessment identified breakers and other components needs to be replaced in long-term. Hydro One will continue to monitor the condition of these components and if required, proceed with the replacement plan.
- Campbell TS: Two feeder breakers and a bus tie breaker for T1/T2 DESN were identified for replacement. The planned in-service date is 2032.

- Scheifele MTS T1/T2/T3/T4 Transformer replacement: These four (T1/T2/T3/T4) transformers are expected to approach end of life over the next 10-year horizon and are planned for replacement by Enova Power Corp. The expected year of replacement is between 2029-2033.

Note: The planned in-service year for the above projects is tentative and is subject to change.

All near, and mid-term needs that were discussed as a part of this report are summarized in table 3 below.

Table 3: Near/Mid-term Needs Identified in Previous RIP and/or this NA

Need Description	Recommended Plan/Update	Previous RIP Report Section	NA Report Section
Asset Renewal Needs			
Cedar TS	T7/T8 Transformers Replacement	7.3.2	7.1.1
Fergus TS	T3/T4 Transformers Replacement	7.3.4	7.1.2
Galt TS	Breakers and Component Replacement	7.3.5	7.1.4
Campbell TS	Breakers and Component Replacement	7.3.6	7.1.3
Station Capacity Needs			
Preston TS	Preston T3/T4 is forecasted to exceed its supply capacity during the study period (beyond the anticipated LTR of the new transformers)	N/A	7.2.1
Energy Inc MTS	The load at Energy Inc MTS is forecasted to exceed its supply capacity in the near term.	N/A	7.2.2
Campbell TS (T3/T4)	The load at Campbell TS (T3/T4) is forecasted to exceed its supply capacity in the near term.	N/A	7.2.3
Cedar TS	Load demand at both Cedar TS T1/T2 and T7/T8 DESNs is forecasted to exceed supply capacities in the mid and near term respectively.	N/A	7.2.4
Kitchener MTS#7	The load at Kitchener MTS#7 is forecasted to exceed its supply capacity in the mid-term.	N/A	7.2.5

Waterloo North MTS #3	The load at Waterloo North MTS#3 is forecasted to exceed its supply capacity in the mid-term.	N/A	7.2.6
Rush MTS	The load at Rush MTS is forecasted to exceed its supply capacity in the mid-term.	N/A	7.2.7
Transmission Line Capacity Needs			
M20D/M21D	The 230 kV M20D/M21D circuits supply transformer stations connected between Detweiler TS and Middleport TS. Loading violations were observed on M20D/ M21D circuits starting 2026 on the sections between Galt Jct. and Cambridge Jct. .	N/A	7.3.1
D11K/D12K	D11K/D12K supplies Enova Power Corp stations, Kitchener MTS#1 and Kitchener MTS#4. Loading violations were observed on these circuits for the loss of companion circuit in the mid-term.	N/A	7.3.2
D10H	The 115 kV D10H circuit between Detweiler TS and Hanover TS supplies loads at Rush MTS, Elmira TS and Palmerston TS with a normally open motorized switch just south of Palmerston TS. During the outage of 115 kV D8S circuit, loading violations were observed on a section of 115 kV D10H circuit in the long term.	N/A	7.3.3
System Reliability, Operation and Load restoration Needs			
M20D/ M21D	For the loss of two elements M20D/M21D on the 230 kV system, the load interrupted by configuration will exceed 600MW based on the peak coincident load, resulting in violation of ORTAC security criteria in the mid-term.	N/A	7.4.1
M20D/M21D	Load restoration violations observed on the M20D/M21D 230 kV circuits	N/A	7.4.1
D6V/ D7V	Marginal load restoration violations were observed for D6V/D7V 230 kV circuits	N/A	7.4.2
Voltage Performance			

M20D/M21D	Several voltage violations were observed in the near term.	N/A	7.4.3

7.1 Asset Renewal Needs for Major HV Transmission Equipment

Hydro One and TWG has identified asset renewal needs for major high voltage transmission equipment that are expected to be replaced over the next 10 years in the **KWCG** Region. The complete list of major HV transmission equipment requiring replacement in the **KWCG** Region is provided in table 4 in this section. Hydro One and Enova Power Corp are the Transmission Asset Owners (TAO) in the Region.

Asset Replacement needs are determined by asset condition assessment. Asset condition assessment is based on a range of considerations such as:

- Equipment deterioration due to aging infrastructure or other factors,
- Technical obsolescence due to outdated design,
- Lack of spare parts availability or manufacturer support, and/or
- Potential health and safety hazards, etc.

The major high voltage equipment information shared and discussed as part of this process is listed below:

- 230/115kV autotransformers
- 230 and 115kV load serving step down transformers
- 230 and 115kV breakers where:
  replacement of six breakers or more than 50% of station breakers, the lesser of the two
- 230 and 115kV transmission lines requiring refurbishment where:
  Leave to Construct (i.e., section 92) approval is required for any alternative to like-for-like
- 230 and 115kV underground cable requiring replacement where:
  Leave to Construct (i.e., section 92) approval is required for any alternative to like-for-like

The Asset renewal assessment considers the following options for “right sizing” the equipment:

- Maintaining the status quo
- Replacing equipment with similar equipment with *lower* ratings and built to current standards
- Replacing equipment with similar equipment with *lower* ratings and built to current standards by transferring some load to other existing facilities
- Eliminating equipment by transferring all the load to other existing facilities
- Replacing equipment with similar equipment and built to current standards (i.e., “like-for-like” replacement)
- Replacing equipment with higher ratings and built to current standards

From Hydro One’s perspective as a facility owner and operator of its transmission equipment, do nothing is generally not an option for major HV equipment due to safety and reliability risk of equipment failure. This also results in increased maintenance cost and longer duration of customer outages.

Table 4: Major HV Transmission Asset assessed for Replacement in the region over the next 10 years

Station/Circuit	Need Description	Planned ISD
Kitchener MTS #5	The existing T10 & T9 83 MVA transformers to be replaced by 100 MVA units	T10-2024 T9-2025
Preston TS	Replacement of existing T3 & T4 transformers with similar size units.	2027
B5C/B6C	Refurbishment of B5C/B6C line between Burlington TS to CTS1.	2025
Scheifele MTS	The existing four transformers are expected to approach end of service life over the next 10 years Horizon	2029-2033

7.1.1 Cedar TS (T7/T8)

Cedar TS is located in the city of Guelph supplying Alectra loads. Cedar T7/T8 is a 115/13.8 kV DESN station with an LTR of 44 MVA (40 MW @ 0.9 PF), and 40 MW of peak load in 2022. Hydro One will continue to monitor the condition of these transformers. Based on asset condition assessment, T7/T8 are expected to reach end of life beyond the 10-year planning horizon. The station capacity need at this station is discussed in Section 7.2.4 of this report.

7.1.2 Fergus TS (T3/T4)

Fergus TS is a 230 kV/ 44 kV single DESN station having two 125 MVA transformers located in the township of Fergus having a supply capacity of 154 MW and supplying 94 MW of loads. The supply capacity of this station is forecasted to be sufficient over the study period and beyond. Based on asset condition assessment, T7/T8 are expected to reach end of life beyond the 10-year planning horizon.

The TWG recommended Hydro One to keep monitoring the condition of these transformers. No further regional planning coordination is required at this time.

7.1.3 Campbell TS (T1/T2) Breakers and Components

Campbell TS is located in the city of Guelph supplying Alectra loads. Campbell TS has two 230/13.8 kV DESNs T1/T2 and T3/T4, having supply capacities of 94 MW and 56 MW respectively. The loads on these two DESNs are currently supplying about 86 MW and 47 MW of loads respectively.

In the previous regional planning RIP report, two feeder breakers and a bus tie breaker for T1/T2 DESN were identified for replacement. Based on asset condition assessment, the equipment at this station are expected to reach end of life within 10 year planning horizon. No further regional coordination is required at this time.

7.1.4 Galt TS Breakers and Components

Galt TS is located in the city of Cambridge supplying Energy + loads in the KWCG region. Galt TS has two 230/ 28-28 kV transformers T7 and T8 of 75/100/125 MVA, currently supplying 115 MW of peak loads. The total supply capacity of Galt TS is 169 MW, expected to be more than adequate over the study period.

The T7/T8 transformers were replaced in 2010 and 2012 respectively due to technical issues with the transformers. The breakers and other component at the station are almost 50 years old. Condition assessment has identified that these older components to be replaced in the long term.

The station cannot be downsized or eliminated because there is no nearby supply station/s having surplus supply capacity for transferring loads. Hydro One will continue monitoring the condition of these components at Galt TS and if required proceed with the replacement plan as required.

7.2 Station Capacity Needs

A 'Station Capacity' assessment was performed over the study period 2023-2032 for the 230kV and 115kV Transforming stations in the KWCG Region using the non-coincident summer peak load forecasts provided by the Technical Working Group. Based on the results, the following Station capacity needs have been identified during the study period:

7.2.1 Preston TS Supply Transformers

Preston TS (DESN) is located in the city of Cambridge supplying Grandbridge energy loads. Preston TS is a single T3/T4 DESN station of 125 MVA transformers with no additional LTR capability available. This station is currently supplying loads to its supply capacity. The non-coincident loads at Preston TS are currently forecasted to reach 242 MW[2] by the end of study period. The replacement of these station supply transformers is underway and forecasted to be completed by Q2 of 2027. Upon completion, the new station LTR is expected to be in the range of 180 MW. The Preston TS loads are currently forecasted to reach this new supply capacity in the in-service timeframe of these new transformers. A near-term solution is required to address this need. The TWG recommends to further review this need in next regional planning phases.

[2] Note: Due to the load limit on M20D/M21D imposed by ORTAC's load security criteria, the coincident peak loading on M20D/M21D is limited to 600 MW forecasted to exceed in 2032.

7.2.2 Energy MTS#1

Energy + MTS#1 is located in the city of Cambridge supplying Grandbridge Energy loads in the KWCG region. This station has an LTR of 102 MW and forecasted to exceed its supply capacity near the end of the study period. The loading at this station will be monitored by Grandbridge Energy and this need will be further assessed in the next regional planning phase. Grandbridge Energy is working on measures to transfer load within the distribution system to Galt TS to address near term loading concerns. Hydro One and Grandbridge will continue to monitor load levels.

7.2.3 Campbell TS Transformer

Campbell TS is located in the city of Guelph supplying Alectra loads. Campbell TS has two 230/13.8 kV DESNs units supplying through T1/T2 and T3/T4 transformers, having supply capacities of 94 MW and 56 MW respectively. These two Campbell TS DESNs are currently supplying about 81 MW and 45 MW of loads respectively and their combined loads at Campbell TS are forecasted to exceed the total station supply capacity close to the end of the study period.

Alectra to propose measures to address capacity needs at this station, if required. Hydro One and Alectra will continue to monitor load levels. The TWG recommends that no further regional coordination is required at this time.

7.2.4 Cedar T1/T2 and T7/T8

Cedar TS is located in the city of Guelph supplying Alectra loads. Cedar TS has two 115/13.8 kV DESN stations T1/T2 and T7/T8 of 75 MVA with a LTR of 115 MVA (103 MW @ 0.9 PF) and 37 MVA with a LTR of 44 MVA (40 MW @ 0.9 PF), currently supplying 82 MW and 40 MW of peak loads respectively. The total load of both DESNs is forecasted to exceed its supply capacity in the near term.

Alectra to propose measures to address this capacity needs, if required. Hydro One and Alectra to continue monitoring load levels. The TWG recommends that no further regional coordination is required at this time.

7.2.5 Kitchener MTS #7

Kitchener MTS #7 is located in the city of Kitchener supplying Enova Power Corp loads. Kitchener MTS #7 is a 115/ 13.8 kV single T13/T14 DESN station having 50 MVA transformers and a LTR of 60 MVA (54 MW @ 0.9 PF). This station is currently supplying 37 MW of peak load. The loads at Kitchener MTS #7 are currently forecasted to grow approaching its supply capacity near the end of the study period.

Enova Power Corp to monitor the loading on this station and manage any overloading through load transfers, if required. The TWG recommends that no further regional coordination is required at this time.

7.2.6 Waterloo North MTS #3

Waterloo North MTS#3 is located in the city of Waterloo supplying Enova Power Corp. Waterloo North MTS#3 is a 230/27.6 kV single T1/T2 DESN station having an LTR of 85MVA. This station is currently supplying 48 MW of peak load. The loads at Waterloo North MTS#3 is currently forecasted to grow approaching its supply capacity near the end of the study period. Enova Power Corp to monitor the loading on this station and manage any overloading in the mid term through load transfers and a new supply station in the long term. The TWG recommends that no further regional coordination is required at this time.

7.2.7 Rush MTS

Rush MTS is located in the city of Waterloo supplying Enova Power Corp loads. Rush MTS is a 115/ 13.8 kV single T1/T2 DESN station having an LTR of 68 MW. This station is currently supplying 50 MW of peak load. The loads at Rush MTS is currently forecasted to grow approaching its supply capacity near the end of the study period. Enova Power Corp to monitor the loading on this station and manage any overloading in the mid term through load transfers and a new supply station in the long term. The TWG recommends that no further regional coordination is required at this time and will be reviewed in next regional planning cycle.

7.3 Transmission Lines Capacity Needs

All line and equipment loads shall be within their continuous ratings with all elements in service and within their long-term emergency ratings with any one element out of service. Immediately following contingencies, lines may be loaded up to their short-term emergency ratings where control actions such as re-dispatch, switching, etc. are available to reduce the loading to the long-term emergency ratings. A Transmission Lines Capacity Assessment was performed over the study period 2023-2032 for the 230kV and 115kV Transmission line circuits in the KWCG Region by assessing thermal limits of the circuit and the voltage range as per ORTAC to cater this need. Based on the results, the following line capacity needs have been identified in the during the study period:

7.3.1 M20D/M21D – 230 kV – Transmission Circuit Supply

The M20D/M21D is a 230kV double circuit line about 58 km long, supplying the following stations:

- Kitchener MTS #6
- Kitchener MTS #8
- Galt TS
- Preston TS
- Energy + Inc.
- A Customer CTS

For the loss of one of the M20D or M21D 230 kV circuits, the loading on the Galt JCT to Cambridge JCT section exceeds its rating starting in 2026 (Summer load forecast). The TWG recommends to further review this need in next regional planning phases.

7.3.2 D11K/D12K

D11K/D12K is a 115 kV line supplying Enova Power Corp stations of Kitchener MTS#1 and Kitchener MTS#4. With the current load forecast on the above stations, these D11K and D12K 115 kV circuits will be experiencing overloading for the loss of companion circuits by the end of the study period (2032). The TWG recommends to further review this need in next regional planning phases.

7.3.3 D10H

The 115 kV D10H circuit between Detweiler TS and Hanover TS supplies loads to Rush MTS and Elmira TS. The D10H circuit has a normally open point just south of Palmerston TS through a motorized disconnect switch for emergency supply to Palmerston TS. The northern section of D10H is supplied from Hanover TS radially supplying Palmerston TS loads. The southern section of D10H is supplied through Detweiler TS radially supplying Enova Power Corp's 34 MW of Elmira TS peak loads. D10H also supplies Rush MTS which has a dual supply through 115 kV D8S circuit from Detweiler TS. For any outage of 115 kV D8S circuit. The D10H line section between Detweiler and Leong Jct is approaching its supply capacity close to the end of the study period.

7.4 System Reliability, Operation and Restoration Needs

The transmission system must be planned to satisfy demand levels up to the extreme weather, median-economic forecast for an extended period with any one transmission element out of service. A study has been performed, considering the net coincident load forecast and the loss of one element over the study period 2023-2032 to cater this need. Based on the results, some system reliability, operating and restoring issues have been identified for this Region.

7.4.1 M20D/M21D Load Security and Restoration Needs

As per the load security criteria (ORTAC Section 7.1), with one element out of service, planned load curtailment or load rejection is permissible only to account for local generation outages; and not more than 150MW of load may be interrupted by configuration, planned load curtailment or rejection. With two elements out of service, not more than 600 MW of load may be interrupted by configuration, planned load curtailment or rejection.

As per the load restoration criteria (ORTAC Section 7.2), interrupted load must be restored within the following timelines:

- Load above 250 MW, within 30 minutes;
- Load above 150 MW, within 4 hours; and
- All load, within 8 hours.

For the loss of double 230kV circuits (M20D/M21D), a total peak coincident load of 638 MW will be interrupted in 2032 by configuration which violates ORTAC load security criteria since not more than 600 MW of load may be interrupted by configuration.

With respect to load restoration, a total of 638 MW (2032 forecast) will be interrupted by configuration, of which, 388 MW needs to be restored within 30 mins as per ORTAC criteria. For a double line fault on Galt Jct. to Preston TS section, only 210 MW (out of the 388MW required to be restored) of that load is restorable. Kitchener MTS#6 and MTS#8 load can be restored via Galt Jct in-line switches and approximately 100 MW of load can be restored at Preston TS. This can be accomplished by opening the M20/211D line disconnect switches at Preston TS and back-feed Preston TS T2 230-115 kV autotransformer to supply load at Preston TS only.

Therefore, the existing restoration capability to loads connected to M20/21D does not meet criteria for the duration of the study period. The TWG recommends to further review this need in next regional planning phases.

7.4.2 D6V/D7V Restorations Needs.

By year 2032, the total peak coincident forecasted load connected to D6V/D7V is 517 MW. Loss of this double circuit line (Tower Contingency) would result in the loss of all 517 MW which is below the ORTAC load security limit. To restore load to these stations, the 230 kV in-line switches will be utilized to isolate the problem and return to service the remaining healthy circuit sections. These switches allow for more flexibility to restore load to the affected stations in a timely fashion. Non-restorable load within 30 minutes is estimated to be about 256 MW. Hence, the load restoration criterion is substantially met. Therefore, no additional transmission restoration capability is warranted at this time, and the loading levels will be monitored.

7.4.3 Voltage Performance

M20D or M21D post contingency voltage change exceeds the 10% pre-tap and 5% post-tap limits on the low voltage side at Preston TS and Energy + Inc MTS within the near-term coincident forecast. The post contingency voltages also drop beyond the allowable voltage range. The situation is further worsened in the subsequent years.

In the midterm, the voltage change limits on the high side of Preston TS, Galt TS and Energy + Inc MTS are violated for the post-contingency loss of M20D or M21D circuits. Voltage also drops below the allowable voltage range. The TWG recommends to further review this need in next regional planning phases.

8. SENSITIVITY ANALYSIS

The objective of a sensitivity analysis is to capture uncertainty in the load forecast as well as variability of electric demand drivers to identify any emerging needs and/or advancement or deferment of recommended investments. The TWG determined that the key electric demand driver in the KWCG region to be considered in this sensitivity analysis is electric vehicle (EV) penetration and unforeseen electrification which would cause the load to increase at a faster rate than shown in the forecast; or the potential delay in some projects which could result in less demand than anticipated.

The TWG reviewed EV scenarios and any unforeseen electrification needs to develop high demand growth forecasts by applying 50% additional growth to the growth rate on the extreme summer corrected Normal Growth net load forecasts. The low growth scenario was obtained by reducing the growth rate by applying -50% growth to the annual growth rate on the extreme summer corrected Normal Growth net load forecasts.

The normal and high growth forecasts are shown in Tables A.1, A.2, A.3 and A.4.

The impact of sensitivity analysis for the high and low growth scenario identified the following updates or new Station/Line capacity needs:

Table 5: Impact of Sensitivity Analysis on Station/Line capacity needs in the region

Sr.no	Need Identified	Normal Growth Scenario	High Growth Scenario	Low Growth Scenario
1	Preston TS- Capacity need	2026	2026	2029
2	Galt TS- Capacity need	Reaches capacity in 2032	2030	Long term
3	Energy Inc MTS - Capacity need	2023	2023	2023
4	Rush MTS - Capacity need	2030	2029	Long term
5	Waterloo North MTS #3 - Capacity need	2030	2030	Long term
6	Campbell TS (T3/T4)- Capacity need	2026	2025	2030
7	Cedar TS (T7/T8)- Capacity need	2024	2024	2024
8	Cedar TS (T1/T2)- 115kV- Capacity need	2031	2029	Long term
9	Kitchener MTS#7	2031	2030	Long term
10	M20D/M21D Transmission Circuit Supply	2026	2024	2026
11	D11K/D12K- Transmission Circuit Supply	2032	2030	Long term
12	D10H - Transmission Circuit Supply	Long term	2030	Long term
13	M20D/M21D Load Security	2032	2028	Long term
14	M20D/M21D Restoration Needs	2025	2023	2025
15	D6V/D7V Restoration Needs	Long term	2030	Long term
16	Voltage change violation on M20D/M21D	2026	2025	2026

The sensitivity analysis identified the additional capacity needs towards the end of the study period and advanced the triggering date of all the needs. These needs will be assessed again during the next phases of this Regional Planning cycle.

The 2022 forecast from last year's RIP aligns with the actual 2022 loading. Therefore, the high growth scenario can be discounted for now, and monitoring the load growth is recommended.

9. CONCLUSION AND RECOMMENDATION

The Technical Working Group's recommendations to address the needs identified are as follows:

Table 7: Needs which do not require regional coordination

Sr.no.	Need	Recommendation
1	Campbell TS (T3/T4) Station Capacity	LDC to propose measures to address capacity needs, if required, Hydro One and Alectra to continue to monitor load levels.
2	Cedar TS (T1/T2) Station Capacity	LDC to propose measures to address capacity needs, if required, Hydro One and Alectra to continue to monitor load levels.
3	Kitchener MTS #7 Station Capacity	LDC to monitor load levels and manage any overloading through load transfers.
4	Cedar TS (T7/T8) Station Capacity	LDC to propose measures to address capacity needs, if required. Hydro One and Alectra to continue to monitor load levels. Advancing and upsizing Cedar transformers is also being considered as an option
5	Waterloo North MTS #3 Station Capacity	LDC to monitor the loading on this station and manage any overloading in the mid term through load transfers and a new supply station in the long term.
6	Rush MTS Station Capacity	LDC to monitor the loading on this station and manage any overloading in the mid term through load transfers and a new supply station in the long term.

Table 8: Needs which require further regional coordination

Sr.no.	Need	Recommendation
1	Preston TS Station Capacity	To be further assessed in the next RP phases. Hydro One and Grandbridge Energy to keep monitoring load levels
2	Energy Inc MTS Station Capacity	To be further assessed in the next RP phases. Grandbridge Energy to monitor load levels

3	Overload - M20D/M21D post contingency capacity violation (Galt Jct x Cambridge #1 Jct)-	To be further assessed in the next RP phases.
4	System security violation - M21D/M20D 230 kV circuits	To be further assessed in the next RP phases.
5	Voltage violations – On 230 kV M20D or M21D circuit for loss of companion circuit.	To be further assessed in the next RP phases.
6	Load restorations -M20D or M21D due to single tower outage	To be further assessed in the next RP phases.
7	Overload - D11K/D12K 115 kV circuits experience post contingency violation (Detweiler TS x Kitchener MTS#1 & #4 Jct.)	To be further assessed in the next phases. Enova Power Corp to explore load transfers between their stations. H1 and Enova Power Corp to monitor load levels.

List of LDC(s) to be involved in further regional planning activities:

- Grandbridge Energy
- Enova Power Corp.

List of LDC(s) which are not required to be involved in further regional planning phases: (if any)

- Hydro One Networks Inc. (Distribution)
- Alectra Inc.
- Center Wellington Hydro
- Halton Hills Hydro Inc.
- Wellington North Power

10. REFERENCES

[1] Independent Electricity System Operator, Ontario Resource and Transmission Assessment Criteria (issue 5.0 August 22, 2007)

[2] Ontario Energy Board, Transmission System Code (issue July 14, 2000 rev. August 2, 2023)

[3] Ontario Energy Board, Distribution system Code (issue July 14, 2000 rev. March 27, 2024)

[4] Ontario Energy Board, Load Forecast Guideline for Ontario (issue October 13, 2022)

Appendix A: Extreme Summer Weather Adjusted Net Load Forecast

Table A.1: KWCG Region – Non-Coincident- Normal Growth Net Load Forecast

Station/DESN	LTR (MW)	Historical (MW)	Summer Net Forecast (MW)									
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Arlen MTS	45.0	35.1	34.2	17.8	20.1	21.8	22.6	23.8	24.6	26.0	27.3	28.6
Campbell TS (T1/T2)	94.1	81.2	86.1	87.3	88.3	89.1	88.8	89.2	89.2	89.5	90.0	91.0
Campbell TS (T3/T4)	56.3	45.7	46.9	54.2	56.2	56.7	56.8	57.3	57.6	58.1	58.7	59.3
Cedar TS (T1/T2)	103.3	82.5	89.0	90.7	92.0	94.8	95.8	97.6	99.1	101.3	103.5	105.4
Cedar TS (T7/T8)	39.9	40.7	45.0	46.8	48.3	50.6	51.2	52.1	52.9	54.0	55.1	56.0
Elmira TS	55.0	36.7	33.8	33.9	34.0	34.2	34.2	36.4	36.5	36.7	37.0	37.3
Energy Inc(Cam) MTS#1	101.7	115.2	125.5	130.5	135.6	141.3	146.3	152.5	158.5	164.9	172.4	179.7
Fergus TS	153.5	91.0	93.9	95.9	98.6	101.9	104.9	108.3	110.7	113.5	117.7	120.0
Galt TS	169.4	113.6	117.0	121.9	126.7	132.1	136.7	142.5	148.1	154.6	161.5	168.4
Hanlon TS	42.9	25.7	27.9	28.7	29.2	30.1	30.8	31.7	32.4	33.6	34.7	36.2
Kitchener MTS # 1	54.0	26.1	27.5	28.9	30.2	31.7	34.2	36.9	39.6	42.2	45.1	47.9
Kitchener MTS # 3	108.0	55.1	48.2	59.1	60.1	61.3	63.0	65.2	67.2	85.0	95.9	98.2
Kitchener MTS # 4	90.0	58.6	71.8	63.1	64.4	65.9	68.2	71.0	73.6	76.3	79.3	82.2
Kitchener MTS#5	79.7	72.0	58.1	77.2	78.4	80.0	91.4	94.8	97.7	100.6	98.5	102.5
Kitchener MTS#6	90.0	57.0	64.7	61.1	62.3	63.6	65.7	68.1	70.4	72.7	75.4	78.0
Kitchener MTS#7	54.0	37.4	39.8	40.6	41.7	43.0	44.9	47.2	49.4	51.6	54.1	56.5
Kitchener MTS#8	54.0	36.2	36.5	40.0	41.6	43.3	46.5	50.1	53.5	41.1	44.7	48.3
Kitchener MTS#9	90.0	32.3	20.3	28.7	29.5	30.3	37.5	38.9	40.3	41.7	43.2	44.7
Preston TS[3]	112.5	102.4	109.8	135.5	144.5	190.1	198.0	206.4	214.4	223.0	233.0	242.8
Puslinch DS	56.3	32.7	39.6	40.3	41.0	41.8	42.3	43.0	43.7	44.4	45.4	46.2
Rush MTS	67.5	50.6	54.7	55.6	56.6	57.8	58.6	62.0	65.3	69.4	73.7	78.0
Scheifele MTS (T3/T4)	99.0	83.6	89.7	91.3	92.9	94.9	96.1	101.9	107.3	114.0	113.7	110.1
Scheifele MTS (T1/T2)	62.1	50.5	54.0	55.0	56.0	57.1	57.9	61.4	64.7	58.0	54.8	58.8
Waterloo North MTS#3	76.5	48.4	52.6	53.5	54.5	55.6	56.3	59.7	62.9	77.4	86.0	90.3
Wolverton DS	54.4	18.2	18.2	18.7	19.1	19.7	20.0	20.6	21.0	21.6	22.2	22.8
CTS 1		4.2	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
CTS 2		5.6	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Snyder MTS	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	20.6

[3] Upon completion of an on-going project, the new station LTR is expected to be in the range of 180 MW.

Table A.2:KWCG Region – Coincident – Normal Growth Net Load Forecast

Station/DESN	LTR	Historical	Summer Net Forecast									
	(MW)	(MW)	(MW)									
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Arlen MTS	45.0	30.0	34.2	17.8	20.1	21.8	22.6	23.8	24.6	26.0	27.3	28.6
Campbell TS (T1/T2)	94.1	81.2	86.1	87.3	88.3	89.1	88.8	89.2	89.2	89.5	90.0	91.0
Campbell TS (T3/T4)	56.3	43.0	44.0	50.8	52.8	53.3	53.3	53.8	54.1	54.5	55.2	55.7
Cedar TS (T1/T2)	103.3	57.1	61.6	62.7	63.6	65.6	66.2	67.5	68.6	70.0	71.6	73.0
Cedar TS (T7/T8)	39.9	40.4	44.6	46.3	47.9	50.1	50.7	51.7	52.4	53.5	54.6	55.5
Elmira TS	55.0	36.7	33.6	33.7	33.8	34.0	34.0	36.2	36.3	36.5	36.8	37.1
EnergyInc(Cam) MTS#1	101.7	95.8	105.0	109.2	113.5	118.3	122.4	127.6	132.6	138.0	144.3	150.5
Fergus TS	153.5	86.2	88.1	89.9	92.5	95.6	98.5	101.6	103.9	106.5	110.6	112.9
Galt TS	169.4	83.8	91.5	95.4	99.2	103.4	107.0	111.6	116.0	121.2	126.6	132.1
Hanlon TS	42.9	24.3	26.4	27.1	27.6	28.5	29.1	30.0	30.6	31.8	32.8	34.2
Kitchener MTS # 1	54.0	25.1	26.4	27.8	29.1	30.5	32.9	35.5	38.1	40.6	43.4	46.1
Kitchener MTS # 3	108.0	51.8	45.3	55.5	56.4	57.6	59.2	61.2	63.1	79.8	90.1	92.2
Kitchener MTS # 4	90.0	53.9	66.1	58.1	59.3	60.7	62.8	65.4	67.8	70.3	73.0	75.7
Kitchener MTS#5	79.7	65.8	53.0	70.4	71.6	73.0	83.5	86.6	89.2	91.8	90.0	93.6
Kitchener MTS#6	90.0	49.5	56.2	53.0	54.0	55.2	57.0	59.1	61.1	63.2	65.5	67.7
Kitchener MTS#7	54.0	34.4	36.6	37.3	38.4	39.5	41.4	43.5	45.5	47.5	49.8	52.0
Kitchener MTS#8	54.0	32.7	32.8	36.0	37.4	39.0	41.9	45.1	48.2	37.0	40.3	43.5
Kitchener MTS#9	90.0	29.2	17.7	25.3	26.0	26.7	33.7	35.1	36.3	37.5	39.0	40.3
Preston TS[3]	112.5	98.8	108.3	133.7	142.6	187.6	195.4	203.7	211.6	220.1	229.9	239.6
Puslinch DS	56.3	32.1	38.9	39.5	40.2	41.0	41.5	42.2	42.9	43.6	44.5	45.4
Rush MTS	67.5	46.3	50.0	50.9	51.8	52.9	53.6	56.8	59.8	63.5	67.5	71.4
Scheifele MTS (T3/T4)	99.0	75.2	80.6	82.0	83.5	85.2	86.4	91.5	96.4	102.4	102.2	98.9
Scheifele MTS (T1/T2)	62.1	49.6	53.0	54.0	54.9	56.1	56.8	60.2	63.5	57.0	53.8	57.7
Waterloo North MTS#3	76.5	43.0	46.4	47.3	48.1	49.1	49.8	52.7	55.5	68.3	75.9	79.7
Wolverton DS	54.4	13.2	14.4	14.8	15.1	15.5	15.8	16.3	16.6	17.1	17.6	18.1
CTS 1		2.1	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
CTS 2		2.9	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Snyder MTS	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	20.6

[3]Upon completion of an on-going project, the new station LTR is expected to be in the range of 180 MW.

Table A.3: KWCG Region Non-Coincident – High Growth Net Load Forecast

Station/DESN	LTR (MW)	Historical (MW)	Summer Net Forecast (MW)									
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Arlen MTS	45	35.1	34.2	17.8	21.2	23.8	25.0	26.8	28.1	30.1	32.0	34.0
Campbell TS (T1/T2)	94.1	81.2	86.1	87.3	88.7	90.0	89.6	90.1	90.2	90.5	91.3	92.9
Campbell TS (T3/T4)	56.3	45.7	46.9	54.2	57.1	58.0	58.1	58.8	59.3	60.0	61.0	61.8
Cedar TS (T1/T2)	103.3	82.5	89.0	90.7	92.7	96.8	98.3	101.1	103.3	106.6	109.9	112.8
Cedar TS (T7/T8)	39.9	40.7	45.0	46.8	49.1	52.5	53.4	54.8	55.9	57.6	59.3	60.7
Elmira TS	55	36.7	33.8	33.9	34.1	34.4	34.3	37.7	37.9	38.1	38.6	39.0
EnergyInc(Cam) MTS#1	101.7	115.2	125.5	130.5	138.2	146.8	154.2	163.5	172.5	182.1	193.3	204.4
Fergus TS	153.5	91.0	93.9	95.9	100.0	105.0	109.5	114.5	118.1	122.3	128.6	132.1
Galt TS	169.4	113.6	117.0	121.9	129.1	137.2	144.1	152.9	161.3	171.0	181.4	191.7
Hanlon TS	42.9	25.7	27.9	28.7	29.4	30.8	31.8	33.3	34.2	36.1	37.6	39.9
Kitchener MTS # 1	54	26.1	27.5	28.9	30.9	33.0	36.8	40.9	44.9	48.9	53.2	57.4
Kitchener MTS # 3	108	55.1	48.2	59.1	60.6	62.4	65.0	68.3	71.2	98.0	114.4	117.8
Kitchener MTS # 4	90	58.6	71.8	63.1	65.0	67.3	70.8	75.0	78.9	83.0	87.5	91.8
Kitchener MTS#5	79.7	72.0	58.1	77.2	79.1	81.4	98.6	103.7	107.9	112.3	109.2	115.1
Kitchener MTS#6	90	57.0	64.7	61.1	62.9	64.9	67.9	71.7	75.1	78.6	82.5	86.4
Kitchener MTS#7	54	37.4	39.8	40.6	42.3	44.2	47.1	50.6	53.8	57.2	60.9	64.4
Kitchener MTS#8	54	36.2	36.5	40.0	42.4	45.0	49.8	55.1	60.2	41.7	47.1	52.5
Kitchener MTS#9	90	32.3	20.3	28.7	29.9	31.2	41.8	44.1	46.1	48.2	50.5	52.7
Preston TS[3]	112.5	102.4	109.8	135.5	149.0	217.3	229.3	241.8	253.9	266.8	281.7	296.5
Puslinch DS	56.3	32.7	39.6	40.3	41.3	42.5	43.2	44.4	45.4	46.5	47.9	49.2
Rush MTS	67.5	50.6	54.7	55.6	57.1	58.9	60.0	65.2	70.2	76.2	82.8	89.2
Scheifele MTS (T3/T4)	99	83.6	89.7	91.3	93.7	96.7	98.6	107.1	115.3	125.3	124.9	119.5
Scheifele MTS (T1/T2)	62.1	50.5	54.0	55.0	56.5	58.2	59.4	64.5	69.5	59.6	54.7	60.7
Waterloo North MTS#3	76.5	48.4	52.6	53.5	54.9	56.6	57.8	62.8	67.6	89.3	102.2	108.7
Wolverton DS	54.4	18.2	18.2	18.7	19.4	20.2	20.7	21.5	22.2	23.0	24.0	24.9
CTS 1		4.2	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
CTS 2		5.6	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Snyder MTS	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10	20.6

[3] Upon completion of an on-going project, the new station LTR is expected to be in the range of 180 MW.

Table A.4: KWCG Region – Coincident – High Growth Net Load Forecast

Station/DESN	LTR (MW)	Historical (MW)	Summer Net Forecast (MW)									
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Arlen MTS	45.0	30.0	34.2	17.8	21.2	23.8	25.0	26.8	28.1	30.1	32.0	34.0
Campbell TS (T1/T2)	94.1	81.2	86.1	87.3	88.7	90.0	89.6	90.1	90.2	90.5	91.3	92.9
Campbell TS (T3/T4)	56.3	43.0	44.0	50.8	53.7	54.5	54.6	55.3	55.7	56.4	57.4	58.1
Cedar TS (T1/T2)	103.3	57.1	61.6	62.7	64.1	67.0	68.0	69.9	71.5	73.7	76.0	78.1
Cedar TS (T7/T8)	39.9	40.4	44.6	46.3	48.6	52.0	52.9	54.3	55.4	57.1	58.7	60.1
Elmira TS	55.0	36.7	33.6	33.7	33.9	34.2	34.1	37.5	37.6	37.9	38.4	38.8
EnergyInc(Cam) MTS#1	101.7	95.8	105.0	109.2	115.6	122.8	129.1	136.9	144.4	152.5	161.9	171.2
Fergus TS	153.5	86.2	88.1	89.9	93.8	98.5	102.7	107.5	110.9	114.9	121.0	124.3
Galt TS	169.4	83.8	91.5	95.4	101.0	107.4	112.9	119.7	126.3	134.1	142.3	150.4
Hanlon TS	42.9	24.3	26.4	27.1	27.8	29.2	30.1	31.4	32.3	34.1	35.6	37.7
Kitchener MTS # 1	54.0	25.1	26.4	27.8	29.7	31.8	35.4	39.4	43.2	47.1	51.2	55.2
Kitchener MTS # 3	108.0	51.8	45.3	55.5	56.9	58.6	61.0	64.1	66.9	92.0	107.4	110.6
Kitchener MTS # 4	90.0	53.9	66.1	58.1	59.9	61.9	65.2	69.1	72.7	76.4	80.5	84.5
Kitchener MTS#5	79.7	65.8	53.0	70.4	72.2	74.3	90.0	94.7	98.6	102.5	99.7	105.1
Kitchener MTS#6	90.0	49.5	56.2	53.0	54.6	56.4	59.0	62.2	65.2	68.2	71.7	75.0
Kitchener MTS#7	54.0	34.4	36.6	37.3	38.9	40.6	43.4	46.6	49.6	52.6	56.1	59.3
Kitchener MTS#8	54.0	32.7	32.8	36.0	38.2	40.5	44.9	49.7	54.3	37.5	42.5	47.3
Kitchener MTS#9	90.0	29.2	17.7	25.3	26.3	27.5	38.0	40.0	41.8	43.7	45.8	47.8
Preston TS[3]	112.5	98.8	108.3	133.7	147.0	214.5	226.3	238.6	250.6	263.3	278.0	292.6
Puslinch DS	56.3	32.1	38.9	39.5	40.5	41.7	42.4	43.6	44.6	45.6	47.0	48.3
Rush MTS	67.5	46.3	50.0	50.9	52.3	53.9	55.0	59.7	64.3	69.8	75.8	81.6
Scheifele MTS (T3/T4)	99.0	75.2	80.6	82.0	84.2	86.9	88.6	96.3	103.6	112.6	112.3	107.4
Scheifele MTS (T1/T2)	62.1	49.6	53.0	54.0	55.4	57.2	58.3	63.4	68.2	58.5	53.7	59.6
Waterloo North MTS#3	76.5	43.0	46.4	47.3	48.5	50.0	51.0	55.4	59.7	78.9	90.3	96.0
Wolverton DS	54.4	13.2	14.4	14.8	15.3	15.9	16.4	17.0	17.6	18.2	19.0	19.7
CTS 1		2.1	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
CTS 2		2.9	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Snyder MTS	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	20.6

[3]Upon completion of an on-going project, the new station LTR is expected to be in the range of 180 MW.

Appendix B: Lists of Step-Down Transformer Stations

Sr. No.	Transformer Station	Voltage (kV)	Supply Circuits
1.	Arlen MTS	115	B5C/B6C
2.	Campbell TS (T1/T2)	230	D6V/D7V
3.	Campbell TS (T3/T4)	230	D6V/D7V
4.	Cedar TS (T1/T2)	115	B5C/B6C
5.	Cedar TS (T7/T8)	115	B5C/B6C
6.	Elmira TS	115	D10H
7.	Energy+ MTS #1	230	M20D/M21D
8.	Fergus TS	230	D6V/D7V
9.	Galt TS	230	M20D/M21D
10.	Hanlon TS	115	B5C/B6C
11.	Kitchener MTS # 1	115	D11K/D12K
12.	Kitchener MTS # 3	115	D7F/D9F
13.	Kitchener MTS # 4	115	D11K/D12K
14.	Kitchener MTS #5	115	F11C/F12C
15.	Kitchener MTS #6	230	M20D/M21D
16.	Kitchener MTS #7	115	D7F/D9F
17.	Kitchener MTS #8	230	M20D/M21D
18.	Kitchener MTS #9	230	D4W/D5W
19.	Preston TS	230	M20D/M21D
20.	Puslinch DS	115	B5C/B6C
21.	Rush MTS	115	D10H/D8S
22.	Scheifele MTS	230	D6V/D7V
23.	Waterloo North MTS#3	230	D6V/D7V
24.	Wolverton DS	115	D7F/D9F
25.	CTS - 1	230	M20D/M21D
26.	CTS - 2	115	B5C/B6C

Appendix C: Lists of Transmission Circuits

Sr. No.	Connecting Stations	Circuit ID	Voltage (kV)
1.	D6V/ D7V	Detweiler TS	Orangeville TS
2.	M20D/ M21D	Detweiler TS	Middleport TS
3.	D4W/ D5W	Detweiler TS	Buchanan TS
4.	B22D/ B23D	Detweiler TS	Bruce TS
5.	D7F/ D9F	Detweiler TS	Free Port SS
6.	F11C/ F12C	Free Port SS	Cedar TS
7.	B5C/ B6C	Cedar TS	Burlington TS
8.	D11K/ D12K	Detweiler TS	Kitchener MTS #4
9.	D8S	Detweiler TS	St. Mary TS
10.	D10H	Detweiler TS	Hanover TS

Appendix D: List of LDC's

Sr. no.	Name of LDC
1	Energy + Inc
2	Alectra
3	H1 Distribution
4	Enova Power Corp
5	Centre Wellington Hydro
6	Halton Hills Hydro
7	Milton Hydro
8	Wellington North Power Inc

Appendix E: List of Municipalities in the region

Sr. no.	Name of Municipality
1	Township of Blandford-Blenheim
2	City of Cambridge
3	City of Kitchener
4	City of Waterloo
5	Regional Municipality of Waterloo
6	Township of North Dumfries
7	Township of Wellesley
8	Township of Wilmot
9	Township of Woolwich
10	Region of Waterloo
11	City of Guelph
12	County of Wellington
13	Township of Centre Wellington
14	Township of Puslinch
15	County of Perth
16	Town of St. Marys

Appendix F: Acronyms

Acronym	Description
A	Ampere
BES	Bulk Electric System
BPS	Bulk Power System
CDM	Conservation and Demand Management
CEP	Community Energy Plan
CIA	Customer Impact Assessment
CGS	Customer Generating Station
CSS	Customer Switching Station
CTS	Customer Transformer Station
DESN	Dual Element Spot Network
DG	Distributed Generation
DS	Distribution Station
GS	Generating Station
HV	High Voltage
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
kV	Kilovolt
LDC	Local Distribution Company
LP	Local Plan
LTE	Long Term Emergency
LTR	Limited Time Rating
LV	Low Voltage
MEP	Municipal Energy Plan
MTS	Municipal Transformer Station
MW	Megawatt
MVA	Mega Volt-Ampere
MVAR	Mega Volt-Ampere Reactive
NA	Needs Assessment
NERC	North American Electric Reliability Corporation
NGS	Nuclear Generating Station
NPCC	Northeast Power Coordinating Council Inc.
NUG	Non-Utility Generator
OEB	Ontario Energy Board

ORTAC	Ontario Resource and Transmission Assessment Criteria
PF	Power Factor
PPWG	Planning Process Working Group
RIP	Regional Infrastructure Plan
SA	Scoping Assessment
SIA	System Impact Assessment
SPS	Special Protection Scheme
SS	Switching Station
STG	Steam Turbine Generator
TS	Transformer Station