EXHIBIT 2 – RATE BASE

EXHIBIT 2 – RATE BASE

Table of Contents

RATE BASE

Overview

The following Exhibit contains both details and analysis of London Hydro's rate base for the years 2013 Actual, 2013 Board Approved, 2014 Actual, 2015 Actual, 2016 Bridge Year, and 2017 Test Year. Actuals for 2012 are also included in the Capital Expenditures section (Page 34). Rate base has been calculated in accordance with the OEB's Filing Requirements for Electricity Distribution Rate Applications – 2016 Edition for 2017 Rate Applications, issued on July 14, 2016.

London Hydro's 2017 Cost of Service Rate Application, like its 2013 Application, has been filed in accordance with Modified International Financial Reporting Standards ("MIFRS"). All schedules and number references in this Application are in accordance with MIFRS. For external financial statement purposes, London Hydro implemented International Financial Reporting Standards ("IFRS") effective January 1, 2015. The Company had previously chosen to accept the available deferral to IFRS due to issues surrounding rate-regulated accounting for regulatory assets and liabilities, which have now been temporarily resolved. For rate-making purposes, London Hydro, in essence, moved to MIFRS effective January 1, 2012. This early adoption was accomplished by implementing required MIFRS changes acceptable under the CGAAP accounting standard. Accordingly, the transition to IFRS has no impact for rate-making purposes.

The net fixed assets include those distribution assets that are associated with the delivery of electricity to the inhabitants of the City of London. London Hydro's rate base calculation excludes any non-distribution assets, work-in-progress as well as inventory held for capital projects. Controllable expenses used in the calculation of the working capital allowance include operations and maintenance, billing and collections, community relations, eligible donations, and administration expenses.

Table 2-1 below presents a summary of London Hydro's rate base for the 2013 Board Approved Year, 2013-2015 Historical Years, 2016 Bridge Year, and 2017 Test Year. Rate base for the 2017 Test Year is calculated at $301,746,404.

Note that the gross fixed assets and accumulated depreciation balances used in London Hydro's rate base calculation correspond directly to the Fixed Asset Continuity Schedules that can be found in Appendix 2-1, within this Exhibit.

Table 2-1 – Summary of Rate Base

SUMMARY OF RATE BASE	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 Board Approved to 2017 Test	CAGR
	$	$	$	$	$	$	$	%
Opening Balance, January 1	223,433,727	222,156,052	228,404,051	235,609,045	247,353,386	258,767,468	36,611,416	3.9%
Closing Balance, December 31	228,404,051	230,954,219	235,609,045	247,353,386	258,510,661	268,869,300	37,915,081	3.9%
1576 CGAAP to IFRS Adjustment	471,922	471,922	393,268	275,288	157,307		(471,922)	-100.0%
Adjusted Closing Balance, December 31	228,875,973	231,426,141	236,002,313	247,628,674	258,667,968	268,869,300	37,443,159	3.8%
Net Fixed Assets (Average)	226,154,850	227,027,058	232,439,143	241,815,493	253,148,321	263,768,634	36,741,576	3.8%
Allowance for Working Capital	42,538,003	41,958,198	45,338,048	47,397,023	51,285,613	37,977,770	(3,980,428)	-2.5%
Rate Base	**268,692,852**	**268,985,256**	**277,777,190**	**289,212,516**	**304,433,933**	**301,746,404**	**32,761,148**	**2.9%**
Annual Change		292,403	8,791,935	11,435,326	15,221,417	(2,687,529)		
Annual Change %		0.1%	3.3%	4.1%	5.3%	-0.9%	**12.2%**	

Total rate base has increased by $32,761,148 between the 2013 Board Approved amounts and the 2017 Test Year, representing a total increase of 12.2% or a 2.9% compound annual growth rate (CAGR). (Note: The 2016 closing balance differs from the 2017 opening balance by $256,807. This amount represents the net book value of the renewable connection and smart grid regulatory deferral accounts, budgeted to be brought into rate base on January 1, 2017). Details of this transfer are shown in Table 2-2 below. More information about the transfer of these regulatory deferral accounts can be found in Exhibit 9, "Deferral and Variance Accounts".

Details regarding the calculation of working capital allowance can be found on Page 32 within this Exhibit.

Fixed Asset Continuity Schedules

London Hydro has completed Fixed Asset Continuity Schedules, in accordance with Appendix 2-BA of the Filing Requirements, for each of the following years: 2013 Board Approved, 2013 Actuals, 2014 Actuals, 2015 Actuals, 2016 Bridge and 2017 Test Year. Refer to Table 2-2 below for a summary of those continuity schedules. Individual schedules can be found at the end of this Exhibit, Appendix 2-1.

Table 2-2 – Summary of Continuity Schedules

SUMMARY OF FIXED ASSET CONTINUITY SCHEDULES	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$
Gross Fixed Assets						
Opening balance	414,817,196	413,940,268	415,328,059	429,305,453	433,843,637	451,710,106
Transfer regulatory deferrals Jan 1, 2017	-	-	-	-	-	438,897
Additions	21,772,739	25,153,400	24,651,127	29,237,293	29,800,000	28,092,000
Disposals	(21,261,877)	(12,022,015)	(10,673,733)	(24,699,109)	(11,933,531)	(10,921,994)
Closing balance (excluding WIP)	415,328,059	427,071,653	429,305,453	433,843,637	451,710,106	469,319,009
Average Gross Fixed Assets	415,072,627	420,505,960	422,316,756	431,574,545	442,776,871	460,734,006
Accumulated Depreciation						
Opening balance	191,383,469	191,784,216	186,924,008	193,696,409	186,490,251	193,199,445
Transfer regulatory deferrals Jan 1, 2017	-	-	-	-	-	182,089
Additions	16,746,338	16,365,169	17,423,639	17,492,952	18,642,725	17,984,944
Disposals	(21,205,799)	(12,031,951)	(10,651,238)	(24,699,109)	(11,933,531)	(10,916,770)
Closing balance	186,924,008	196,117,434	193,696,409	186,490,251	193,199,445	200,449,709
Average Accumulated Depreciation	189,153,738	193,950,825	190,310,208	190,093,330	189,844,848	196,915,622
Net Fixed Assets	**228,404,051**	**230,954,219**	**235,609,045**	**247,353,386**	**258,510,661**	**268,869,300**

Table 2-3 below reconciles the change in Accumulated Depreciation, shown above, to the annual depreciation expense (as reported in Exhibit 4, Page 379).

Table 2-3 – Reconciliation of Change in Accumulated Depreciation to Depreciation Expense

DEPRECIATION EXPENSE RECONCILIATION 2013 - 2017	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$
Change in Accumulated Depreciation	16,746,338	16,365,169	17,423,639	17,492,952	18,642,725	17,984,944
Add: Amortization of 1576 MIFRS Transition	78,654	117,981	117,981	117,981	118,000	-
Less: V&E (included in OH Allocation)	(726,900)	(726,800)	(814,974)	(865,252)	(1,019,430)	(1,076,551)
Less: Deferred Revenue	-	-	20,811	78,721	167,569	219,919
Depreciation Expense	**16,098,091**	**15,756,350**	**16,747,457**	**16,824,401**	**17,908,864**	**17,128,312**

Gross Assets – Property, Plant and Equipment and Accumulated Depreciation

Below are the details of London Hydro's Gross Asset and Accumulated Depreciation balances for the 2013 Board Approved Year, 2013-2015 Historical Years, 2016 Bridge Year, and 2017 Test Year. This information is captured in the following tables:

- Table 2-4 – Gross Asset Balances 2013 to 2017 – Page 8
- Table 2-11 – Accumulated Depreciation Balances 2011 to 2013 – Page 29

These tables break down gross assets and accumulated depreciation first by function and then further by major plant account.

The gross assets and accumulated depreciation are broken down into the following four functions:

- Distribution Plant Asset Accounts include the Uniform System of Accounts (USoA) accounts 1805 – 1860
- General Plant Asset Accounts include the USoA accounts 1908 – 1980 (excluding 1920)
- Information Systems Asset Accounts include the USoA accounts 1920 and 1611 (formerly 1925)
- Contributions and grants include the USoA accounts 1995 and 2440

For each of these functionalized plant items, a detailed breakdown by major plant account is provided. Each plant item is accompanied by a description in accordance with the Board's USoA, including the 2017 test year, per Filing Requirement 2.2.1.2.

Variance Analysis of Gross Asset Balances

London Hydro's gross asset balances are projected to be $469,319,009 at the end of the 2017 Test Year, representing an increase of $42,247,356 between the 2013 Board Approved Year and 2017. Significant annual variances broken down by function are discussed below.

Table 2-4 – Gross Asset Balances 2013 to 2017

GROSS ASSET BALANCES 2013 TO 2017	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 OEB Approved to 2017 Test
	$	$	$	$	$	$	$
Distribution Plant							
1805 Land - Substations	385,690	385,690	385,690	385,690	385,690	385,690	(0)
1806 / 1612 Land Rights	366,233	322,234	383,514	414,759	414,759	414,759	92,525
1808 Buildings - Substations	1,128,336	1,278,336	1,128,336	1,128,336	1,168,336	1,210,336	(68,000)
1820 /1610 Substation Equipment	17,123,890	16,739,536	17,396,761	17,563,552	17,679,652	17,794,152	1,054,616
1830 Poles, Towers & Fixtures	39,738,167	41,493,467	41,662,934	43,125,558	45,079,658	47,273,458	5,779,991
1835 OH Conductors & Devices	55,136,846	55,679,739	58,467,100	61,194,389	64,476,589	67,987,489	12,307,750
1840 UG Conduit	35,698,363	35,319,448	38,211,108	43,296,851	47,849,151	52,171,051	16,851,604
1845 UG Conductor & Devices	101,576,155	109,523,965	96,726,669	90,803,781	90,510,422	92,535,816	(16,988,149)
1850 Line Transformers	79,632,662	77,245,338	83,540,538	89,220,013	93,490,013	97,784,813	20,539,475
1855 Services (OH & UG)	24,720,934	22,381,015	27,008,301	29,459,220	30,974,120	32,569,920	10,188,905
1860 Meters	25,081,481	25,318,013	25,774,558	26,831,646	27,925,246	29,038,746	3,720,734
	380,588,758	385,686,781	390,685,509	403,423,795	419,953,636	439,166,230	53,479,450
General Plant							
1908 Buildings & Fixtures	22,091,652	23,749,979	22,780,090	23,396,955	24,500,503	23,096,571	(653,408)
1910 Leasehold Improvements	-	-	-	-	-	-	-
1915 Office Furniture & Equipment	731,859	922,307	732,848	520,905	797,931	860,704	(61,603)
1930 Transportation Equipment	11,472,907	11,602,662	11,826,499	12,813,264	13,219,310	13,589,831	1,987,169
1935 Stores Equipment	278,138	266,776	273,759	267,598	345,540	234,972	(31,804)
1940 Tools, Shop & Garage Equipment	1,023,409	1,204,152	1,040,004	941,130	989,586	1,020,795	(183,357)
1945 Measurement & Testing Equipment	119,614	156,864	202,476	516,606	726,606	865,590	708,726
1950 Power Operated Equipment	931,471	1,214,137	951,281	1,032,283	1,032,283	1,106,979	(107,158)
1955 Communication Equipment	3,756,098	3,788,534	3,992,791	4,064,185	4,834,685	5,582,185	1,793,651
1960 Miscellaneous Equipment	-	-	-	4,039	4,039	4,039	4,039
1980 System Supervisory Equipment	2,154,497	3,300,223	2,439,074	3,385,233	3,716,233	4,006,818	706,595
	42,559,643	46,205,634	44,238,822	46,942,197	50,166,717	50,368,484	4,162,850
Information Systems							
1920 Computer - Hardware	3,200,325	2,640,094	3,381,156	2,523,106	1,763,237	632,829	(2,007,265)
1925 /1611 Computer - Software	28,241,375	30,301,668	32,132,701	25,875,825	26,834,803	28,260,752	(2,040,916)
	31,441,700	32,941,762	35,513,857	28,398,931	28,598,040	28,893,581	(4,048,182)
Total Gross Balance before Contributed Capital	**454,590,101**	**464,834,177**	**470,438,188**	**478,764,923**	**498,718,392**	**518,428,295**	**53,594,118**
1995 /2440 Contributions and Grants	(39,262,043)	(37,762,524)	(41,132,735)	(44,921,286)	(47,008,286)	(49,109,286)	(11,346,762)
	415,328,059	**427,071,653**	**429,305,453**	**433,843,637**	**451,710,106**	**469,319,009**	**42,247,356**

2013 Board Approved vs. 2013 Actuals

In 2013, London Hydro's gross asset balances were lower than 2013 Board Approved amounts by $11,743,594, or 2.8%. See Table 2-5 below for breakdown of gross asset balances by function and major plant account.

Table 2-5 – 2013 Board Approved vs. 2013 Actuals Gross Assets by Account

GROSS ASSET VARIANCE ANALYSIS 2013 BOARD APPROVED vs. 2013 ACTUALS				
	2013 Actual	2013 Board Approved	Variance	Variance
	$	$	$	%
Distribution Plant				
1805 Land - Substations	385,690	385,690	(0)	0%
1806 / 1612 Land Rights	366,233	322,234	43,999	12%
1808 Buildings - Substations	1,128,336	1,278,336	(150,000)	-13%
1820 /1610 Substation Equipment	17,123,890	16,739,536	384,354	2%
1830 Poles, Towers & Fixtures	39,738,167	41,493,467	(1,755,300)	-4%
1835 OH Conductors & Devices	55,136,846	55,679,739	(542,893)	-1%
1840 UG Conduit	35,698,363	35,319,448	378,916	1%
1845 UG Conductor & Devices	101,576,155	109,523,965	(7,947,810)	-8%
1850 Line Transformers	79,632,662	77,245,338	2,387,324	3%
1855 Services (OH & UG)	24,720,934	22,381,015	2,339,919	9%
1860 Meters	25,081,481	25,318,013	(236,532)	-1%
	380,588,758	**385,686,781**	**(5,098,023)**	-1%
General Plant				
1908 Buildings & Fixtures	22,091,652	23,749,979	(1,658,327)	-8%
1910 Leasehold Improvements	-	-	-	
1915 Office Furniture & Equipment	731,859	922,307	(190,448)	-26%
1930 Transportation Equipment	11,472,907	11,602,662	(129,755)	-1%
1935 Stores Equipment	278,138	266,776	11,362	4%
1940 Tools, Shop & Garage Equipment	1,023,409	1,204,152	(180,743)	-18%
1945 Measurement & Testing Equipment	119,614	156,864	(37,250)	-31%
1950 Power Operated Equipment	931,471	1,214,137	(282,666)	-30%
1955 Communication Equipment	3,756,098	3,788,534	(32,436)	-1%
1960 Miscellaneous Equipment	-	-	-	
1980 System Supervisory Equipment	2,154,497	3,300,223	(1,145,726)	-53%
	42,559,643	**46,205,634**	**(3,645,991)**	-9%
Information Systems				
1920 Computer - Hardware	3,200,325	2,640,094	560,231	18%
1925 /1611 Computer - Software	28,241,375	30,301,668	(2,060,293)	-7%
	31,441,700	**32,941,762**	**(1,500,062)**	-5%
Total Gross Balance before Contributed Capital	**454,590,101**	**464,834,177**	**(10,244,076)**	-2%
1995 /2440 Contributions and Grants	(39,262,043)	(37,762,524)	(1,499,519)	4%
Total	**415,328,059**	**427,071,653**	**(11,743,594)**	**-2.8%**

Revised 2013 OEB Approved Amounts

The 2013 OEB Approved gross asset balances did not factor in the increased disposals that were deemed to have taken place when the asset lifespans were updated in 2012, due to the conversion to IFRS. Because of this, London Hydro has prepared an additional schedule, comparing 2013 Actuals to revised 2013 OEB Approved amounts, utilizing actual 2013 OEB Approved amounts, and adjusting for the actual amount of 2013 disposals (including those due to the change in lifespans). Table 2-6 below, provides a better comparison of gross asset balances for the 2013 year.

The following pages describe a high level summary of variances in gross capital asset balances. Details specific to capital purchases can be found in the 'Capital Expenditures' section within this Exhibit, commencing on page 34.

1 **Table 2-6 – 2013 Board Approved (Revised) vs. 2013 Actuals Gross Assets by Account**

GROSS ASSET VARIANCE ANALYSIS 2013 BOARD APPROVED REVISION vs. 2013 ACTUALS	2013 Actual	2013 Board Approved Revision	Variance	Variance
	$	$	$	%
Distribution Plant				
1805 Land - Substations	385,690	385,690	(0)	0%
1806 / 1612 Land Rights	366,233	322,234	43,999	12%
1808 Buildings - Substations	1,128,336	1,278,336	(150,000)	-13%
1820 /1610 Substation Equipment	17,123,890	16,704,716	419,174	2%
1830 Poles, Towers & Fixtures	39,738,167	42,290,730	(2,552,563)	-6%
1835 OH Conductors & Devices	55,136,846	56,509,543	(1,372,697)	-2%
1840 UG Conduit	35,698,363	35,543,291	155,073	0%
1845 UG Conductor & Devices	101,576,155	102,778,364	(1,202,209)	-1%
1850 Line Transformers	79,632,662	79,660,816	(28,154)	0%
1855 Services (OH & UG)	24,720,934	22,381,015	2,339,919	9%
1860 Meters	25,081,481	25,135,799	(54,318)	0%
	380,588,758	**382,990,534**	**(2,401,776)**	-1%
General Plant				
1908 Buildings & Fixtures	22,091,652	21,516,407	575,245	3%
1910 Leasehold Improvements	-	-	-	
1915 Office Furniture & Equipment	731,859	706,027	25,832	4%
1930 Transportation Equipment	11,472,907	11,654,025	(181,118)	-2%
1935 Stores Equipment	278,138	282,520	(4,382)	-2%
1940 Tools, Shop & Garage Equipment	1,023,409	1,090,483	(67,074)	-7%
1945 Measurement & Testing Equipment	119,614	126,305	(6,692)	-6%
1950 Power Operated Equipment	931,471	1,214,137	(282,666)	-30%
1955 Communication Equipment	3,756,098	3,788,534	(32,436)	-1%
1960 Miscellaneous Equipment	-	-	-	
1980 System Supervisory Equipment	2,154,497	1,916,975	237,521	11%
	42,559,643	**42,295,413**	**264,230**	1%
Information Systems				
1920 Computer - Hardware	3,200,325	1,615,748	1,584,578	50%
1925 /1611 Computer - Software	28,241,375	28,703,471	(462,096)	-2%
	31,441,700	**30,319,218**	**1,122,482**	4%
Total Gross Balance before Contributed Capital	**454,590,101**	**455,605,165**	**(1,015,064)**	0%
1995 /2440 Contributions and Grants	(39,262,043)	(37,773,374)	(1,488,669)	4%
Total	**415,328,059**	**417,831,791**	**(2,503,733)**	**-0.6%**

2

Distribution Plant: Variance ($2,401,776)

In 2013, Actual Distribution Plant assets were $2,401,776 less than the 2013 Revised Board Approved amount. Details regarding this variance are explained below:

- Investments in Poles and Overhead Conductors and Devices (Accounts 1830 and 1835) were significantly lower than planned primarily due to delays in Overhead Voltage Conversions for Substations 1, 2 and 28. See capital expenditures discussion on Page 66 within this Exhibit for more information).
- Additions to Underground Conductors and Devices were $642,448 lower than anticipated for 2013. The remaining variance in this account is attributable to difference in the prior year actual ending balance and the 2012 Bridge Year ending balance.

Information Systems: Variance $1,122,482

In 2013, Actual Information Systems assets were $1,122,482 more than the 2013 Revised Board Approved amount. Additions to Hardware were $947,608 higher than the 2013 Board Approved amounts. This is primarily as a result of additional spending due to unforeseen costs required in network development to replace core switches.

Contributions and Grants: Variance ($1,488,669)

In 2013, London Hydro collected $1,488,669 more contributed capital than the 2013 Board Approved Amount.

2013 Actuals vs. 2014 Actuals

London Hydro's gross asset balances increased by $13,977,395, or 3.4%, between the 2013 and 2014 Actuals. See Table 2-7 below for a breakdown of gross asset balances by function and major plant account.

Table 2-7 –2013 Actuals vs. 2014 Actuals Gross Assets by Account

GROSS ASSET VARIANCE ANALYSIS 2013 ACTUALS vs. 2014 ACTUALS	2013 Actual	2014 Actual	Variance	Variance
	$	$	$	%
Distribution Plant				
1805 Land - Substations	385,690	385,690	-	0%
1806 / 1612 Land Rights	366,233	383,514	17,281	5%
1808 Buildings - Substations	1,128,336	1,128,336	-	0%
1820 /1610 Substation Equipment	17,123,890	17,396,761	272,871	2%
1830 Poles, Towers & Fixtures	39,738,167	41,662,934	1,924,767	5%
1835 OH Conductors & Devices	55,136,846	58,467,100	3,330,254	6%
1840 UG Conduit	35,698,363	38,211,108	2,512,744	7%
1845 UG Conductor & Devices	101,576,155	96,726,669	(4,849,487)	-5%
1850 Line Transformers	79,632,662	83,540,538	3,907,876	5%
1855 Services (OH & UG)	24,720,934	27,008,301	2,287,367	9%
1860 Meters	25,081,481	25,774,558	693,077	3%
	380,588,758	**390,685,509**	**10,096,751**	3%
General Plant				
1908 Buildings & Fixtures	22,091,652	22,780,090	688,438	3%
1910 Leasehold Improvements	-	-	-	
1915 Office Furniture & Equipment	731,859	732,848	990	0%
1930 Transportation Equipment	11,472,907	11,826,499	353,592	3%
1935 Stores Equipment	278,138	273,759	(4,379)	-2%
1940 Tools, Shop & Garage Equipment	1,023,409	1,040,004	16,595	2%
1945 Measurement & Testing Equipment	119,614	202,476	82,862	69%
1950 Power Operated Equipment	931,471	951,281	19,810	2%
1955 Communication Equipment	3,756,098	3,992,791	236,693	6%
1960 Miscellaneous Equipment	-	-	-	
1980 System Supervisory Equipment	2,154,497	2,439,074	284,577	13%
	42,559,643	**44,238,822**	**1,679,179**	4%
Information Systems				
1920 Computer - Hardware	3,200,325	3,381,156	180,831	6%
1925 /1611 Computer - Software	28,241,375	32,132,701	3,891,326	14%
	31,441,700	**35,513,857**	**4,072,157**	13%
	-	-	-	
Total Gross Balance before Contributed Capital	**454,590,101**	**470,438,188**	**15,848,087**	3%
1995 /2440 Contributions and Grants	(39,262,043)	(41,132,735)	(1,870,692)	5%
Total	**415,328,059**	**429,305,453**	**13,977,395**	**3.4%**

Distribution Plant: Variance $10,096,751

Variance attributable to Additions: $19,166,621. Variance attributable to Disposals: ($9,069,870).

In 2014, Actual Distribution Plant assets were higher than 2013 Actual amounts by $10,096,751. Details regarding this variance are described below:

- Capital spending for demand driven road relocations throughout the City of London was $1,542,380 in 2014, which resulted in increased investments primarily in Poles and Fixtures and Overhead Conductors and Devices (Accounts 1830 – 1835).
- Capital spending for Developer Works Projects, such as new residential subdivisions and condominiums, commercial connections and overhead line expansions, was $5,084,680.
- Capital spending for silicone injection of underground cable and conversions with silicone injection was $3,303,086 in 2014, which resulted in increased investments in Underground Conduits and Underground Conductors and Devices (Accounts 1840 – 1845).
- Fully-depreciated Underground Conductors and Devices with an original cost of $8,793,672 were disposed of in 2014. The majority of this cost ($8,591,828) represents direct-buried cable.

1908 Buildings and Fixtures: Variance $688,438

Variance attributable to Additions: $1,123,130. Variance attributable to Disposals: ($434,692).

The following major projects relating to Buildings and Fixtures occurred in 2014:

- Second phase of paving in the Administration parking lots
- Replacement of windows in the Administration building due to broken seals
- Cafeteria renovation
- Transfer switch replacement in the Operations building
- Construction of the smart meter validation lab in the Electric Meter Department

Fully-depreciated assets that were removed from the gross asset balance in 2014 were $434,692. Most of this pertains to the (previous) paved Operations yard parking lot and the Administration building roof.

For more information regarding capital spending for Buildings and Fixtures, refer to Page 113.

1930 Transportation Equipment: Variance $353,592

Variance attributable to Additions: $686,041. Variance attributable to Disposals: ($332,449).

The following major projects relating to Transportation Equipment occurred in 2014:

- Purchase of one radial boom derrick (RBD) and one dump truck
- An increase in small vehicle purchases in 2014 compared to 2013 (individually less expensive)

Transportation Equipment disposals included the sale of a fully-depreciated flat deck truck, a dump truck and a van with original costs totalling $249,379.

For more information regarding capital spending for Vehicles and Major Equipment, refer to Page 107.

1925 /1611 Computer - Software: Variance $3,891,326

Variance attributable to Additions: $4,120,230. Variance attributable to Disposals: ($228,904).

The following major software projects went live in 2014:

- CRM Version 7 upgrade - Customer Relations Management Software
- MyLondonHydro customer portal and Corporate Website
- Outage Management System
- Mobile Workforce Deployment Phase 1

Fully-depreciated assets that were removed from the gross asset balance in 2014 amounted to $228,904.

For more information regarding capital spending for Information Services, refer to Page 118.

2014 Actuals vs. 2015 Actuals

London Hydro's gross asset balances increased by $4,538,183, or 1.1%, between the 2014 and 2015 Actuals. See Table 2-8 below for a breakdown of gross asset balances by function and major plant account.

Table 2-8 –2014 Actuals vs. 2015 Actuals Gross Assets by Account

GROSS ASSET VARIANCE ANALYSIS
2014 ACTUALS vs. 2015 ACTUALS

	2014 Actual $	2015 Actual $	Variance $	Variance %
Distribution Plant				
1805 Land - Substations	385,690	385,690	-	0%
1806 / 1612 Land Rights	383,514	414,759	31,245	8%
1808 Buildings - Substations	1,128,336	1,128,336	-	0%
1820 /1610 Substation Equipment	17,396,761	17,563,552	166,791	1%
1830 Poles, Towers & Fixtures	41,662,934	43,125,558	1,462,624	4%
1835 OH Conductors & Devices	58,467,100	61,194,389	2,727,289	5%
1840 UG Conduit	38,211,108	43,296,851	5,085,744	13%
1845 UG Conductor & Devices	96,726,669	90,803,781	(5,922,888)	-6%
1850 Line Transformers	83,540,538	89,220,013	5,679,475	7%
1855 Services (OH & UG)	27,008,301	29,459,220	2,450,919	9%
1860 Meters	25,774,558	26,831,646	1,057,088	4%
	390,685,509	**403,423,795**	**12,738,286**	3%
General Plant				
1908 Buildings & Fixtures	22,780,090	23,396,955	616,865	3%
1910 Leasehold Improvements	-	-	-	
1915 Office Furniture & Equipment	732,848	520,905	(211,944)	-29%
1930 Transportation Equipment	11,826,499	12,813,264	986,765	8%
1935 Stores Equipment	273,759	267,598	(6,161)	-2%
1940 Tools, Shop & Garage Equipment	1,040,004	941,130	(98,874)	-10%
1945 Measurement & Testing Equipment	202,476	516,606	314,130	155%
1950 Power Operated Equipment	951,281	1,032,283	81,002	9%
1955 Communication Equipment	3,992,791	4,064,185	71,394	2%
1960 Miscellaneous Equipment	-	4,039	4,039	
1980 System Supervisory Equipment	2,439,074	3,385,233	946,159	39%
	44,238,822	**46,942,197**	**2,703,375**	6%
Information Systems				
1920 Computer - Hardware	3,381,156	2,523,106	(858,051)	-25%
1925 /1611 Computer - Software	32,132,701	25,875,825	(6,256,876)	-19%
	35,513,857	**28,398,931**	**(7,114,926)**	-20%
Total Gross Balance before Contributed Capital	**470,438,188**	**478,764,923**	**8,326,735**	2%
1995 /2440 Contributions and Grants	(41,132,735)	(44,921,286)	(3,788,551)	9%
Total	**429,305,453**	**433,843,637**	**4,538,183**	**1.1%**

Fully-Depreciated Asset Disposals

Prior to 2015, London Hydro had a practice of waiting until the subsequent year (following the year in which an asset was fully-depreciated) to dispose of the asset and its accumulated depreciation. In 2015, this practice was updated, and fully-depreciated assets are now disposed of in the current year. This essentially resulted in the disposing of two years' worth of assets in a single year.

Distribution Plant: Variance $12,738,286

Variance attributable to Additions: $23,920,783. Variance attributable to Disposals: ($11,182,497).

In 2015, Actual Distribution Plant assets were higher than 2014 Actual amounts by $12,738,286. Details regarding this variance are described below:

- Capital spending for City of London-driven road relocations was $1,968,293 in 2015, which resulted in increased investments primarily in Poles and Fixtures and Overhead Conductors and Devices (Accounts 1830 – 1835).
- Increases in Underground Conduits, Underground Conductors and Devices, Line Transformers, Services and Meters (Accounts 1840 – 1860) are primarily due to new customer connections and residential developments. Capital spending for these Developer Works Projects was $6,017,328 in 2015.
- Additionally, an increase of $1,404,237 in Underground Conduit (Account 1840) is a result of substantial investments in encased duct and maintenance hole structures along Dufferin Avenue and Simcoe Street.
- Capital spending for the replacement of depreciated and leaking transformers was $825,693 in 2015, which resulted in increased investments in Line Transformers (Account 1850).
- Fully-depreciated disposals were $11,182,497. The majority of this was the disposal of direct buried cable with an original cost of $10,629,890.

1908 Buildings and Fixtures: Variance $616,865

Variance attributable to Additions: $673,316. Variance attributable to Disposals: ($56,452).

The following major projects relating to Buildings and Fixtures occurred in 2015:

- Relocation of data centre switches, wiring and racks as per distance from electrical equipment requirements per the Ontario Electrical Code

- New drive-on hoist for garage; the old hoist could not accommodate newer vehicles
- HVAC upgrades
- New fuel inventory system

For more information regarding capital spending for Buildings and Fixtures, refer to Page 113.

1930 Transportation Equipment: Variance $986,765

Variance attributable to Additions: $1,150,226. Variance attributable to Disposals: ($163,461).

Significant additions to Transportation Equipment in 2015 included 3 bucket trucks ($916,961), an Electric Meter truck and an EUS Truck ($185,236) and 2 trailers ($14,351).

Disposals included the sale of a fully-depreciated radial boom derrick (RBD) truck and a trailer with original costs totalling $163,461.

For more information regarding capital spending for Vehicles and Major Equipment, refer to Page 107.

1945 Measurement & Testing Equipment: Variance $314,130

Variance attributable to Additions: $316,421. Variance attributable to Disposals: ($2,290).

The following major projects relating to Measurement and Testing Equipment occurred in 2015:

- Smart meter validation lab
- Measurement Canada test console

For more information regarding capital spending for Metering, refer to Page 85.

1980 System Supervisory Equipment: Variance $946,159

Variance attributable to Additions: $946,159.

The following major projects relating to System Supervisory Equipment occurred in 2015:

- Network temperature monitoring and infrastructure
- New Remote Terminal Unit (RTU) control cabinets
- Various FIT connections

For more information regarding capital spending for Automation, refer to Page 71.

1920 Computer – Hardware: Variance ($858,051)

Variance attributable to Additions: $631,317. Variance attributable to Disposals: ($1,489,367).

Approximately $631,317 of additions was capitalized in 2015, covering items such as desktops, mobile devices and wireless networks.

Fully-depreciated assets that were removed from the gross asset balance in 2015 amounted to $1,489,367.

For more information regarding capital spending for Information Services, refer to Page 118.

1925 /1611 Computer - Software: Variance ($6,256,876)

Variance attributable to Additions: $4,995,403. Variance attributable to Disposals: ($11,252,279).

The following major software projects went live in 2015:

- Human Resources Information System (HRIS)
- Customer Engagement Web Enhancements
- Field Workforce Automation
- Interval Data Centre 2
- Cyber security & disaster recovery

Fully-depreciated assets that were removed from the gross asset balance in 2015 amounted to $11,252,279. Most of these items related to the billing system, which had a five-year estimated useful life. The transition to more Cloud-based services is resulting in less capital investment in Hardware and Software.

For more information regarding capital spending for Information Services, refer to Page 118.

2015 Actuals vs. 2016 Bridge

London Hydro's gross asset balances are budgeted to increase by $17,866,469, or 4.1%, between the 2015 Actuals and the 2016 Bridge Year. See Table 2-9 below for breakdown of gross asset balances by function and major plant account.

Table 2-9 –2015 Actuals vs. 2016 Bridge Year Gross Assets by Account

GROSS ASSET VARIANCE ANALYSIS 2015 ACTUALS vs. 2016 BRIDGE				
	2015 Actual	2016 Bridge	Variance	Variance
	$	$	$	%
Distribution Plant				
1805 Land - Substations	385,690	385,690	-	0%
1806 / 1612 Land Rights	414,759	414,759	-	0%
1808 Buildings - Substations	1,128,336	1,168,336	40,000	4%
1820 /1610 Substation Equipment	17,563,552	17,679,652	116,100	1%
1830 Poles, Towers & Fixtures	43,125,558	45,079,658	1,954,100	5%
1835 OH Conductors & Devices	61,194,389	64,476,589	3,282,200	5%
1840 UG Conduit	43,296,851	47,849,151	4,552,300	11%
1845 UG Conductor & Devices	90,803,781	90,510,422	(293,359)	0%
1850 Line Transformers	89,220,013	93,490,013	4,270,000	5%
1855 Services (OH & UG)	29,459,220	30,974,120	1,514,900	5%
1860 Meters	26,831,646	27,925,246	1,093,600	4%
	403,423,795	**419,953,636**	**16,529,841**	4%
General Plant				
1908 Buildings & Fixtures	23,396,955	24,500,503	1,103,548	5%
1910 Leasehold Improvements	-	-	-	
1915 Office Furniture & Equipment	520,905	797,931	277,026	53%
1930 Transportation Equipment	12,813,264	13,219,310	406,046	3%
1935 Stores Equipment	267,598	345,540	77,943	29%
1940 Tools, Shop & Garage Equipment	941,130	989,586	48,456	5%
1945 Measurement & Testing Equipment	516,606	726,606	210,000	41%
1950 Power Operated Equipment	1,032,283	1,032,283	-	0%
1955 Communication Equipment	4,064,185	4,834,685	770,500	19%
1960 Miscellaneous Equipment	4,039	4,039	-	0%
1980 System Supervisory Equipment	3,385,233	3,716,233	331,000	10%
	46,942,197	**50,166,717**	**3,224,519**	7%
Information Systems				
1920 Computer - Hardware	2,523,106	1,763,237	(759,869)	-30%
1925 /1611 Computer - Software	25,875,825	26,834,803	958,978	4%
	28,398,931	**28,598,040**	**199,109**	1%
Total Gross Balance before Contributed Capital	**478,764,923**	**498,718,392**	**19,953,469**	4%
1995 /2440 Contributions and Grants	(44,921,286)	(47,008,286)	(2,087,000)	5%
Total	**433,843,637**	**451,710,106**	**17,866,469**	**4.1%**

Distribution Plant: Variance $16,529,841

Variance attributable to Additions: $22,720,500. Variance attributable to Disposals: ($6,190,659).

Distribution Plant assets in the 2016 Bridge Year are projected to be higher than 2015 Actual amounts by $16,529,841. Details regarding this variance are described below:

- Capital spending for City of London-driven road relocations is planned to be $1,996,000 in 2016, which will result in increased investments primarily in Poles and Fixtures and Overhead Conductors and Devices (Accounts 1830 – 1835).
- Capital spending for Developer Works Projects, such as new residential subdivisions and condominiums, commercial connections and overhead line expansions, is planned to be $4,258,000.
- Capital spending for Main Feeder Conversions, Backup Supply and Civil Structure Installation is planned to be $3,982,000 in 2016, and is focused on the downtown core in preparation for the Nelson TS conversion. This spending results primarily in increased investments in Poles and Fixtures, Overhead Conductors and Devices and Underground Conduits (Accounts 1830 – 1840).
- Regular capital projects for Subdivision Rebuilds account for $5,102,000 in capital spending in 2016. This spending results primarily in increased investments in Underground Conduits, Underground Conductors and Devices, Line Transformers and Services (Accounts 1840 – 1855).
- Fully-depreciated asset disposals are planned to be $6,190,659, which accounts for the disposal of direct buried cable.

1908 Buildings and Fixtures: Variance $1,103,548

Variance attributable to Additions: $1,160,000. Variance attributable to Disposals: ($56,452).

The following major projects relating to Buildings and Fixtures are budgeted for 2016:

- Replacement of elevators and associated control systems
- Control Room renovations - Phase 2
- HVAC equipment replacements

For more information regarding capital spending for Buildings and Fixtures, refer to Page 113.

1930 Transportation Equipment: Variance $406,046

Variance attributable to Additions: $1,130,000. Variance attributable to Disposals: ($723,954).

The following major items relating to Transportation Equipment are budgeted for 2016:

- 4 pickup trucks
- 5 SUV's
- 1 dump truck
- 1 commercial van
- 1 aerial bucket truck

Fully-depreciated assets that are budgeted to be removed from the gross asset balance in 2016 amount to $723,954 and include items such as one flat deck, one bucket truck, five SUV's, four pickup trucks and one dump truck.

For more information regarding capital spending for Vehicles and Major Equipment, refer to Page 107.

1955 Communication Equipment: Variance $770,500

Variance attributable to Additions: $770,500.

The majority of the budget for Communication Equipment ($625,000) pertains to the AMI Communications Renewal project. More information about this project can be found within the Metering Section of this Exhibit, Page 85.

1980 System Supervisory Equipment: Variance $331,000

Variance attributable to Additions: $331,000.

The following major projects relating to System Supervisory Equipment are budgeted for 2016:

- New RTU control cabinets
- Control centre consoles and digital schematics

For more information regarding capital spending for Automation, refer to Page 71.

1920 Computer – Hardware: Variance ($759,869)

Variance attributable to Additions: $323,200. Variance attributable to Disposals: ($1,083,069).

Approximately $323,200 of additions is budgeted to be capitalized in 2016, covering items such as desktops, servers and networks.

Fully-depreciated assets that are scheduled to be removed from the gross asset balance in 2016 amount to $1,083,069.

Refer to Page 118 within this Exhibit for more information regarding capital spending and capital projects for Information Technology.

1925 /1611 Computer - Software: Variance $958,978

Variance attributable to Additions: $4,551,800. Variance attributable to Disposals: ($3,592,822).

The following major software projects are scheduled to go live in 2016:

- Bill print upgrade
- Builders' Portal and Property Management Portal
- OMS upgrade
- Customer engagement website enhancements
- Mobile Workforce Phase 3
- Operating software servers and networks
- Fleet maintenance system
- Cyber security, disaster recovery, end-point security

Fully-depreciated assets that are scheduled to be removed from the gross asset balance in 2016 amount to $3,592,822. Most of this pertains to billing system enhancements and an IVR phone system.

Refer to Page 118 within this Exhibit for more information regarding Information Technology capital spending & capital projects.

2016 Bridge vs. 2017 Test

London Hydro's gross asset balances are budgeted to increase by $17,608,903, or 3.9%, between the 2016 Bridge Year and the 2017 Test Year. See Table 2-10 below for a breakdown of gross asset balances by function and major plant account.

Table 2-10 –2016 Bridge Year vs. 2017 Test Year Gross Assets by Account

GROSS ASSET VARIANCE ANALYSIS 2016 BRIDGE vs. 2017 TEST	2016 Bridge	2017 Test	Variance	Variance
	$	$	$	%
Distribution Plant				
1805 Land - Substations	385,690	385,690	-	0%
1806 / 1612 Land Rights	414,759	414,759	-	0%
1808 Buildings - Substations	1,168,336	1,210,336	42,000	4%
1820 /1610 Substation Equipment	17,679,652	17,794,152	114,500	1%
1830 Poles, Towers & Fixtures	45,079,658	47,273,458	2,193,800	5%
1835 OH Conductors & Devices	64,476,589	67,987,489	3,510,900	5%
1840 UG Conduit	47,849,151	52,171,051	4,321,900	9%
1845 UG Conductor & Devices	90,510,422	92,535,816	2,025,394	2%
1850 Line Transformers	93,490,013	97,784,813	4,294,800	5%
1855 Services (OH & UG)	30,974,120	32,569,920	1,595,800	5%
1860 Meters	27,925,246	29,038,746	1,113,500	4%
	419,953,636	**439,166,230**	**19,212,594**	5%
General Plant				
1908 Buildings & Fixtures	24,500,503	23,096,571	(1,403,932)	-6%
1910 Leasehold Improvements	-	-	-	
1915 Office Furniture & Equipment	797,931	860,704	62,773	8%
1930 Transportation Equipment	13,219,310	13,589,831	370,522	3%
1935 Stores Equipment	345,540	234,972	(110,569)	-32%
1940 Tools, Shop & Garage Equipment	989,586	1,020,795	31,209	3%
1945 Measurement & Testing Equipment	726,606	865,590	138,984	19%
1950 Power Operated Equipment	1,032,283	1,106,979	74,696	7%
1955 Communication Equipment	4,834,685	5,582,185	747,500	15%
1960 Miscellaneous Equipment	4,039	4,039	-	0%
1980 System Supervisory Equipment	3,716,233	4,006,818	290,585	8%
	50,166,717	**50,368,484**	**201,767**	0%
Information Systems				
1920 Computer - Hardware	1,763,237	632,829	(1,130,408)	-64%
1925 /1611 Computer - Software	26,834,803	28,260,752	1,425,949	5%
	28,598,040	**28,893,581**	**295,541**	1%
Total Gross Balance before Contributed Capital	**498,718,392**	**518,428,295**	**19,709,903**	4%
1995 /2440 Contributions and Grants	(47,008,286)	(49,109,286)	(2,101,000)	4%
Total	**451,710,106**	**469,319,009**	**17,608,903**	**3.9%**

Distribution Plant: Variance $19,212,594

Variance attributable to Additions: $22,717,900. Variance attributable to Disposals: ($3,505,306).

Distribution Plant assets in the 2017 Test Year are projected to be higher than 2016 Bridge Year by $19,212,594. Details regarding this variance are described below:

- Capital spending for City of London-driven road relocations is budgeted to be $2,250,900 in 2017, which will result in increased investments primarily in Poles and Fixtures and Overhead Conductors and Devices (Accounts 1830 – 1835). The City of London is following a multi-year plan to meet the City's growing transportation needs and new developments, which will result in increased capital spending for City-requested relocations and, therefore, increased investments in the aforementioned assets.
- Capital spending for Overhead Line Work is budgeted to be $4,530,000 for 2017, which will result in increased investments primarily in Poles and Fixtures, Overhead Conductors and Devices, Line Transformers, and Services (Accounts 1830, 1835, 1850 and 1855). A total of $3,280,000 of this amount is attributable to Overhead Voltage Conversions required to convert 13.8 kV overhead load to 27.6 kV and rebuild/convert all 4.16kV plant within Zones ‘A’, ‘B’, & ‘C’.
- Increases in Underground Conduits, Underground Conductors and Devices, Line Transformers, Services and Meters (Accounts 1840 – 1860) are primarily due to new customer connections and residential developments. Capital spending for these Developer Works Projects is budgeted to be $4,519,100 in 2017.
- Increases in Underground Conduits and Underground Conductors and Devices are also attributable to capital spending in 2017 of $3,375,000 for Main Feeders and $2,070,000 for Networks. The City of London will be conducting extensive infrastructure rehabilitation in the downtown core beginning in 2017. In conjunction with the City’s projects, London Hydro will install concrete-encased duct and maintenance hole systems.
- Regular capital projects for Subdivision Rebuilds account for $4,389,000 in Capital spending. These projects result primarily in increased investments in Underground Conduits, Underground Conductors and Devices, Line Transformers and Services (Accounts 1840 – 1855).

- Disposals of $3,505,306 include fully-depreciated direct buried cable with an original cost of $3,414,144 and fully-depreciated air-insulated switchgear with an original cost of $91,161.

1908 Buildings and Fixtures: Variance ($1,403,932)

Variance attributable to Additions: $870,000. Variance attributable to Disposals: ($2,273,932).

The following major projects relating to Buildings and Fixtures are budgeted for 2017:

- Paving
- Control Room renovations Phase 3
- HVAC equipment replacements
- Energy savings lighting & controls

Fully-depreciated assets that are scheduled to be removed from the gross asset balance in 2017 amount to $2,273,932. Most of these assets pertain to electrical/mechanical systems in the Administration building and Stores area.

For more information regarding capital spending for Buildings and Fixtures, refer to Page 113.

1930 Transportation Equipment: Variance $370,522

Variance attributable to Additions: $924,000. Variance attributable to Disposals: ($553,478).

The following major items relating to Transportation Equipment are budgeted for 2017:

- 4 pickup trucks
- 1 SUV
- 1 commercial van
- 1 double bucket truck
- 2 trailers

Fully-depreciated assets that are budgeted to be removed from the gross asset balance in 2017 amount to $553,478 and include items such as one bucket truck, four SUV's, one pickup truck and one dump truck.

For more information regarding capital spending for Vehicles and Major Equipment, refer to Page 107.

1955 Communication Equipment: Variance $747,500

Variance attributable to Additions: $747,500.

The majority of the budget for Communication Equipment ($649,000) pertains to the AMI Communications Renewal project. More information on this project can be found in the Metering Section of this Exhibit, Page 85.

1920 Computer – Hardware: Variance ($1,130,408)

Variance attributable to Additions: $297,200. Variance attributable to Disposals: ($1,427,608).

Approximately $297,200 of additions is budgeted to be capitalized in 2017, covering items such as desktops, servers and networks.

Fully-depreciated assets that are budgeted to be removed from the gross asset balance in 2017 amount to $1,427,608.

Refer to Page 118 within this Exhibit for more information regarding capital spending and capital projects for Information Technology.

1925 /1611 Computer - Software: Variance $1,425,949

Variance attributable to Additions: $4,082,697 (including regulatory deferrals). Variance attributable to Disposals: ($2,656,748).

The following major software projects are scheduled to go live in 2017:

- ODS upgrade
- HRIS enhancements
- Automated billing payments
- Miscellaneous operating software servers & networks
- Field timesheet automation
- Residential customer mobile app
- C&I optimization apps

Additionally, $419,897 is budgeted to be transferred from the Smart Grid Regulatory Deferral account into gross assets in 2017.

Fully-depreciated assets that are scheduled to be removed from the gross asset balance in 2017 amount to $2,656,748. Most of these items pertain to the GIS system.

Refer to Page 118 within this Exhibit for more information regarding capital spending and capital projects for Information Technology.

Change in Accumulated Depreciation

Accumulated depreciation increased by $3,953,376 between the 2013 Board Approved Year and the 2017 Test Year. See Table 2-11 below for annual accumulated depreciation balances, broken down by major plant account. Fluctuations by category are as follows:

- $9,114,927 increase to accumulated depreciation on Distribution Plant assets
- $120,333 increase to accumulated depreciation on General Plant assets
- $766,650 decrease to accumulated depreciation on Information Systems assets
- $4,136,335 increase (credit) to accumulated depreciation on Contributed Capital

Further discussion regarding depreciation and estimated useful lives can be found within Exhibit 4 of this Rate Application, Section ‘Depreciation and Amortization Expense’, Page 379.

Table 2-11 – Accumulated Depreciation Balances 2013 to 2017

ACCUMULATED DEPRECIATION BALANCES 2013 TO 2017	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 OEB Approved to 2017 Test
	$	$	$	$	$	$	$
Distribution Plant							
1805 Land - Substations	-	-	-	-	-	-	-
1806 / 1612 Land Rights	180,897	178,584	198,161	215,730	234,445	253,160	74,576
1808 Buildings - Substations	713,458	715,456	724,552	735,645	747,005	758,911	43,455
1820 /1610 Substation Equipment	6,752,604	6,769,195	7,069,017	7,392,247	7,718,198	8,047,617	1,278,422
1830 Poles, Towers & Fixtures	19,132,710	19,164,055	19,735,070	20,372,416	21,056,938	21,787,548	2,623,493
1835 OH Conductors & Devices	22,386,713	20,557,706	23,219,310	24,114,383	25,082,792	26,120,756	5,563,050
1840 UG Conduit	9,483,834	9,537,815	10,010,139	10,597,956	11,298,459	12,079,367	2,541,553
1845 UG Conductor & Devices	54,734,965	60,722,839	49,578,787	42,149,108	39,353,720	39,250,228	(21,472,611)
1850 Line Transformers	30,979,674	28,587,886	32,854,306	34,862,679	37,042,460	39,352,241	10,764,355
1855 Services (OH & UG)	8,049,275	8,206,786	8,590,057	9,181,004	9,835,804	10,530,901	2,324,115
1860 Meters	7,986,510	8,168,764	9,147,072	10,377,857	11,927,391	13,543,285	5,374,521
	160,400,641	162,609,086	161,126,469	159,999,024	164,297,211	171,724,013	9,114,927
General Plant							
1908 Buildings & Fixtures	10,359,435	12,440,217	10,817,099	11,679,716	12,575,948	11,047,245	(1,392,972)
1910 Leasehold Improvements	-	-	-	-	-	-	-
1915 Office Furniture & Equipment	420,900	632,647	430,567	261,650	225,883	270,894	(361,753)
1930 Transportation Equipment	6,290,330	6,336,700	6,663,503	7,254,516	7,424,086	7,821,505	1,484,805
1935 Stores Equipment	261,042	246,114	259,809	259,681	265,052	151,731	(94,383)
1940 Tools, Shop & Garage Equipment	522,561	708,772	532,264	466,399	485,999	487,693	(221,079)
1945 Measurement & Testing Equipment	25,264	(1,517)	42,427	73,712	151,456	239,264	240,781
1950 Power Operated Equipment	434,483	626,751	486,198	530,978	656,884	687,458	60,707
1955 Communication Equipment	875,181	908,656	1,105,729	1,353,714	1,627,712	1,943,759	1,035,103
1960 Miscellaneous Equipment	-	-	-	42	547	1,052	1,052
1980 System Supervisory Equipment	663,896	2,036,216	801,234	963,629	1,177,101	1,404,289	(631,927)
	19,853,091	23,934,556	21,138,831	22,844,038	24,590,668	24,054,889	120,333
Information Systems							
1920 Computer - Hardware	1,236,614	1,885,252	1,929,035	1,399,030	1,063,991	109,433	(1,775,819)
1925 /1611 Computer - Software	14,050,010	16,254,378	19,038,934	12,763,442	14,830,128	17,263,547	1,009,169
	15,286,625	18,139,630	20,967,970	14,162,472	15,894,119	17,372,980	(766,650)
Total Gross Balance before Contributed Capital	**195,540,357**	**204,683,272**	**203,233,270**	**197,005,534**	**204,781,998**	**213,151,882**	**8,468,610**
1995 /2440 Contributions and Grants	(8,616,349)	(8,565,838)	(9,536,861)	(10,515,283)	(11,582,553)	(12,702,173)	(4,136,335)
	186,924,008	**196,117,434**	**193,696,409**	**186,490,251**	**193,199,445**	**200,449,709**	**4,332,275**

Capital Additions Reconciliation to Capital Spending

In order to provide for a more accurate correlation between capital activities and associated explanations, the discussions that follow in this Exhibit are directed at capital spending rather than capital additions.

Capital additions are difficult to discuss at a high level due to the following factors:

- Changes in work-in-progress;
- One capital project can be capitalized to many different capital asset accounts. For example, upon completion, one project may be capitalized to various accounts such as Services, Overhead Conductor and Devices, Underground Conductor and Devices, Poles, Towers and Fixtures; and
- Capital additions differ from capital spending in a given year since only projects that are complete and in service are added to rate base as a capital addition. Projects that are not complete at the end of the year remain in work-in-progress.

Capital spending is less complicated as it simply represents the dollars spent in a given year without any adjustment for projects that remain in work-in-progress. Capital spending discussions are based on specific projects rather than on the many fixed asset accounts that projects are allocated to upon completion. In addition, discussing capital spending makes it easier to segregate those expenditures that are a result of developer and customer demand (e.g., the City of London), compared to those that are completed at London Hydro's discretion.

Table 2-12 below has been provided to display and reconcile the difference between capital additions and capital spending due to changes in work-in-progress (WIP). Further, Table 2-13 contains details of annual WIP balances.

Variance analysis at a capital expenditure level is completed further in this Exhibit, commencing on Page 34.

Table 2-12 – Reconciliation of Capital Additions to Capital Spending

RECONCILIATION OF CAPITAL ADDITIONS TO CAPITAL SPENDING 2013 - 2017						
	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$
Net Additions to Fixed Assets	21,772,739	25,153,400	24,651,127	29,237,293	29,800,000	28,092,000
Work-in-progress, beginning of year	(6,707,278)	(10,422,102)	(10,225,904)	(10,653,337)	(12,128,580)	(13,960,580)
Work-in-progress, end of year	10,225,904	10,422,102	10,653,337	12,128,580	13,960,580	16,342,580
	3,518,625	0	427,433	1,475,243	1,832,000	2,382,000
Net Capital Spending	25,291,364	25,153,400	25,078,561	30,712,535	31,632,000	30,474,000

Table 2-13 – Work-In-Progress by Project Category 2013 to 2017

WORK IN PROGRESS 2013 - 2017 SUMMARY BY CATEGORY						
Annual Spending	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$
Infrastructure						
Substation Rebuilds	198,344	482,830	193,303	330,695	330,695	330,695
Subdivision Rebuilds	2,081,005	924,815	1,988,872	966,879	966,879	966,879
Main Feeders	124,541	450,794	694,495	578,267	578,267	578,267
Networks	65,695	619,431	559,587	600,075	600,075	600,075
Overhead Line Work	2,041,407	487,462	481,862	1,209,747	1,209,747	1,209,747
Automation	56,477	482,447	263,476	154,256	154,256	154,256
	4,567,467	3,447,778	4,181,595	3,839,919	3,839,919	3,839,919
Transmission						
Transmission Equipment	-	-	-	1,616,590	3,448,590	5,330,590
	-	-	-	1,616,590	3,448,590	5,330,590
Demand						
City Works Projects	493,457	93,042	1,255,256	1,340,203	1,340,203	1,340,203
Developer Works Projects	695,388	1,610,079	1,432,696	820,709	820,709	820,709
	1,188,846	1,703,121	2,687,953	2,160,912	2,160,912	2,160,912
Metering						
Metering	92,927	12,963	155,024	218,354	218,354	218,354
	92,927	12,963	155,024	218,354	218,354	218,354
Fleet and Facilities						
Vehicles & Major Equipment	116,559	280,613	102,018	-	-	-
Buildings & Fixtures	67,403	357,050	115,676	189,018	189,018	189,018
	183,962	637,663	217,694	189,018	189,018	189,018
Information Systems						
Hardware / Software	40,544	(34,432)	-	-	-	-
Application Development	749,387	1,243,327	458,798	393,851	393,851	893,851
	789,931	1,208,894	458,798	393,851	393,851	893,851
	6,823,132	**7,010,419**	**7,701,063**	**8,418,645**	**10,250,645**	**12,632,645**
Inventory Held for Capital Projects	3,402,771	3,411,683	2,952,274	3,709,935	3,709,935	3,709,935
	10,225,904	**10,422,102**	**10,653,337**	**12,128,580**	**13,960,580**	**16,342,580**

Allowance for Working Capital

London Hydro's working capital allowance has been calculated to be $37,977,770 for the proposed 2017 Test Year and is based on a rate of 8.67%.

Table 2-14 – Summary of Working Capital Allowance

SUMMARY OF WORKING CAPITAL ALLOWANCE	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 Board Approved to 2017 Test	CAGR
	$	$	$	$	$	$	$	%
Controllable Expenses	31,351,306	32,978,000	33,621,467	35,098,651	37,011,000	38,797,000	5,819,000	4.1%
Cost of Power (COP)	341,135,582	334,431,790	363,384,203	379,936,576	412,074,924	399,239,563	64,807,773	4.5%
Total Controllable Expenses & COP	372,486,887	367,409,790	397,005,671	415,035,227	449,085,924	438,036,563	70,626,773	4.5%
WCA Rate	11.42%	11.42%	11.42%	11.42%	11.42%	8.67%	-2.75%	
Working Capital Allowance (WCA)	**42,538,003**	**41,958,198**	**45,338,048**	**47,397,023**	**51,285,613**	**37,977,770**	(3,980,428)	-2.5%

On June 3, 2015, the Ontario Energy Board issued a letter regarding "Allowance for Working Capital for Electricity Distribution Rate Applications." In this letter, the Board adopted a new default value for calculating working capital allowance: 7.5% of the sum of the cost of power and operating, maintenance and administration (OM&A) costs.

As an alternative, London Hydro has elected to engage the services of Navigant Consulting Ltd. to perform a lead-lag study. This alternative was chosen because working capital is a significant component of London Hydro's rate base. Navigant's study was completed in March 2016 (using 2014 data) and calculates working capital as a percentage of OM&A including cost of power to be 8.67%. A copy of this study has been provided in Appendix 2-3 – Lead Lag Study.

As displayed in Table 2-14, actual results for 2013 working capital allowance were comparable to the 2013 Board Approved amount, varying by only 1.38%.

The 2017 working capital allowance has decreased $3,980,428, or 2.5% CAGR, in comparison to the 2013 Actuals. This change is a result of the decrease in the percentage rate applied in the computation of the working capital allowance from 11.42% to 8.67%, net of increased working capital requirements, due to the increased costs associated with controllable expenses and the cost of power as displayed below:

Increase in Controllable Expense	$	504,507
Increase in Cost of Power		5,618,834
		6,123,341
Decrease in WCA Rate from 11.42% to 8.68%		(10,103,769)
		(3,980,428)

Details regarding the calculation of total controllable expenses, used in the calculation of working capital, can be found within Exhibit 4, Section 'Operating Expenses', page 17. Additionally, volume, pricing and rates associated with the calculation of the cost of power for the proposed 2017 Test Year can be found in Exhibit 6, Tab 1, Schedule 1, Attachment 2.2.

Treatment of Stranded Assets Related to Smart Meter Deployment

London Hydro is not seeking recovery for any costs associated with stranded meters in this Application. All items relating to smart meters were settled in the 2013 Cost of Service Rate Application. Accordingly, London Hydro has not completed an Appendix 2-S: Stranded Meter Treatment, for this Cost of Service.

CAPITAL EXPENDITURES

Planning

London Hydro has prepared its first Distribution System Plan (DSP), in accordance with Chapter 5 of the "Filing Requirements for Electricity Transmission and Distribution Applications." The DSP has been submitted as a stand-alone document and can also be found in Appendix 2-6.

Capital spending information is provided for the 2012-2015 Historical Years, 2016 Bridge Year, and the 2017 Test Year. The DSP also contains forecasted capital expenditures beyond the 2017 Test Year, for 2018-2021, representing the total planning horizon of the instructed five years.

In Exhibit 2, capital expenditures are discussed at the project category level. In the DSP, spending has been presented at both the Chapter 5 Investment Categories level (System Access, System Renewal, System Service, General Plant), and it has also been broken down further to the project level. Table 2-42, further within this Exhibit, reconciles the total Chapter 5 spending amounts to the total project category spending amounts, in order to demonstrate that all items listed in the DSP are included within Exhibit 2. London Hydro has assigned all historical and future projects to the new categories as required by the Board.

London Hydro has engaged in regional planning sessions with various entities, such as Hydro One and neighbouring utilities, in accordance with the Board's RRFE. London Hydro has partnered with Hydro One regarding the Nelson TS Upgrade project; more information can be found on Page 75 within this Exhibit. Other planning sessions, regarding topics such as Customer Engagement and load forecasting have also occurred. More information on these planning initiatives can be found in section 3.1 and 3.2 of the DSP.

Required Information

Please refer to the table below for information on information required for Exhibit 2, per Section 2.2.2.2 of the Chapter 2 Filing Requirements.

REQUIRED INFORMATION	
Requirement	**Location**
Consolidated DSP	Appendix 2-6
Appendix 2-AB - Capital Expenditure Summary from Chapter 5 Consolidated Distribution System Plan Filing Requirements	2016 Filing Requirements Chapter 2 Appendices (Excel workbook)
Appendix 2-AA - Capital Projects Table	2016 Filing Requirements Chapter 2 Appendices (Excel workbook)
Explanation of Variances	Page 39
Accounting Treatment of Projects Greater than One Year	Page 45
Reconciliation of All Capital Components to Total Capital Budget	Page 45
Details of Any Capital Contributions Made re: CCRA	Page 39
Efficiencies Realized Due to Deployment of Smart Meters and Related Technologies	Page 35
Rate-Funded Activities to Defer Distribution Infrastructure	Page 37

Efficiencies Realized Due to Deployment of Smart Meters and Related Technologies

The implementation of smart meters has resulted in significant change for London Hydro's billing and distribution operations. Some of the key smart meter efficiencies and benefits leveraged by London Hydro include the following:

1) Meter Reading: The one obvious area of operating efficiency realized with wireless smart meters is the elimination of meter readers. In addition, human error in reading or recording incorrect values by meter readers has been eliminated.
2) Accuracy: The meter hardware itself is capable of more accurate readings than the previous electro-mechanical meters.
3) Faster replacement: To comply with the MDM/R requirement that no meters could be estimated more than 15 days, London Hydro revamped its operational procedures to dispatch field workers within hours of either meter failure alarms or lack of response from a meter. In the past, it may have taken several months before a failed meter was identified and fixed.

4) Missing Meters: Theft of meters and lost meters are quickly identified and can be found by triangulating the RF signal. In the past, lost or stolen meters could not be found easily. However, through detailed wireless reporting, London Hydro is able to monitor the metering installations and respond to these problems within hours.
5) System Voltage at the smart meter endpoints is now being reported through alarm settings and raw reported voltage data. While a voltage management system is yet to be developed to make full use of the smart meter sensor endpoint data, London Hydro has developed some basic reports and processes to monitor voltage. These changes have led to improvements in transformer tap management and phase outages.
6) Hot Sockets: Smart meters report high temperature conditions also known as “hot sockets.” These alarms are often present in the case of loose supply or load connections to the meter base and can result in fires. London Hydro has used these alarms to proactively detect and remedy potentially dangerous situations that would have otherwise not been detected.
7) Customer interaction: When customers call into the Contact Centre regarding high billing issues, the additional hourly data enables a more informed conversation between the customer and London Hydro.
8) Outage data: Smart meter power on / power off signals now send information from the AMI (Advanced Metering Infrastructure) smart meter system to the OMS (Outage Management System). This new functionality allows Control Room Operators to detect and respond to power outages before customers call in to complain and notify London Hydro.
9) Collection and customer interaction: Access to hourly data provides informed decision-making and evidence-based enforcement of collections or unauthorized meter removal or tampering. If a meter is enabled on a service that is intended to be off for collections, it can be monitored and alarmed to ensure there is no unauthorized consumption. Available data can serve as evidence or be made available to determine a bill for the used electricity.
10) Smart meters also provide a basis to integrate with thermostat demand response programs (e.g., OPA Peaksaver Plus) and other home area networking programs to offer to the customers.

The above qualitative benefits and efficiencies have led to financial savings for London Hydro, but these savings are not yet readily identifiable, as there is not enough data to perform a thorough quantitative analysis that would provide meaningful results at this time.

Rate-Funded Activities to Defer Distribution Infrastructure

London Hydro's Engineering and Planning team considers non-distribution alternatives at the planning and design stage when evaluating infrastructure changes. They are guided by a document referred to as "Engineering Instruction 31 – Asset Management Policy and Procedures (see DSP Appendix F)". The Director of Network Operations takes Regional Planning and REG requirements into account when assessing capacity and forecasting constraints (EI-31, Responsibilities, Step 1, System Service Part 4; EI-31, Procedures, Step 1, System Access Part 5 and System Service Part 5; EI-31, Procedures, Step 3, CDM). The Manager of Engineering considers CDM and REG investment alternatives prior to building new capacity and works with the Senior Director of Energy Management Programs to explore ways in which CDM initiatives can be used to reduce the need to invest in system assets (EI-31, Responsibilities, Step 3, Engineering Design Part 1).

The planning forecast for the overall supply to London also considers the impact of CDM and DG (see DSP Section 2.2.4 System Utilization). The forecast indicates that the supply to London through the seven transformer stations will be sufficient for at least twenty years. Therefore, London Hydro has not planned for any infrastructure upgrades to increase capacity at the transformer stations.

The long range plans for the downtown core of London include converting the 13.8 kV supply to 27.6 kV. As this conversion takes place, it is necessary to extend new 27.6 kV feeders into downtown to reliably supply load that was supplied at 13.8 kV. To determine the location and quantity of feeders required, the planning engineers considered the impact of existing CDM and DG in the system model by using real-time meter data (see DSP Appendix J). In consultation with the Senior Director of Energy Management Programs, the planning engineers also considered how additional CDM and DG might further affect the plans for new feeders, keeping in mind the need for redundancy to maintain a reliable supply. This evaluation concluded that the planned extension of feeders into the downtown could not be deferred through incremental CDM or DG because the primary driver of these feeder extensions is the conversion from 13.8

kV to 27.6 kV to eliminate aging infrastructure and the need for adequate redundancy to maintain a reliable supply to a significant and dense load growth area. While the extension of the 27.6 kV feeders may facilitate additional DG connections in the downtown core, these projects are needed to replace aging infrastructure and maintain a reliable supply. Therefore, London Hydro did not consider making a request for funding in accordance with O.Reg. 330/09.

Analysis of Capital Expenditures

Table 2-15 below outlines capital spending for the 2013 Board Approved Year, 2012-2015 Historical Years, 2016 Bridge Year and the 2017 Test Year. Material variances are further discussed below.

Table 2-15 – Capital Spending Summary 2012 – 2017 *(before capital contributions)*

CAPITAL SPENDING 2012 - 2017 (before Capital Contributions) SUMMARY BY CATEGORY									
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 Actuals to 2017 Test	CAGR
	$	$	$	$	$	$	$	$	%
Infrastructure	12,827,086	12,494,840	13,447,000	13,250,035	15,069,062	15,824,000	15,214,000	2,719,160	*5.0%*
Metering	739,835	743,722	648,000	837,612	1,274,040	1,639,000	1,671,000	927,278	*22.4%*
Fleet and Facilities	2,982,199	2,059,715	2,295,000	2,259,453	2,234,137	3,230,000	2,528,000	468,285	*5.3%*
Information Systems	5,672,943	6,875,635	6,000,000	4,425,591	5,563,977	4,940,000	4,510,000	(2,365,635)	*-10.0%*
Regular Capital Spending (at LHI's Discretion)	22,222,063	22,173,913	22,390,000	20,772,690	24,141,215	25,633,000	23,923,000	1,749,087	*1.9%*
TS Upgrade	-	-	-	-	1,616,590	1,832,000	1,882,000	1,882,000	
Demand	6,337,830	5,294,316	5,463,400	6,627,060	7,985,620	6,254,000	6,770,000	1,475,684	*6.3%*
Other Capital Spending (Atypical or Demand Driven)	6,337,830	5,294,316	5,463,400	6,627,060	9,602,210	8,086,000	8,652,000	3,357,684	*13.1%*
Inventory Held for Capital Projects	(250,719)	241,807	-	(450,497)	757,661	-	-	(241,807)	*-100.0%*
CGAAP to MIFRS Burden Adjustment	(536,620)							-	
	27,772,554	**27,710,036**	**27,853,400**	**26,949,253**	**34,501,087**	**33,719,000**	**32,575,000**	**4,864,964**	**4.1%**

London Hydro's capital expenditures are categorized into the following groupings and will be discussed further at these levels:

- Infrastructure
  - A - Substation Rebuild Projects
  - B - Subdivision Rebuild Projects
  - C - Main Feeder Projects
  - F - Network Projects
  - G - Overhead Line Work Projects
  - H - Automation Projects
- TS Upgrade (CC)
- Demand
  - D - City Works Projects
  - E - Developer Works Projects
- Metering (M)

- Fleet and Facilities
  - N - Vehicles and Major Equipment
  - O - Operating Equipment
  - Q - Office Furniture and Equipment
  - R - Building Improvements/Renovations
- Information Systems
  - V - Infrastructure and Hardware Projects
  - W - Application Development Projects

The largest increase in capital spending since the 2013 Actuals is in the area of Infrastructure, which has increased $2,719,160 or 5% CAGR. The majority of this increase is related to the Networks and Main Feeders categories, and is primarily driven by the need to convert the 4.16 kV and 13.8 kV systems to 27.6 kV and the subsequent expansion of the 27.6 kV system.

A new grouping in this Application is entitled TS Upgrade, with the first spending occurring in 2015. This grouping refers to capital contributions (intangible asset) paid to Hydro One regarding the decommissioning of the 13.8kV Substation and the conversion of the Substation to 27.6kV (Nelson).

The capital expenditures for the Demand area have increased by $1,475,684 or 6.3% CAGR between the 2013 Actual and the proposed 2017 Test Year. These increases are driven solely by City Works and Developer Works and are not under the control of London Hydro.

Spending for Metering has increased by $927,728 or 22.4% CAGR between the 2013 Actual and the proposed 2017 Test Year primarily due to a new AMI Communications Renewal project and increased equipment costs.

Fleet and Facilities spending has fluctuated insignificantly.

Information Systems spending is decreasing between the 2013 Actual and the proposed 2017 Test Year by $2,365,635 or 10.0% CAGR. This decrease is due to the increased reliance on Cloud Computing, which lessens the need for London Hydro-owned premise-based IT Infrastructure.

"Inventory held for capital projects" represents spending on capital-related inventory items such as transformers that have been purchased but not yet assigned to a specific capital job.

The "CGAAP to MIFRS Burden Adjustment" line refers to the 1576 IFRS-GAAP Transitional PP&E Amounts that were discussed fully in London Hydro's 2013 Cost of Service Rate Application.

Note that this capital spending information excludes renewable generation owned by London Hydro up to and including December 31, 2015.

Table 2-16 below further breaks down Capital Spending by Project Category.

Table 2-16 – Capital Expenditures 2012 – 2017

LONDON HYDRO INC. CAPITAL EXPENDITURES - 2012 TO 2017	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Infrastructure							
Substation Rebuilds							
Relay replacements	25,278	32,040	25,000	110,033	63,787	80,000	80,000
Downtown network supply reinforcement	10,361	-	-	-	-	-	-
Battery bank replacements	15,435	11,427	30,000	11,018	12,065	15,000	15,000
Switchgear modifications	32,636	107,589	120,000	81,590	142,207	-	-
Substation installations/refurbishments	525	183,850	-	(10,000)	-	-	-
Switch replacements	76,362	976	-	56,975	57,918	-	-
Voltage conversion	82,303	53,578	-	89,880	-	-	-
Vault Renewal and RTU Standardization	-	23,722	30,000	126	42,598	30,000	30,000
Other	-	7,570	15,000	-	-	-	-
	242,899	**420,752**	**220,000**	**339,622**	**318,575**	**125,000**	**125,000**
Subdivision Rebuilds							
Silicone Injection of Underground Cable	792,460	1,856,705	1,165,000	2,323,405	2,528,992	1,891,000	2,711,000
Conversions and Rebuilds with Silicone Injection	3,051,901	1,821,492	2,000,000	979,680	709,546	700,000	75,000
Air-Insulated Sectionalized Enclosures	492,255	512,158	480,000	350,100	221,833	246,000	293,000
Replace leaking transformer	1,115,183	1,091,724	1,050,000	570,360	1,493,000	700,000	700,000
Rebuild or Convert Vault Areas	152,397	264,152	385,000	91,029	170,696	166,000	144,000
Underground Conversions	85,744	370,753	468,000	329,213	731,287	1,489,000	556,000
Backup Supply and Fault Indicator Installations	109,326	61,638	40,000	52,886	181,561	90,000	90,000
Miscellaneous Subdivision Projects	33,610	20,456	25,000	22,015	26,322	20,000	20,000
Transformer Returns	-	(444,051)	-	(236,087)	(667,306)	(200,000)	(200,000)
	5,832,875	**5,555,027**	**5,613,000**	**4,482,600**	**5,395,930**	**5,102,000**	**4,389,000**
Main Feeders							
Reinforcements	456,904	575,177	989,000	344,509	153,939	-	-
Extensions & Installations	639,989	447,869	-	2,182	-	-	-
Conversions	2,628	1,545	-	35,415	1,544,346	1,492,000	815,000
Backup Supply & Civil Structure Installations	-	13,447	-	663,895	1,035,484	2,490,000	2,560,000
	1,099,522	**1,038,038**	**989,000**	**1,046,001**	**2,733,769**	**3,982,000**	**3,375,000**
Network							
Replacement of Network Vaults, Maintenance Holes and Transformers	839,431	616,923	530,000	1,324,019	1,537,231	1,000,000	1,020,000
Replacement of Primary/Second Cable	484,417	199,082	340,000	384,082	50,059	380,000	750,000
East End Network	425,361	55,299	120,000	-	-	-	-
Maintenance Hole Cable Rebuilds & Fuse Installs	40,344	243,550	150,000	142,460	539	550,000	300,000
Maintenance Hole Cable Protection	-	-	-	-	387,412	-	-
	1,789,554	**1,114,854**	**1,140,000**	**1,850,561**	**1,975,242**	**1,930,000**	**2,070,000**
Overhead Line Works							
Replacement of Fully Depreciated/Deteriorated Poles and Poles Susceptible to Fire	948,911	509,558	600,000	668,105	495,465	520,000	410,000
Arrestor/Insulator/Other	4,949	80,748	100,000	796,858	950,244	880,000	580,000
Rebuild Fully Depreciated Overhead Areas	2,514,411	814,383	200,000	228,610	316,131	300,000	260,000
Reliability/Outage Mitigation	450	127,350	250,000	296,880	1,655	-	-
Overhead Voltage Conversions	101,092	2,515,522	4,000,000	2,837,901	2,388,036	2,180,000	3,280,000
	3,569,813	**4,047,562**	**5,150,000**	**4,828,353**	**4,151,531**	**3,880,000**	**4,530,000**
Automation							
Recloser Installation	173,245	183,677	195,000	212,822	185,367	275,000	195,000
Remote Terminal Unit Replacements	46,451	66,789	50,000	199,051	189,867	130,000	130,000
Miscellaneous Automation	54,793	41,661	90,000	59,431	30,191	250,000	250,000
SCADA	6,476	26,481	-	163,357	81,115	100,000	100,000
Power Quality	-	-	-	34,991	4,009	50,000	50,000
Miscellaneous Control Room General Plant	11,458	-	-	33,244	3,468	-	-
	292,424	**318,608**	**335,000**	**702,897**	**494,015**	**805,000**	**725,000**
TOTAL INFRASTRUCTURE	**12,827,086**	**12,494,840**	**13,447,000**	**13,250,035**	**15,069,062**	**15,824,000**	**15,214,000**

LONDON HYDRO INC. CAPITAL EXPENDITURES - 2012 TO 2017 *(cont'd)*

	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
TS Upgrade							
TS Upgrade							
Contribution to TS Upgrade	-	-	-	-	1,616,590	1,832,000	1,882,000
TOTAL TS UPGRADE	**-**	**-**	**-**	**-**	**1,616,590**	**1,832,000**	**1,882,000**
Demand							
City Works							
City of London (Road Authority) Relocations	1,446,613	543,034	805,400	1,542,380	1,968,293	1,996,000	2,250,900
Developer Works							
Developer Expansions & Relocations	400,272	531,758	594,000	254,200	269,752	146,000	340,900
Residential Secondary Service Upgrade	305,886	306,803	325,000	307,721	369,831	340,000	355,000
Single Family Residential Underground	1,333,826	900,487	1,174,000	1,868,778	1,388,376	1,066,000	1,090,200
Multi-Family Residential Underground	393,578	744,736	565,000	616,065	1,400,041	766,000	783,000
Commercial Distribution Services	2,457,653	2,267,498	2,000,000	2,037,915	2,589,329	1,940,000	1,950,000
	4,891,216	**4,751,282**	**4,658,000**	**5,084,680**	**6,017,328**	**4,258,000**	**4,519,100**
TOTAL DEMAND PROJECTS	**6,337,830**	**5,294,316**	**5,463,400**	**6,627,060**	**7,985,620**	**6,254,000**	**6,770,000**
Metering							
Metering and installations	680,002	633,937	527,000	680,197	895,391	660,000	668,000
Primary metering	56,614	109,785	121,000	112,549	85,368	354,000	354,000
Testing and validation equipment	-	-	-	44,865	293,280	-	-
AMI Communications Renewal	-	-	-	-	-	625,000	649,000
Wholesale metering upgrades	3,220	-	-	-	-	-	-
TOTAL METERING	**739,835**	**743,722**	**648,000**	**837,612**	**1,274,040**	**1,639,000**	**1,671,000**
Fleet and Facilities							
Vehicles & Major Equipment							
Vehicles and Major Equipment	1,675,405	1,310,236	1,410,000	771,500	1,195,208	1,130,000	1,099,000
	1,675,405	**1,310,236**	**1,410,000**	**771,500**	**1,195,208**	**1,130,000**	**1,099,000**
Operating Equipment							
Stores Equipment	119	5,499	5,000	3,348	65,707	165,000	40,000
Miscellaneous Operating Equipment	168,718	130,517	150,000	192,161	146,759	280,000	280,000
	168,837	**136,016**	**155,000**	**195,509**	**212,466**	**445,000**	**320,000**
Office Furniture & Equipment							
Office Furniture/Equipment	84,536	101,296	80,000	121,041	79,805	455,000	197,000
	84,536	**101,296**	**80,000**	**121,041**	**79,805**	**455,000**	**197,000**
Buildings & Fixtures							
Heating/Venting & A/C	39,931	-	100,000	24,453	73,410	150,000	154,000
Paving	440,753	230,555	250,000	140,550	66,750	345,000	346,000
Improvements/Renovations	247,548	138,560	175,000	896,314	464,798	530,000	360,000
Garage Fixtures	-	-	125,000	-	127,520	-	-
Roofing	10,153	-	-	-	-	-	-
Yard Environmental Controls	-	-	-	-	-	50,000	-
Standby Generator	293,762	75,649	-	-	10,952	50,000	52,000
Uninterrupted Power Supply & Battery Banks	21,275	67,403	-	110,086	3,229	75,000	-
	1,053,422	**512,167**	**650,000**	**1,171,402**	**746,658**	**1,200,000**	**912,000**
TOTAL FLEET AND FACILITIES	**2,982,199**	**2,059,715**	**2,295,000**	**2,259,453**	**2,234,137**	**3,230,000**	**2,528,000**

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LONDON HYDRO INC. CAPITAL EXPENDITURES - 2012 TO 2017 *(cont'd)*	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Information Systems							
Hardware and Software							
Desktop solutions	75,417	75,858	45,000	112,079	136,377	129,000	120,000
Network development	394,167	819,070	200,000	109,615	374,664	195,000	250,000
Servers and storage	641,703	347,304	760,000	127,129	821,405	315,000	220,000
Back up solutions	13,510	23,550	25,000	49,467	38,246	50,000	30,000
Miscellaneous software	50,890	211,109	85,000	200,422	2,023	25,000	25,000
Miscellaneous hardware	1,545	109,812	5,000	18,953	21,428	21,000	15,000
Miscellaneous IT tools	136,622	3,681	5,000	9,289	-	10,000	10,000
Phone system	9,566	28,103	10,000	499,246	2,204	65,000	50,000
Physical plant	10,787	30,230	75,000	-	21,611	-	15,000
Wireless Communication	9,368	98,639	-	-	-	-	-
	1,343,575	**1,747,356**	**1,210,000**	**1,126,199**	**1,417,956**	**810,000**	**735,000**
Application Development							
Customer Information System (CIS)	383,121	874,096	835,000	601,952	406,743	855,000	300,000
CIS retailer requirements	767,734	-	-	-	-	-	-
CIS Customer Relations Management upgrade	-	726,038	525,000	417,044	-	175,000	-
Cyber Security	-	-	-	-	266,760	125,000	50,000
System Foundations	-	-	-	-	250,242	305,000	150,000
Customer Engagement - Residential	-	-	-	539,465	648,647	300,000	825,000
Customer Engagement - Commercial & Industrial	-	-	-	-	8,121	740,000	400,000
CIS regulatory requirements	260,602	266,879	480,000	9,017	304,583	140,000	250,000
Geographic Information System (GIS)	453,662	-	-	-	158,736	40,000	-
Outage Management System (OMS)	707,427	1,194,718	1,500,000	514,796	107,614	350,000	-
Customer Engagement / Web Presentment & TOU	208,782	1,524,585	500,000	45,314	-	-	-
Meter data	1,548,041	4,696	-	229,753	314,117	150,000	400,000
Mobile Workforce (MWFM)	-	518,019	450,000	489,533	781,324	300,000	300,000
Business intelligence	-	19,249	500,000	1,912	150,814	175,000	250,000
Enterprise Resource Planning (ERP)	-	-	-	450,607	748,319	475,000	850,000
	4,329,368	**5,128,280**	**4,790,000**	**3,299,393**	**4,146,021**	**4,130,000**	**3,775,000**
TOTAL INFORMATION SYSTEMS	**5,672,943**	**6,875,635**	**6,000,000**	**4,425,591**	**5,563,977**	**4,940,000**	**4,510,000**
TOTAL CAPITAL PROJECTS	**28,559,893**	**27,468,229**	**27,853,400**	**27,399,750**	**33,743,426**	**33,719,000**	**32,575,000**
Inventory Held for Capital Projects	(250,719)	241,807	-	(450,497)	757,661	-	-
CGAAP to MIFRS Burden Adjustment	(536,620)	-	-	-	-	-	-
Less: Capital Contributions	(3,780,997)	(2,418,672)	(2,700,000)	(1,870,692)	(3,788,551)	(2,087,000)	(2,101,000)
NET CAPITAL PROJECTS	**23,991,557**	**25,291,364**	**25,153,400**	**25,078,561**	**30,712,535**	**31,632,000**	**30,474,000**

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Capital Projects Longer than One Year

London Hydro has only one project with a life cycle greater than one year: the Nelson transformer station upgrade (See Page 75 within this Exhibit for more information). Spending regarding this project remains in Construction Work In Progress (CWIP) until the asset is placed into service in 2018. At this time, capital expenditures as well as a financing charge (Allowance for Funds Used During Construction or ``AFUDC``) will be capitalized. The interest rate used for the AFUDC calculation is based on the quarterly OEB prescribed rates.

Reconciliation to Total Capital Budget

The capital expenditures shown below agree with the 2016 and 2017 Capital Plan as approved by the London Hydro Board of Directors on December 9, 2015. The only exception pertains to the presentation of transformers returned from the field during a transformer replacement. As some of these transformers may be refurbished and reused, London Hydro budgets for an internal cost recovery of these amounts against "Subdivision Rebuilds." This amount is not listed on the London Hydro Board of Directors Approved Plan since capital expenditures are presented as gross spending.

No capital spending is planned for any non-distribution activities; therefore, an additional reconciliation is not required.

A Comparison between 2013 and 2017

The increase in spending from 2013 to 2017 can be broken down into 3 segments: (1) basic costs, (2) inflation, and (3) TS Upgrade & Demand spending. The basic costs segment is the only area of the spending increase that is at London Hydro's regular discretion, so further discussion will be focused here.

Proposed capital spending for the 2017 Test Year is $2,906,413 or 10.5% higher compared to actual spending in 2013, after adjusting to remove the effects of inflation. Inflation is estimated at a rate of 9.0% based on Statistics Canada CPI for Ontario for the years 2013 to 2017, weighted with London Hydro wage escalation rates.

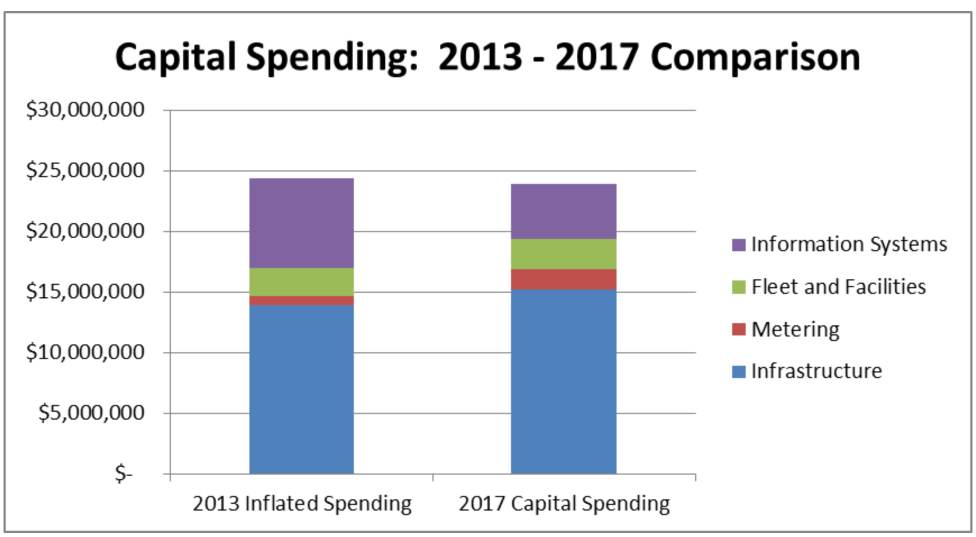
When capital spending in the areas of TS Upgrade and Demand are removed (due to being atypical or demand-driven), the variance between 2013 inflated spending and 2017 proposed spending, in fact, represents a decrease of $510,135 or 2.1% (or an annual decrease of 0.5%). This outcome demonstrates that although at a category level spending patterns have changed, London Hydro's regular discretionary spending at a corporate level has remained relatively consistent from 2013 to 2017.

Tables 2-17 and 2-18 below further demonstrate the consistency of London Hydro's discretionary spending.

Table 2-17 – Impact of Inflation on Capital Spending

Category	Capital Spending 2013	Add: Inflation @ 9.0%	2013 Inflated Spending	2017 Capital Spending	Change Spending 2017 - Inflated 2013	% Change
Regular Spending (at LHI's Discretion):						
Infrastructure	$ 12,736,648	$ 1,146,298	$ 13,882,946	$ 15,214,000	$ 1,331,054	9.6%
Metering	$ 743,722	$ 66,935	$ 810,657	$ 1,671,000	$ 860,343	106.1%
Fleet and Facilities	$ 2,059,715	$ 185,374	$ 2,245,089	$ 2,528,000	$ 282,911	12.6%
Information Systems	$ 6,875,635	$ 618,807	$ 7,494,443	$ 4,510,000	$ (2,984,443)	-39.8%
	$ 22,415,720	$ 2,017,415	$ 24,433,135	$ 23,923,000	$ (510,135)	-2.1%
Other Spending (Atypical or Demand-Driven)						
TS Upgrade	$ -	$ -	$ -	$ 1,882,000	$ 1,882,000	
Demand	$ 2,875,644	$ 258,808	$ 3,134,452	$ 4,669,000	$ 1,534,548	49.0%
	$ 2,875,644	$ 258,808	$ 3,134,452	$ 6,551,000	$ 3,416,548	109.0%
	$ 25,291,364	**$ 2,276,223**	**$ 27,567,587**	**$ 30,474,000**	**$ 2,906,413**	**10.5%**

Table 2-18 – LHI's Regular Capital Spending: A Comparison 2013 – 2017



Infrastructure

Forecasted spending for Infrastructure for the proposed 2017 Test Year is $15,214,000, representing an increase of $2,719,160 or 5.0% CAGR compared to the 2013 Actuals. Table 2-19 below further divides Infrastructure spending into various project categories, which are then subdivided and discussed further.

Table 2-19 – Infrastructure Capital Spending by Project Category 2012 - 2017

INFRASTRUCTURE CAPITAL SPENDING 2012 - 2017									
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 Actuals to 2017 Test	CAGR
	$	$	$	$	$	$	$	$	%
Infrastructure									
Substation Rebuilds	242,899	420,752	220,000	339,622	318,575	125,000	125,000	(295,752)	*-26.2%*
Subdivision Rebuilds	5,832,875	5,555,027	5,613,000	4,482,600	5,395,930	5,102,000	4,389,000	(1,166,027)	*-5.7%*
Main Feeders	1,099,522	1,038,038	989,000	1,046,001	2,733,769	3,982,000	3,375,000	2,336,962	*34.3%*
Networks	1,789,554	1,114,854	1,140,000	1,850,561	1,975,242	1,930,000	2,070,000	955,146	*16.7%*
Overhead Line Work	3,569,813	4,047,562	5,150,000	4,828,353	4,151,531	3,880,000	4,530,000	482,438	*2.9%*
Automation	292,424	318,608	335,000	702,897	494,015	805,000	725,000	406,392	*22.8%*
	12,827,086	**12,494,840**	**13,447,000**	**13,250,035**	**15,069,062**	**15,824,000**	**15,214,000**	**2,719,160**	**5.0%**

Infrastructure related projects result from engineering and planning studies, as well as from operational issues. Infrastructure spending is divided into six categories of work: substation rebuilds, subdivision rebuilds, main feeders, networks, overhead line work, and automation. Each category is described further below.

Substation Rebuilds (A)

Overview

London Hydro has been gradually eliminating 4.16 kV and 13.8 kV substations through voltage conversion projects. These conversion projects replace distribution assets at end of life with modern equivalents that operate at the standard voltage of 27.6 kV. This higher voltage reduces system losses and increases capacity. However, in the interim, the reliability of the 4.16 kV system must be sustained; therefore, investment will continue in projects that help to sustain the existing substations, including projects that involve the refurbishment of switchgear, relays and egress cables, etc. that is required for the safe and reliable operation of the substation. These projects also include the replacement of relays, battery banks and communication equipment.

Capital Spending

Forecasted spending for Substation Rebuilds for the proposed 2017 Test Year is $125,000; $295,752 lower than the 2013 Actuals. Table 2-20 below divides Substation Rebuilds spending to the project type.

Table 2-20 – Substation Rebuilds Capital Spending 2012 – 2017

SUBSTATION REBUILDS CAPITAL SPENDING							
Annual Spending	**2012 Actual**	**2013 Actual**	**2013 Board Approved**	**2014 Actual**	**2015 Actual**	**2016 Bridge**	**2017 Test**
	$	$	$	$	$	$	$
Downtown network supply reinforcement	10,361	-	-	-	-	-	-
Substation installations/refurbishments	525	183,850	-	(10,000)	-	-	-
Relay replacements	25,278	32,040	25,000	110,033	63,787	80,000	80,000
Battery bank replacements	15,435	11,427	30,000	11,018	12,065	15,000	15,000
Switchgear modifications	32,636	107,589	120,000	81,590	142,207	-	-
Switch replacements	76,362	976	-	56,975	57,918	-	-
Voltage conversion	82,303	53,578	-	89,880	-	-	-
Vault Renewal and RTU Standardization	-	23,722	30,000	126	42,598	30,000	30,000
Other	-	7,570	15,000	-	-	-	-
Total	**242,899**	**420,752**	**220,000**	**339,622**	**318,575**	**125,000**	**125,000**
Annual Change		177,852	(200,752)	(81,129)	(21,048)	(193,575)	-

To reduce costs, when substations are decommissioned, parts that could be used to maintain the remaining substations are salvaged; although, certain components such as relays or battery banks must be replaced with new ones. This approach has resulted in a general decline in the capital spending required to sustain the remaining substations. In some areas, a substation may require upgrades to extend its useful life long enough to allow the area to be converted, which can result in capital spending on switchgear modifications. For the Bridge and Test Years, only minor capital investments are required.

Subdivision Rebuilds (B)

Overview

Project categories relating to underground distribution plant that are planned for 2016 and 2017 have been selected based on the recommendations of the Asset Sustainment Plan and SPOORE analysis (see Appendix G of the Distribution System Plan), which identify assets approaching end of life or at risk of failure. The central focus of all these projects is to maintain reliability and safety of the distribution grid in a manner that is consistent with the long-term planning strategies. Projects include the rehabilitation of underground cable by means of silicone injection and/or replacement in underground residential subdivisions, the continuation of the replacement of air-insulated switching enclosures, the replacement of leaking padmounted transformers, the replacement of dry-type vault transformers inside of buildings, the conversion of 4.16 kV and 13.8 kV underground system equipment and other smaller projects outlined below.

Capital Spending

Forecasted spending for Subdivision Rebuilds for the proposed 2017 Test Year is $4,389,000, which is $1,166,027 lower than the 2013 Actuals. Table 2-21 below divides Subdivision Rebuilds spending into project type.

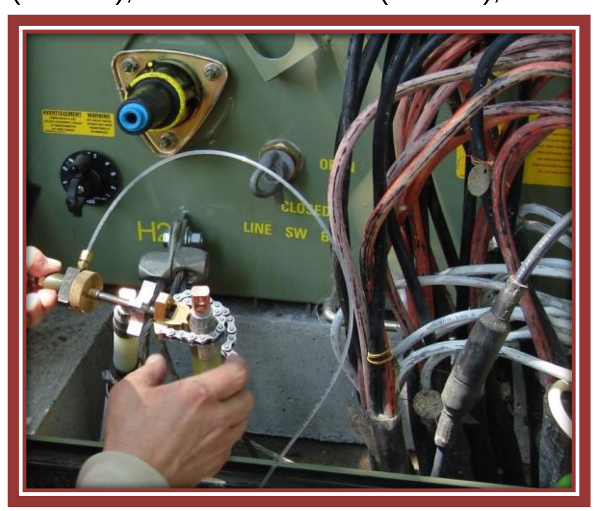
Table 2-21 – Subdivision Rebuilds Capital Spending 2012 – 2017

SUBDIVISION REBUILDS CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Silicone Injection of Underground Cable	792,460	1,856,705	1,165,000	2,323,405	2,528,992	1,891,000	2,711,000
Conversions and Rebuilds with Silicone Injection	3,051,901	1,821,492	2,000,000	979,680	709,546	700,000	75,000
Air-Insulated Sectionalized Enclosures	492,255	512,158	480,000	350,100	221,833	246,000	293,000
Replace leaking transformer	1,115,183	1,091,724	1,050,000	570,360	1,493,000	700,000	700,000
Rebuild or Convert Vault Areas	152,397	264,152	385,000	91,029	170,696	166,000	144,000
Underground Conversions	85,744	370,753	468,000	329,213	731,287	1,489,000	556,000
Backup Supply and Fault Indicator Installations	109,326	61,638	40,000	52,886	181,561	90,000	90,000
Miscellaneous Subdivision Projects	33,610	20,456	25,000	22,015	26,322	20,000	20,000
Transformer Returns	-	(444,051)	-	(236,087)	(667,306)	(200,000)	(200,000)
Total	**5,832,875**	**5,555,027**	**5,613,000**	**4,482,600**	**5,395,930**	**5,102,000**	**4,389,000**
Annual Change		(277,847)	57,973	(1,072,427)	913,330	(293,930)	(713,000)

Silicone Injection of Underground Cable / Conversions and Rebuilds with Silicone Injection

These projects include either the rehabilitation of underground cable through the use of silicone injection or full cable replacement where injection is not possible. In 2002, London Hydro used the silicone injection process to rehabilitate several kilometres of underground cable in the Westmount West subdivision. The project was a great success given that no cable failures have occurred in that area since that time. The rehabilitation/replacement process has resulted in approximately 400 km of cable being addressed since 2001 and will result in the planned completion of 41 km of cable in 2016 and 35 km in 2017. A total of 198 transformers will also be replaced during 2016 and 2017 as part of this work. Silicone injection technology increases the lifespan of polymeric cable by adding up to another 40 years of service, and this method is much more cost effective than replacing cables, especially those that are direct-buried.

Six subdivisions were selected for silicone injection work in 2016: Cleardale West (13 km), Somerset Ridge Phase 1 (6.2 km), Hutton Gate (1.4 km), Sherwood Forest (8.8 km), Somerset Ridge Phase 2 (7.1 km), and Joklin (1.9 km). Nine subdivisions have been selected for silicone injection work in 2017: Berkshire Village (0.4 km), White Oaks West (10.8 km), Byron Woods (4.0 km), Belmont (2.9 km), Waterman Avenue (1.4 km), Whitlow Estates (4.8 km), Huron Village (4.4 km), Huntington Meadows (4.5 km), and Glenora Drive (0.8 km). These subdivisions were selected using the SPOORE analysis, which measures safety, performance, operability, outage risk and environmental impact of the underground cable. The analysis is based on a multi-year performance window, which takes into account age and failure rate of cables and transformers, as well as the presence of transformer leaks.



The rehabilitation project also includes the replacement of 158 single phase padmounted transformers that have deteriorated, are leaking or do not meet current standards. The new transformers will be equipped with dual load break switches that provide operational flexibility and are expected to reduce downtime for customers by allowing more effective restoration and regular maintenance switching. These investments also improve employee safety in eliminating live front equipment on the system.

Air-Insulated Sectionalizing Enclosures

This project involves the replacement of air-insulated sectionalizing enclosures (sometimes referred to as switching enclosures or padmounted switchgear). In 2006, a report was prepared that detailed the problems posed by these enclosures and recommended solutions for addressing the rash of failures of the units in service. As presented in the report, the solution calls for the replacement or elimination of these units wherever possible. The replacement units are non-air-insulated and are not prone to the same modes of failure as the air-insulated units. The program will be entering its twelfth year in 2016 and it is expected to be completed by 2021. This program has proven to be effective by the decrease of in-service failures. As we address the higher risk units, the probability for failure and customer impact diminishes.

Replace Leaking Transformers

This project addresses the problem of transformers that are found to be leaking oil and cannot be repaired in the field. For both pole-top and padmounted transformers, oil leakage is detected through DSC inspections or through customer or staff notification. Notwithstanding the fact that fixing the problem immediately is a requirement of the Ministry of the Environment, fixing it early avoids a more costly cleanup and potentially lengthy outage in the future.

To ensure all transformers (both pole-mounted and padmounted) are inspected every three years, London Hydro has divided the City into a grid and audits the condition of the transformers for one-third of the system each year. These audits help identify potentially defective/end-of-life or leaking transformers for replacement.

London Hydro takes its environmental responsibilities seriously and, therefore, continues to invest capital dollars in the identification and removal of these problematic transformers. This budget item also includes funding for the replacement of transformers that have failed in the field or require immediate replacement, prioritized according to audit results. The cost to replace a typical padmounted transformer ranges from $7,500 to $20,000 depending on its type and size. In an effort to reduce some of the transformer costs, London Hydro has a transformer rebuild program through which transformers removed from service as part of the 4.16 kV and 13.8 kV conversion program are rebuilt for our 27.6kV system. Savings from this program can reach 75% of the cost of a new transformer depending on the transformer specifications. On average, London Hydro has been replacing approximately 60-80 units a year. Spending in this area has been high due to the increased amount of rehabilitation work in underground subdivisions that has been required outside of the annual DSC inspections.

Rebuild or Convert Vault Areas

These projects involve the rebuilding or converting of transformer vaults that are deteriorating, have reached the end of their useful life and are outside of the DSP conversion plan areas. Transformer vaults are usually located on customer-owned premises, such as in apartment building basements, school vaults etc. London Hydro requires permission from the owner to upgrade the service and, therefore, engages the customer in the decision-making process. Selection information is gathered during DSC inspections. The transformer vault replacement projects are also coordinated with the 13.8 kV and 4.16 kV conversion projects when possible.

Underground Conversions

The projects in this area involve the replacement or conversion of the underground systems, as outlined in the conversion plans. They include replacement of cables, switchgears, padmounted transformers, transformer vaults and customer-owned substations. These conversions require very close co-ordination with the overhead line conversions that are outlined later in this document.

Some of the conversions are for 13.8 kV non-network commercial customers in the downtown core which include supply from existing vaults and maintenance holes. While some civil work such as ducts or maintenance hole replacement on private property is covered under this section any work required on the vaults and maintenance holes in the downtown core network and non-network systems is covered in the Networks Section on page 60.

Backup Supply and Fault Indicator Installations

These projects are targeted at improving reliability by reducing restoration time. These projects achieve this goal through the installation of a looped underground system versus a radially supplied system, or through the installation of fault indicators on mini-pad transformers. The looped underground system allows crews to isolate a section of faulted cable to a small area and restore power to most if not all customers quickly. The fault indicators allow crews to identify faulted cables quickly within underground subdivisions, accelerating power restoration efforts.

Main Feeders (C)

Overview

London Hydro has made significant investments in order to increase the available capacity of our 27.6 kV distribution system. These investments have resulted in desirable loading levels on our feeders while also improving our reliability performance by reducing the average number of customers that are connected to a feeder. By maintaining proper loading levels on our feeder circuits, we ensure that we have sufficient flexibility to accommodate the majority of operating conditions that occur during peak and non-peak load periods, as well as to handle the natural system load growth.

Currently, London Hydro has energized 50 of the 52 feeder positions that are available at the Hydro One transformer stations. In 2016 and 2017, we will continue to reinforce our system capacity by constructing feeder enhancements in parts of the City where reinforcement is needed or operating flexibility is constrained.

London Hydro will also combine plans to integrate the new Nelson 27.6kV transformer station scheduled for completion in 2018 into immediate projects such as road improvements that are initiated by the City of London, 27.6kV supplies to the City core, and replacement of aging infrastructure. By considering all drivers relating to projects in a common geographic area, we are able to maximize the effectiveness of capital expenditures.

Capital Spending

Forecasted spending for Main Feeders for the proposed 2017 Test Year is $3,375,000; $2,336,962 higher than the 2013 Actuals. Table 2-22 below breaks down Main Feeders spending to the project type.

Table 2-22 – Main Feeders Capital Spending 2012 – 2017

MAIN FEEDERS CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Reinforcements	456,904	575,177	989,000	344,509	153,939	-	-
Extensions & Installations	639,989	447,869	-	2,182	-	-	-
Conversions	2,628	1,545	-	35,415	1,544,346	1,492,000	815,000
Backup Supply & Civil Structure Installations	-	13,447	-	663,895	1,035,484	2,490,000	2,560,000
Total	**1,099,522**	**1,038,038**	**989,000**	**1,046,001**	**2,733,769**	**3,982,000**	**3,375,000**
Annual Change		(61,483)	(49,038)	7,962	1,687,768	1,248,231	(607,000)

Extensions & Installations – 2012-2013

Spending in 2012 was high in this area primarily due to a feeder extension on Wellington Road from Scotland Drive to Glanworth Road.

Spending in 2013 was high in this area due to main feeder replacements at Maitland Street & Nelson Street to King Street & Waterloo Street, which coincided with a major City infrastructure and road works project.

Conversions – 2015-2017

A multi-year voltage conversion of 13.8kV loads to 27.6kV will facilitate the removal of aging distribution infrastructure, as well as address the long-term strategic plans described in the "London Downtown – 13.8kV/27.6kV Nelson TS - 5 Year Plan" report, which recommends the conversion of the non-network downtown core to 27.6kV supply. See Appendix J of the DSP for additional information.

The work proposed for 2016 and 2017 relate to the second and third years of a multi-year strategic plan to resupply non-network 13.8kV loads at 27.6kV supply. This work is also coordinated with other plans that will address the age and condition of the existing 13.8kV Nelson TS supply from Hydro One.

Three projects are scheduled for 2016:

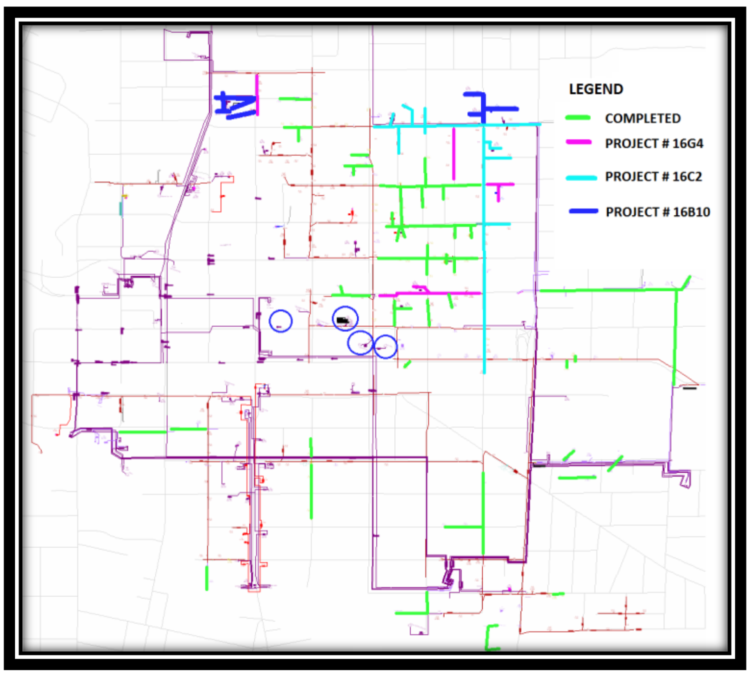
1. William Street (York Street to Central Avenue)
2. Central Avenue (Adelaide Street to Colborne Street)
3. South Street Colborne Street to Wellington Road

Seven projects are scheduled for 2017:

1. Queens Avenue (Waterloo Street to Colborne Street)
2. Waterloo Street (Queens Avenue to Central Avenue)
3. Princess Avenue (City Hall to Colborne Street)
4. Pall Mall Street (Richmond Street to Waterloo Street, south to Central Avenue, east to Colborne Street)
5. King Street (Waterloo Street to William Street)
6. York Street (Burwell Street to Florence Street)
7. Carling Street (Richmond Street to Talbot Street)

The above projects are separated strategically to permit staging of conversion and severing of 13.8kV ties.

Figure 2-1: Five Year 13.8 kV to 27.6 kV Conversion Plan



New Main Feeder Ties (component of Conversions above)

The initiatives outlined in the "4.16kV Aging Infrastructure System Planning Report (2011)" require rebuilding and converting all the 4.16kV plant within three specified areas, identified as Zones ‘A’, 'B' & 'C'. In addition, the proposed rebuilds replace deteriorating infrastructure, thereby meeting the criteria outlined in the "Asset Sustainment Plan, 2015 - 2029 Report" (see DSP Appendix G for the Asset Sustainment Plan contained in the Asset Management Plan).

In 2015, London Hydro commenced rebuilding and converting the Zone 'B' area. This first year of Zone 'B' conversion focused on the voltage conversions along Dundas Street and the circuits supplied off of Dundas Street between Clarke Road and Edmonton Street. For 2016, the first project will be the second phase of the rebuilding and conversion of Dundas Street between Third Street and Saskatoon/Second Street and will complete the main feeder tie between Clarke Road and Saskatoon/Second Streets. This feeder build work will be coordinated with a neighbouring depreciated overhead area project that is along Dundas Street.

The second project consists of an additional 27.6kV tie along Third Street between Dundas Street and Parkhurst Avenue. The Network Planning Department has identified a need to have a tie between the 70M8 and 4M12/4M18 feeders in this area of the City to assist with the backup and reconfiguration of load. Also, a long radial section of the 29F4 4.16kV feeder will be converted to 27.6kV as part of the Zone 'B' conversion area, improving reliability and providing a backup supply.

Additional projects include installing reclosers/automated switches to help reconfigure the 27.6kV feeders and to offload the 32M4 feeder. This offloading will aid in reliability and help balance loading and transfer capability.

Backup Supply & Civil Structure Installations

Much of the downtown core electrical system is comprised of vintage 1950's 13.8kV equipment, maintenance holes and duct systems. The City has created incentives to encourage construction of multi-residential units in the core. The resulting new development, in turn, places increased demand on the older electrical system. London Hydro has created the "London Downtown – the 13.8kV/27.6kV Nelson TS – 5 Year Plan" and the "London Downtown Long Term 27.6kV Supply and 13.8kV Decommissioning Strategy (2014)" reports to ensure the coordinated strategic conversion of the 13.8 kV non-network system to a 27.6 kV system to re-supply existing load, meet projected future demand and rebuild fully-depreciated downtown core systems with the integration of a new Nelson TS 27.6 kV substation.

The backup supply project intends to leverage the only other 27.6kV circuit nearby to back-up the 26M51 feeder. As well, the 27.6kV-13.8kV stepdown distribution stations (Substation 11 & Substation 12) that supply the downtown core will be interconnected, thereby providing an alternative underground backup for what now relies on an overhead circuit as a backup. These new feeders in the downtown core will increase the adequacy and security of supply to the downtown by providing additional capacity for growth, the potential to convert aging infrastructure and, thereby, eliminate lead cable in the core, and provide a much needed backup for the 26M51 feeder to increase reliability.

Approximately one third of the downtown load, including several major customers, is supplied at 27.6kV through the 26M51 feeder via Talbot TS, which is reaching its maximum capacity for load and includes sections of underground supply cables in a common duct bank without an alternative supply. Furthermore, the City of London has communicated plans to rebuild Dundas Street from store-face to store-face for a length of four (4) blocks, which affects a significant portion of the 26M51 feeder and risks the integrity of supply to customers in the area. This two-year project will include extensive infrastructure rehabilitation along Dundas Street from Wellington Road to the Thames River and is scheduled to start in 2017. In conjunction with the City's projects, London Hydro will replace fully-depreciated assets, which inspections have deemed require replacing, install concrete-encased duct and maintenance hole systems, and rebuild and modernize the existing electrical distribution system along Dundas Street. The installation of this infrastructure will also permit London Hydro to install future main feeder circuits and provide the City's core with a scalable 27.6 kV supply.

Additionally, the City of London will be conducting extensive infrastructure rehabilitation along the sections of South Street between Colborne Street and Wellington Road in 2016. In conjunction with the City's projects, London Hydro will install concrete-encased duct and maintenance hole systems. The installation of this infrastructure will permit London Hydro to install future main feeder circuits that will originate from the rebuilt Nelson Transformer Station.

Networks (F)

Overview

The Network system supplies customers in the downtown core area and shares common infrastructure with the 27.6kV system and the non-network 13.8kV system. This system is comprised of five primary feeders that supply 75 submersible transformers. The transformers are located in vaults situated below the sidewalks at various locations throughout the area. The secondaries of the transformers are connected together such that if one transformer or primary cable fails, the remaining transformers continue to supply the load.

Over the past 10 years, a substantial amount of replacement work has been completed on the transformer fleet. As well, sections of the primary and secondary cable systems have been replaced. During the replacement of the cables, the system is often reconfigured to eliminate congestion. Cables are sometimes rerouted in an effort to eliminate situations in which the failure of one component can affect many. Existing lead-covered cables (PILC) are being replaced with a non-lead alternative (EPR – ethylene propylene rubber) to improve health and safety and reduce environmental concerns associated with PILC cables. The end product is a more robust, safer and environmentally beneficial system, which benefits customers as outage duration (SAIDI) should be reduced.

Another area of focus is ensuring the structural condition of vaults and maintenance holes (vaults contain transformers, maintenance holes contain cables). In 2012, safety concerns within the downtown core maintenance vaults resulted in London Hydro engaging a structural engineering consultant to assess the condition of maintenance holes and vaults in the core area. In order to obtain an accurate assessment of the condition of the structures, the consultant inspected one half of all structures including a sampling of the oldest structures in the system. The resultant report ("Summary Report of Structures Inventory – Maintenance Holes & Network Transformer Vaults (Phase 1 - 2012)" outlines a priority schedule for replacement/refurbishment along with projected expenditure levels.

The general recommendation, in line with the report, was that London Hydro did not need to replace vaults when they reach their estimated end of life but rather continue with inspection protocols to determine if the life of the asset could be safely extended. A five-year inspection cycle was also recommended for London Hydro civil structures.

The DSC does not specify an inspection regime for non-electrical components, but London Hydro has developed an inspection checklist (as part of the EIAM audit process) that must be completed by staff when they perform audits on network transformers, which occurs once every two months on average. The inspection covers the condition of the vault's walls, roof slabs, access grates, ladders, pumps and lighting system. See Exhibit 4, Section "London Hydro's Electrical Inspection and Maintenance Program ("EIAM"), for more information on these audits.

At times, London Hydro would abandon a vault after removing all the electrical components while keeping the civil structure in place. The civil structure could pose a risk to public safety if it were allowed to deteriorate; therefore, even abandoned vaults continue to be inspected until fully removed.

Similar to maintenance hole rebuilds, network transformer vault rebuilds at an existing site are costly due to the complexity of construction. Most vaults are rebuilt in the same location, especially when space in the downtown core to construct new vaults is limited. Vault rebuilds, while maintaining customers' electrical services, require cable reconfigurations or temporary supply installations, removal of the network transformer, repair and/or rebuilding of parts or the entire vault and the subsequent installation of the new transformer and associated cables. In general, vaults house a single network transformer, but some can house up to four transformers. On occasion, rebuilding a vault may not be necessary as its condition can be improved by refurbishing it for a lower cost.

Figure 2-2 – Image of Corroded Network Transformer & Vault Severe Delamination

Capital Spending

Forecasted spending for Networks for the proposed 2017 Test Year is $2,070,000; $955,146 higher than the 2013 Board Approved Year. Table 2-23 below breaks down Networks spending to the project type.

Table 2-23 – Networks Capital Spending 2012 – 2017

NETWORKS CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Replacement of Network Vaults, Maintenance Holes and Transformers	839,431	616,923	530,000	1,324,019	1,537,231	1,000,000	1,020,000
Replacement of Primary/Second Cable	484,417	199,082	340,000	384,082	50,059	380,000	750,000
East End Network	425,361	55,299	120,000	-	-	-	-
Maintenance Hole Cable Rebuilds & Fuse Installs	40,344	243,550	150,000	142,460	539	550,000	300,000
Maintenance Hole Cable Protection	-	-	-	-	387,412	-	-
Total	**1,789,554**	**1,114,854**	**1,140,000**	**1,850,561**	**1,975,242**	**1,930,000**	**2,070,000**
Annual Change		(674,700)	25,146	735,708	124,680	(45,242)	140,000

Replacement of Network Vaults, Maintenance Hole and Transformers

Spending in this area has been at an increased level since 2014, when compared to prior years. As previously mentioned, in late 2012, London Hydro solicited a civil engineering firm to conduct inspections of maintenance holes and network transformer vaults. An average yearly capital expenditure of $650,000 (civil portion) over the next ten years was recommended by the consultant, in addition to a larger one-time expenditure in the first year of the plan of $890,000, to be used to replace and rehabilitate the assets indicated. Based on the recommendations given, capital spending on these replacements has been occurring at the escalated level since that time.

Replacement of Primary / Secondary Cable – 2017

The 13.8kV system, including Nelson TS 13.8kV equipment, is nearing end of life. The initiatives outlined in the "London Downtown - 13.8kV/27.6kV Nelson TS - 5 Year Plan" require offloading of the 13.8kV system via conversions to 27.6kV. To improve operational flexibility and be able to restore all customers in the event of a failure on the network system, this project intends to convert 13.8kV network customers on Dufferin Avenue from Waterloo Street to Wellington Street and on Wellington Street from Waverly Place to Queens Avenue to 27.6 kV.

Faulted Cable

Reduction of this network load will facilitate the removal of lead cable resulting in increased duct space available for new 27.6 kV supplies. For greater economic and safety benefits, the new supply configuration will utilize standard switchable padmounted transformers instead of the present vault style network transformers by leveraging available above grade options. The six network transformers that will be reclaimed will be refurbished and used to avoid the purchase of new network transformers required to address high loads at another customer location and to replace older units on the system with a value nearly equivalent to the cost of this project.

This project directly affects 13 GS>50 customers whose systems will be converted, and indirectly affects an additional 4,000 low-volume customers in the wider service territory of Nelson TS.

Maintenance Hole Cable Rebuilds & Fuse Installs

This budget item will cover the installation of cable protecting fuses in the mains of the low voltage grid. A characteristic of the network supply system is high secondary supply fault energy, which can lead to detrimental failures. These fuses limit the fault energy during the failure of the downstream device and decrease the probability of catastrophic failures, which reduces the impact on public safety and customer outages.

Explosions in maintenance holes are low probability/high impact events. The energy released in a major maintenance hole explosion can launch an 80 kg cast-iron maintenance hole cover 15m or more. Such explosions are typically caused by the ignition of combustible gases that accumulate in maintenance holes due to overheating cable insulation or to non-London Hydro sources, such as natural gas leaks and dumped chemicals. It may also be possible for high-current arcs to cause maintenance hole explosions when combustible gases are not present.

Explosion-Limiting Maintenance Hole Cover

To reduce the potential impact of maintenance hole explosions, London Hydro will install maintenance hole covers designed to provide a controlled release of pressure during explosions. By latching the maintenance hole cover to the maintenance hole frame and designing exhaust ports into the bottom of the cover, explosion-limiting maintenance hole covers lift only a few inches during an explosion and create an air-dam that limits the force of the explosion. In 2016, London Hydro will install 80 explosion-limiting maintenance hole covers on a trial basis.

Maintenance Hole Cable Protection - 2015

The purpose of this project was to supply and install temperature current monitoring devices onto existing secondary network XLPE 600 volt cable. High temperature on secondary network cables indicates an overload situation, which could lead to a catastrophic failure. These devices are used at various spot network locations throughout the downtown and provide 24/7 temperature monitoring to the Control Room Operators.

As part of this project, a dedicated fibre optic cable was installed from London Hydro facilities to an off-site secondary location to provide isolation of the SCADA system from the IT Disaster Recovery system. Previous to this work, both SCADA and IT Disaster Recovery shared one fibre optic cable, which for security and operational concerns, was not ideal. This project provided the IT Disaster Recovery system with its own dedicated cable. The existing fibre cable provided SCADA monitoring for the temperature devices, and reclaimed strands from the shared cable were re-purposed to provide SCADA communication and control for the downtown core loop feed system between Substations #10, #11, #12 and switch-gear LC4854 to the SCADA mainframe.

Overhead Line Work (G)

Overview

In 2016, London Hydro's overhead distribution system includes approximately 28,000 poles (roughly 99% of which are made of wood), 7,630 overhead transformers and approximately 1,379 km of primary overhead conductors. London Hydro also has 237 manually operated 27.6 kV loadbreak switches and 161 automated 27.6 kV switches on its overhead system.

The budget for overhead lines is driven largely by the Asset Sustainment Plan and the 4.16 kV Planning Report. The 4.16 kV system largely consists of overhead distribution and is the oldest of all of the distribution grids within London. Both of these documents recommend the refurbishment of the aging 4.16 kV distribution system. Portions of the 13.8 kV downtown system are also approaching end of life and need to be converted to 27.6 kV to accommodate the voltage conversion of the Nelson TS from 13.8 kV to 27.6 kV.

Because they have been found to break under normal use, porcelain insulators have been identified by an external consultant and our internal engineering staff as a significant safety risk to the line maintainers who work on these circuits on a regular basis. Through the porcelain insulator replacement program, London Hydro will continue to replace all insulators on the 27.6 kV system.

In recent years, London Hydro has experienced a surge in copper theft, resulting in many of the ground wires at transformers being cut and stolen. These thefts affect both public and employee safety, as well as system performance. London Hydro has found that the use of copper-clad steel wire is effective in preventing this theft. Going forward, copper-clad steel wire will be used for new installations and replacements/repairs in affected areas. The on-going replacement of stolen copper ground wires with Copperclad wire is expected to continue at approximately 300 locations per year for the next several years.

Firon in-line switches have proven to have a poor performance record as multiple failures of the same mode have occurred. A recent audit of the 27.6 kV system identified the remaining Firon switches on our system (approximately 90). Replacements will be completed in 2016.

London Hydro will continue to enhance system protection with respect to outages caused by lightning, foreign contacts and other defective components by using strategies such as additional insulation, additional lightning arresters, lightning sky wires and protective cover-up on new and existing feeders that have been identified as poor performers. This work will be done in a prioritized manner.

Capital Spending

Forecasted spending for Overhead Line Work for the proposed 2017 Test Year is $4,530,000; $482,438 higher than the 2013 Actuals. Table 2-24 below breaks down Overhead Line Work spending to the project type.

Table 2-24 – Overhead Line Work Capital Spending 2012 – 2017

OVERHEAD LINE WORK CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Replacement of Fully Depreciated/Deteriorated Poles and Poles Susceptible to Fire	948,911	509,558	600,000	668,105	495,465	520,000	410,000
Arrestor/Insulator/Other	4,949	80,748	100,000	796,858	950,244	880,000	580,000
Rebuild Fully Depreciated Overhead Areas	2,514,411	814,383	200,000	228,610	316,131	300,000	260,000
Reliability/Outage Mitigation	450	127,350	250,000	296,880	1,655	-	-
Overhead Voltage Conversions	101,092	2,515,522	4,000,000	2,837,901	2,388,036	2,180,000	3,280,000
Total	**3,569,813**	**4,047,562**	**5,150,000**	**4,828,353**	**4,151,531**	**3,880,000**	**4,530,000**
Annual Change		477,748	1,102,438	780,792	(676,822)	(271,531)	650,000

Replacement of Fully-Depreciated/Deteriorating Poles and Poles Susceptible to Fire

London Hydro tests all poles identified as being in poor or fair condition as well as poles that have been in-service for over 20 years. The testing involves performing a visual check of the pole and its equipment, hammering the pole to listen for hollow sounds (referred to as "sound test"), as well as obtaining a core sample from the base of the pole, when required.

Decaying and deteriorated poles are always an area of concern with respect to the overhead system. London Hydro presently purchases fully treated, pentachlorophenol cedar poles that are commonly used in Ontario due to their natural resistance to decay. As part of the ongoing condition assessment program, 3,000 to 4,000 poles are tested on an annual basis and, as a result, an average of 37 poles is recommended for treatment or replacement. Poles that have been identified as being high risk, typically 35 to 40 per year, are scheduled for replacement to prevent failure.

Pole fires are another area of concern. Poles fires occur in specific older types of overhead construction in which leakage current becomes concentrated in places where bolts and wood intersect. This current produces heat, which results in a fire. Specific areas with this type of construction are targeted for refurbishment on a prioritized basis.

Another area designated for replacement includes plant built more than 40 years ago and aged materials and construction techniques that are more prone to failure than those used today. The deficiencies related to the age of the equipment, some of which is approximately 50 years old may adversely affect the reliability of customer supply as well as public and employee safety. The rebuild areas vary in size and complexity of work, resulting in differing budget amounts compared to the number of areas completed. London Hydro anticipates that by 2020, it will have addressed the susceptible poles identified and any remaining poles would be replaced under other programs.

Arrestor / Insulator / Other – 2014-2017

In July 2014, an event occurred in which a porcelain insulator broke, causing the 27.6 kV line to fall onto the underbuilt 4.16 kV circuit, which, in turn, caused considerable damage to related customers electrical services. As a result of this incident, three measures were implemented to mitigate possible similar events, based on recommendations from a consultant. Station class arrestors were installed on 4.16 kV circuit laterals. Secondly, porcelain insulators are being replaced on overbuilt circuits at different locations so that the mitigation measures cover larger areas. The third measure involves 27.6 kV voltage conversion of overhead transformers on 4.16 kV laterals that are abandoned, if feasible.

Failed Porcelain Insulator

An audit identified circuits that share lines of both voltages, which indicated that approximately 400 poles are supporting a total of 1,300 porcelain insulators on 27.6 kV. Starting in 2014, the pace of porcelain insulator replacements was accelerated due to the risks identified by the consultant, and all porcelain insulators on the identified shared voltage pole lines were replaced by the end of 2015. The pace of replacement is continuing in 2016 as the remaining porcelain insulators (not on shared voltage lines) are replaced over the next five years. The replacement of Firon switches (approximately 90) and the ongoing replacement of stolen copper ground wires with Copperclad wire are also covered under this budget item.

Rebuild Fully-Depreciated Overhead Areas

London Hydro has established a set of criteria to be used when prioritizing which fully-depreciated overhead areas are to be rebuilt. This criteria includes results from infrastructure audit results, pole testing results, safety issues, system performance, accessibility and reliability.

The following 3 areas were fully-depreciated and upgraded in 2012, causing spending in this area to spike during that year:

1. Old East - Phase 2 of 2. This area (with boundaries of Elias Street, Dundas Street, Ontario Street and Burbrook Place) was deemed the worst depreciated area in terms of overall condition. During Phase 1 (2011) overhead infrastructure west of Quebec Street was rebuilt. Phase 2 involved rebuilding all overhead infrastructure east of Quebec Street.

2. Pond Mills - Phase 2 of 2. The area on the southwest corner of Commissioners Road East and Pond Mills Road was deemed the second worst depreciated area. Converting this area will also assist with offloading Substation #15, which experienced a failed transformer in

2011. During Phase 1 (2011), London Hydro completed the 3-phase loop section and during Phase 2, we completed the 1-phase loop sections.

3. First / Second Street area - Phase 2 of 2. This area (bordered by Oxford Street East, Spanner Street, First Street and Second Street) was deemed fourth worst depreciated area. During Phase 1 (2011), we completed First Street and its radial streets. During Phase 2, we completed Second Street and its radial streets.

The rebuild budget fluctuates from year to year based on the actual assessed condition of the areas and overall budget priorities.

Overhead Voltage Conversions

Starting in 2012, the pace of 4.16 kV conversions has been high as many of these assets are approaching end of life. The volume of work is expected to be approximately $2M to $3M a year until 2021. To accommodate the Nelson voltage conversion taking place in 2018, the remaining 13.8 kV overhead lines are being converted to 27.6 kV between 2015 and 2020 (final removal of 13.8 kV as expected to take place in 2021). Total spending on voltage conversions is expected to be approximately $4.5M from 2017 to 2020.

Automation (H)

Overview

One of the key elements that will enhance safety and improve reliability is the installation of automation enabling equipment. By leveraging the existing technologies that are now available, we can achieve decreased response time based on real time data from the field. Reclosers are the main technology used by London Hydro, with some minor investments in the remote communication devices (RTUs: Remote Terminal Unit), fault indicators, line status indicators, and the central System Control and Data Acquisition (SCADA) system.

Reclosers are electrically operated and computer controlled switches that detect faults on lines and automatically open to remove the faulted portion of line from the system before the entire feeder is affected. After a brief pause, the recloser will close and check to see if the fault has been cleared (often the case for animal contacts) and then re-open if the fault is still present. These devices communicate with other devices and the central SCADA system to help the system Control Room Operators isolate problem areas and restore power more rapidly.

The RTUs allow field devices to communicate with the central SCADA system to transmit information in real time and allow the Control Room Operators to open or close devices remotely.

Other devices, such as fault indicators and line status indicators, are being used and tested by London Hydro to assist with locating problems and restoring power more efficiently.

Capital Spending

Forecasted spending for Automation for the proposed 2017 Test Year is $725,000; $406,392 higher than the 2013 Actuals. Table 2-25 below divides Automation spending to the project type.

Table 2-25 – Automation Capital Spending 2012 – 2017

AUTOMATION CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Recloser Installation	173,245	183,677	195,000	212,822	185,367	275,000	195,000
Remote Terminal Unit Replacements	46,451	66,789	50,000	199,051	189,867	130,000	130,000
Miscellaneous Automation	54,793	41,661	90,000	59,431	30,191	250,000	250,000
SCADA	6,476	26,481	-	163,357	81,115	100,000	100,000
Power Quality	-	-	-	34,991	4,009	50,000	50,000
Miscellaneous Control Room General Plant	11,458	-	-	33,244	3,468	-	-
Total	**292,424**	**318,608**	**335,000**	**702,897**	**494,015**	**805,000**	**725,000**
Annual Change		26,184	16,392	384,289	(208,882)	310,985	(80,000)

Recloser Installation

London Hydro will continue to install reclosers on the 27.6 kV system, adding approximately three units per year until the entire system has been sectionalized into groups of approximately 1,000 customers. Reclosers improve system reliability by minimizing the number of customers affected by an outage and reducing the time required to restore power.

Remote Terminal Unit Replacements (RTUs)

Many of the field devices that communicate with the central SCADA system route their information through communication devices referred to as RTUs. Many of these devices are analog transmission, and are now obsolete and are being replaced with faster technology such as fibre optics or wireless digital transmission. Starting in 2012, London Hydro began replacing the RTUs with modern equivalents and expects to have all RTUs replaced by 2020.

Miscellaneous Automation

Capital spending in 2016 and 2017 is higher than other years due to the budgeted 'Control Centre - Consoles and Digital Schematics' project. Since the Control Room was first constructed, many technological changes have occurred; the introduction of personal computers, SCADA, flat screen displays, and most recently the Outage Management System (OMS). To accommodate these changes, the Control Room was altered as each change occurred. This reactive approach has led to a sub-optimal configuration with respect to both technology integration and workflow processes, which can compromise customer and employee safety and increase customer outage response time. To reduce these effects and optimize the operation of the Control Room, a consultant was hired to design an integrated layout and technology solution. A series of investments will address the consultant's recommendations over the course of three to five years. These investments will improve and simplify the visibility of the system for Control Room Operators, provide faster customer outage response, increase safety of both public and staff and reduce the reliance on paper-based or inefficient processes and systems.

In 2016, the investment will be used to replace operator consoles to enhance ergonomics and to develop digital schematics, which will eliminate redundant processes associated with wide-area paper maps.

In 2017, the investment will be used to upgrade the resolution of the display wall cubes to create a digital canvas suitable for managing wide-area outages, thus eliminating the redundant recording of operations in OMS and on the wall paper maps.

SCADA

A System Control and Data Acquisition (SCADA) system is employed to monitor and cache real-time data from the London Hydro network and relay that information to Control Room employees for action. A reliable and secure SCADA system is required to monitor and control the distribution system efficiently. This system enables action to be taken in a more expedient manner in the event of an outage to minimize customer effect. The

SCADA projects in 2016 and 2017 will enhance components of the system that are either technically obsolete or inefficient to maintain. Specifically, the projects will increase the reliability of RTUs, modernize communication protocols and media, secure data against cyber threats, and develop system intelligence tools that enable automation. Cyber security is always a concern with data communications equipment and some of the projects in this area will enhance security and the reliability of the SCADA system by replacing the components of the system that are technically obsolete and introducing system intelligence tools that will enable automation.

TS Upgrade (CC)

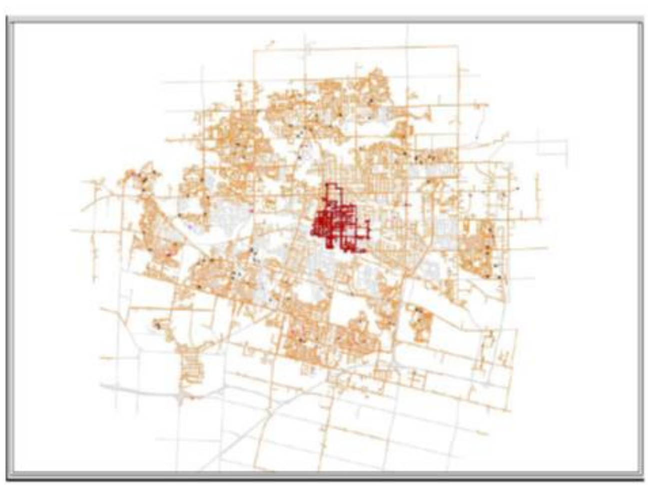
Overview

Costs in this area pertain to London Hydro's capital contributions paid to Hydro One for the decommissioning of the 13.8kV transformer station and the upgrade of the transformer station to 27.6kV. These contributions are recorded as intangible assets and are depreciated over a useful life of 45 years. The CCRA (Connection and Cost Recovery Agreement) with Hydro One is for an indefinite life; therefore the contributions are to be amortized over the useful life of the associated asset, which is based on the 45 year useful life of power transformers (the major component) in accordance with the OEB's Kinetrics report.

The decision to pay Hydro One to convert Nelson TS from 13.8 kV to 27.6 kV was based on a collaborative approach to long-term supply options for the City of London, conducted by London Hydro and Hydro One (Ontario Hydro). The planning started in the early 1980's with the installation of the Talbot TS (near downtown), which provided 27.6 kV supply to the north side of the downtown core. At that time, 27.6 kV had become the standard distribution voltage for most of Ontario, including much of the City of London outside the downtown core. The Nelson TS was one of the oldest transformer stations in London and had several non-standard designs that made it more vulnerable to some contingencies. The only other 13.8 kV supply point was at Highbury TS to the east, which was also approaching end of life and in need of replacement.

In 1990, London Hydro and Hydro One agreed that new connections would be made only to the 27.6 kV supply (if possible), and existing 13.8 kV load would be reduced through conversion. With much of the 13.8 kV distribution system approaching end of life, conversion of the 13.8 kV load proceeded at a gradual pace.

"Island" of 13.8 kV – Nelson TS as Sole Supply



By 1999, the 13.8 kV station at Highbury TS was decommissioned, which left the Nelson TS as the sole supply of 13.8 kV for London's downtown core.

In 2005/2006, joint planning meetings with Hydro One examined supply options and needs for the City of London, with the Nelson TS identified as the preferred location for new supply. In subsequent years, different scenarios were reviewed and issues at the 13.8 kV Nelson TS surfaced, which made conversion to 27.6 kV more desirable. Between 2009 and 2014, Hydro One and London Hydro examined the cost and benefits of keeping Nelson at 13.8 kV or converting it to 27.6 kV.

In early 2015, an agreement was reached whereby Hydro One would rebuild Nelson TS at 27.6 kV with London Hydro responsible for only the incremental cost of conversion. The plan required London Hydro to accelerate some 13.8 kV conversion plans so that Hydro One could decommission the 13.8 kV supply in 2021. London Hydro has documented this decision-making process in a report entitled, "London Downtown - 13.8kV/27.6kV – Nelson TS – 5 Year Plan", which is referred to in DSP Appendix J. In addition, the plan to convert the 13.8 kV distribution system and accommodate future connections has been documented in the report entitled, "Downtown Intensification – December 2015," which is also included in DSP Appendix J. These two reports provide a comprehensive review of the work needed in the downtown core to continue to provide safe and reliable supply for the foreseeable future.

Capital Spending

Forecasted spending in the TS Upgrade category for the proposed 2017 Test Year is $1,882,000. This category is new in this Application, with the first spending occurring in 2015. Table 2-26 below illustrates TS Upgrade spending by year.

Projected 2016 and 2017 costs listed here correspond to a predetermined payment schedule agreed upon with Hydro One in 2015. Borrowing costs are also capitalized here, utilizing the OEB's prescribed rates to calculate the Allowance for Funds Used During Construction (AFUDC). Spending in this area will remain in WIP until the completion of the project, which is estimated to be 2018.

Table 2-26 – TS Upgrade Capital Spending 2012 – 2017

TS UPGRADE CAPITAL SPENDING 2012 - 2017									
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 Actuals to 2017 Test	CAGR
	$	$	$	$	$	$	$	$	%
TS Upgrade									
Contribution to TS Upgrade	-	-	-	-	1,616,590	1,832,000	1,882,000	1,882,000	
	-	**-**	**-**	**-**	**1,616,590**	**1,832,000**	**1,882,000**	**1,882,000**	

Connection and Cost Recovery Agreement

Hydro One has estimated the Avoided Cost Work to be $30.6 million. This amount represents the total cost of work that would have had to be performed by Hydro One to replace portions of its facilities that have reached end of life at its sole expense if London Hydro had not requested that Hydro One upgrade the Nelson facilities.

Hydro One has estimated the Engineering and Construction costs of the facility upgrade to be $38.9 million. This amount represents the total cost of equipment, labour and materials at Hydro One's standard rates plus their standard overheads, as well as interest during construction using Hydro One's capitalization rate in effect during the construction period.

London Hydro must pay a Facilities Upgrade Contribution which represents the difference between the Engineering & Construction costs of Hydro One Work and the Avoided Cost Work.

Calculation of estimated capital contribution

Estimate of Hydro One Work Total = $38.9 million (see details below)

- T5/T6 Commissioning (new TS) = $34.1 million
- T3/T4 Decommissioning (old TS) = $2.9 million
- Line Connection Pool Work = $1.2 million
- Network Customer Allocated Work = $0.7 million

Estimate of Avoided Cost Work = $30.6 million

Total Facilities Upgrade Contribution = $38.9M – $30.6M = $8.3 million (to be paid in milestone payments as set out below)

- $6.85 million is for T5/T6 DESN work
- $1.45 million is for decommissioning of T3/T4 DESN

Progress Payment No.	Payment Milestone Date	Total Payment Required (plus HST)
1	June 15, 2015	$1,600,000 plus HST in the amount of $208,000*
2	March 15, 2016	$1,750,000 plus HST in the amount of $227,500*
3	March 15, 2017	$1,750,000 plus HST in the amount of $227,500*
4	March 15, 2018	$1,750,000 plus HST in the amount of $227,500*
5	Earlier of March 15, 2021 or 3 months prior to the date scheduled by Hydro One to commence decommissioning of the T3/T4 DESN***	$1,450,000 plus HST in the amount of $188,500**

True-up dates and potential true-up payments

True-up of T5/T6 DESN work

The "Ready for Service Date" is the date upon which all of the Hydro One work, other than the decommissioning of T3/T4 DESN, has been completed and is scheduled in the CCRA to be December 15, 2016. The first scheduled true-up date will occur within 180 calendar days after this "Ready for Service Date". This is noted in the CCRA as the "First Reconciliation Date". Any difference between the Actual Facilities Upgrade Contribution for T5/T6 DESN and the Estimated Facilities Upgrade Contribution for T5/T6 DESN will result in either a credit or an invoice to be paid within 30 days after issuance.

True-up of T3/T4 DESN decommissioning work

Once Hydro One has completed the T5/T6 DESN work, they will commence the decommissioning of the T3/T4 DESN. The completion date of the decommissioning work is dependent on the T5/T6 DESN work and transfer of London Hydro's load from T3/T4 to the T5/T6. This Transfer Deadline is outlined in the CCRA as no later than December 15, 2023. According to the CCRA, London Hydro will make its best efforts to transfer the load by December 31, 2020 or within two years following the "Ready for Service Date" outlined above The second scheduled true-up date will occur within 180 calendar days after the completion of the decommissioning. This is noted in the CCRA as the "Second Reconciliation Date". Any difference between the Actual Facilities Upgrade Contribution for the T3/T4 Decommissioning Work and the Estimated Facilities Upgrade Contribution for the T3/T4 Decommissioning work will result in either a credit or an invoice to be paid within 30 days after issuance.

Discussion of London Hydro's other CCRA's with Hydro One can be found further within this Exhibit, Appendix 2-4, "New Policy Options for the Funding of Capital".

Demand

Forecasted spending for Demand for the proposed 2017 Test Year is $4,669,000 (after capital contributions), an increase of $1,793,356 or 12.9% CAGR compared to the 2013 Actuals. Table 2-27 below breaks down Demand spending into two project categories: City Works and Developer Works. The Developer Works project category is then broken down and discussed further.

Note that Demand projects are not undertaken at the discretion of London Hydro and are initiated by the City of London or various developers within London.

Table 2-27 – Demand Capital Spending by Project Category 2012 – 2017

DEMAND CAPITAL SPENDING 2012 - 2017									
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 Actuals to 2017 Test	CAGR
	$	$	$	$	$	$	$	$	%
Demand									
City Works Projects	1,446,613	543,034	805,400	1,542,380	1,968,293	1,996,000	2,250,900	1,707,866	*42.7%*
Developer Works Projects	4,891,216	4,751,282	4,658,000	5,084,680	6,017,328	4,258,000	4,519,100	(232,182)	*-1.2%*
	6,337,830	5,294,316	5,463,400	6,627,060	7,985,620	6,254,000	6,770,000	1,475,684	*6.3%*
Capital Contributions	(3,780,997)	(2,418,672)	(2,700,000)	(1,870,692)	(3,788,551)	(2,087,000)	(2,101,000)	317,672	*-3.5%*
	2,556,833	**2,875,644**	**2,763,400**	**4,756,368**	**4,197,069**	**4,167,000**	**4,669,000**	**1,793,356**	**12.9%**

City Works (D) & Developer Works (E)

Overview

City and Developer Works are externally driven and are predominantly growth-related. For the City Works programs, costs are based on previous expenditure patterns and any projects that have been identified by the City at the time of budgeting. To estimate the amount of funding required for servicing new residential housing developments, five year averages were calculated and balanced against Canada Mortgage and Housing Corporation's (CMHC's) forecast for the London area.

London Hydro has an obligation to perform these activities once the external party has met the requirements as outlined in London Hydro's Conditions of Service (COS) document. A majority of projects are either fully or partially recoverable, through either capital recoveries or capital contributions. The level of capital contributions set out in the COS document are prescribed by various acts and regulations, including the OEB's Distribution System Code, Ontario's *Public Service Works on Highways Act* and joint use agreements with other utilities such as Bell Canada and Rogers Cable.

Descriptions of the expansions and relocations for 2016 and 2017 are provided in the detailed project sheets of the DSP, Appendix G. It is noted that this area of spending is dictated by external influences and is therefore difficult to estimate due to its dependency on factors such as economic conditions and provincial and federal government funded initiatives.

Capital Spending – City Works

Forecasted spending for City Works Projects for the proposed 2017 Test Year is $2,250,900; $1,707,866 higher than the 2013 Actuals. Table 2-28 below depicts budgeted spending for City Works projects on an annual basis.

Table 2-28 – City Works Projects Capital Spending 2012 – 2017

CITY WORKS PROJECTS CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
City Road Authority Relocates	1,446,613	543,034	805,400	1,542,380	1,968,293	1,996,000	2,250,900
Total	**1,446,613**	**543,034**	**805,400**	**1,542,380**	**1,968,293**	**1,996,000**	**2,250,900**
Annual Change		(903,579)	262,366	999,345	425,913	27,707	254,900

This project category involves the relocation of London Hydro infrastructure located on the road allowance. These relocations are initiated by the Road Authority (City of London) and are necessary in order to accommodate planned modifications to the roadway. The terms and conditions under which these relocations occur are specified in the Public Service Works on Highways Act enacted by the Provincial Government.

Spending in the last several years has fluctuated depending on the projects that were identified by the City of London as being required. London Hydro works closely with the City of London to determine which of their projects will affect its infrastructure. When London Hydro's budget was developed, the City had not defined all of its projects for 2016; therefore, the annual expenditures were estimated based on a combination of known projects and base historical spending.

The City of London has a number of multi-year plans that were created to meet the City's growing transportation needs and new developments. Working in collaboration with the City and other utilities, London Hydro relocates infrastructure assets in advance of the City's related projects, typically one to two years in advance.

The 2016 and 2017 budgets for this area are higher than in previous years. These increased expenditures are attributed to aggressive City plans, which are outlined in the "2030 Transportation Master Plan - Smart Moves (May 2013)," "London Rapid Transit (SHIFT)," and "2014 Transportation Development Charge Background Study, City of London (May 2014)." One example of this anticipated work relates to a City project that proposes to widen a roadway, which includes a train rail underpass widening as well the diversion of train tracks. London

Hydro has four major 27.6kV circuits in direct conflict with the proposed work and, therefore, relocation of this plant is contributing to the highest budgeted project within this section.

Capital Spending – Developer Works

Forecasted spending for Developer Works for the proposed 2017 Test Year is $4,519,100; $232,182 lower than the 2013 Actuals. Table 2-29 below breaks down Developer Works spending to the project type, excluding the impact of contributed capital.

Table 2-29 – Developer Works Capital Spending 2012 – 2017

DEVELOPER WORKS CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Developer Expansions & Relocations	400,272	531,758	594,000	254,200	269,752	146,000	340,900
Residential Secondary Service Upgrade	305,886	306,803	325,000	307,721	369,831	340,000	355,000
Single Family Residential Underground	1,333,826	900,487	1,174,000	1,868,778	1,388,376	1,066,000	1,090,200
Multi-Family Residential Underground	393,578	744,736	565,000	616,065	1,400,041	766,000	783,000
Commercial Distribution Services	2,457,653	2,267,498	2,000,000	2,037,915	2,589,329	1,940,000	1,950,000
Total	**4,891,216**	**4,751,282**	**4,658,000**	**5,084,680**	**6,017,328**	**4,258,000**	**4,519,100**
Annual Change		(139,934)	(93,282)	333,399	932,647	(1,759,328)	261,100

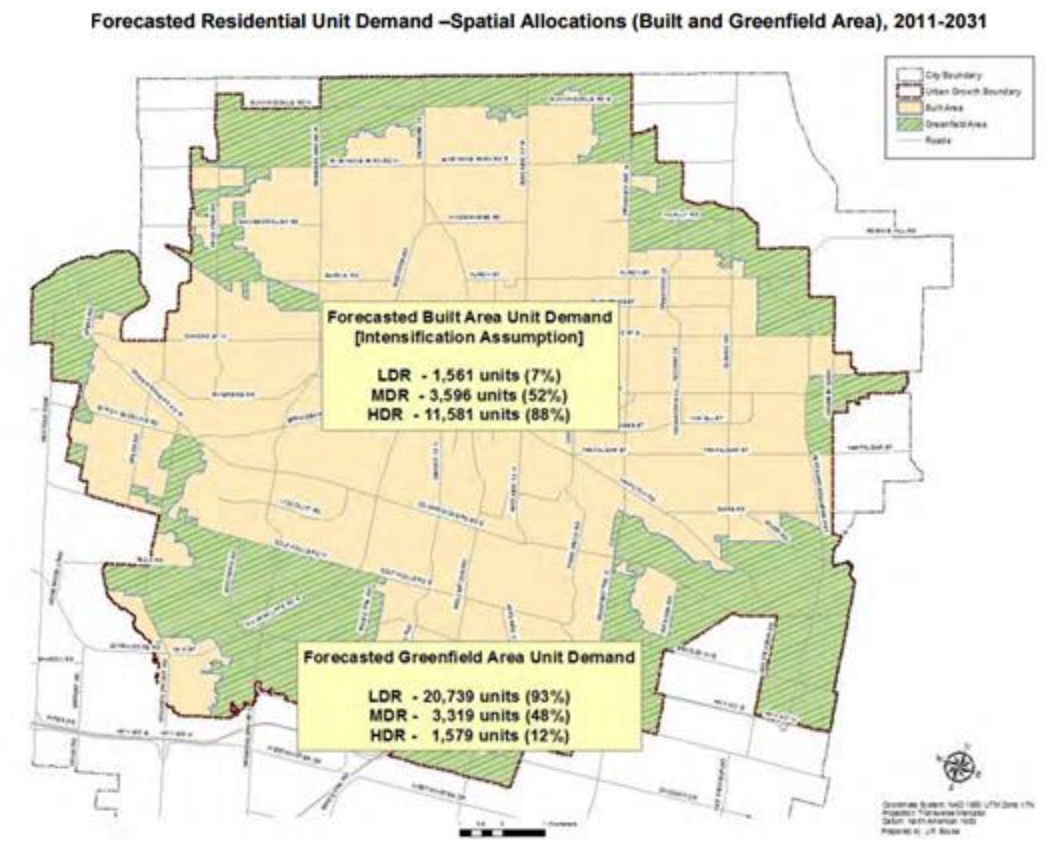
Residential Underground (Single Family and Multi-Family)

This item involves the installation of single family and multi-housing (primarily townhouses and condominiums) residential underground distribution systems to provide service as needed to developers. From a budgeting perspective, the annual expenditures are estimated based on a number of factors including past history, City of London development forecasts, market reviews (including Canada Mortgage and Housing Corporation), and customer inquiries. This information is updated each year (with the exception of 2016 and 2017, which are being updated simultaneously due to it being a COS year) and the forecasts and budgets are adjusted accordingly.

Market conditions can create large fluctuations in these expenditures from year to year. This section will contain many different projects of varying magnitude depending on developer requirements.

The London Hydro Conditions of Service document details how capital contributions are assessed for these installations.

Figure 2-3: Residential Growth Areas



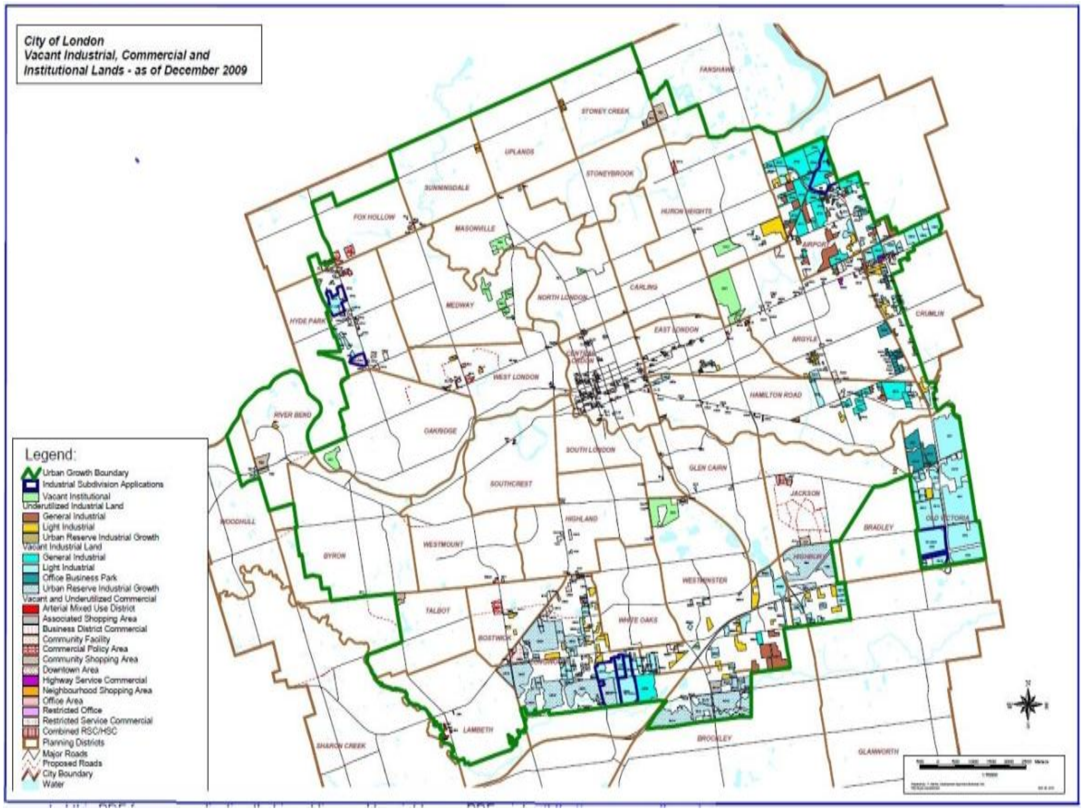
Commercial Distribution Services

This category covers the installation and/or modification of electrical equipment that is used in supplying commercial (including apartments) and industrial customer installations as well as work associated with upgrading existing installations.

From a budgeting perspective, the annual expenditures in this area are estimated based on a number of factors including past history, City of London development forecasts, market reviews and customer inquiries. This information is updated each year, (with the exception of 2016 and 2017 which are being updated simultaneously due to it being a COS year) and the forecasts and budgets are adjusted accordingly.

The London Hydro Conditions of Service document details how capital contributions are assessed for these installations.

Figure 2-4: Commercial Growth Areas

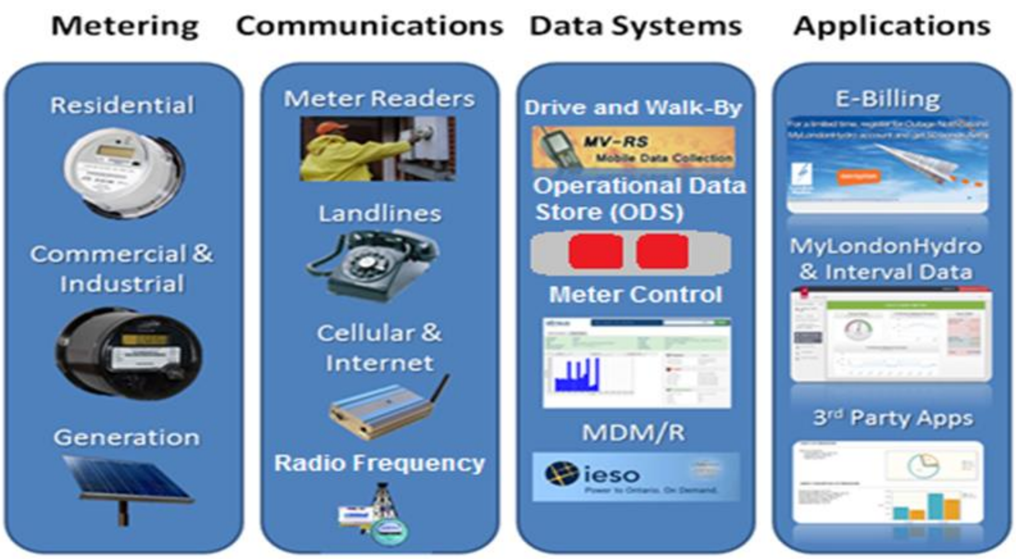


Metering (M)

Overview

London Hydro's Metering function involves four key service areas within two divisions: the Electric Meter (EM) Department and the Meter Database Management (MDM) Department. The Electric Meter Department is associated with the physical assets and communications while the Meter Database Management Department is responsible for information systems and data flows.

Figure 2-5 – Scope of Metering Services



The Ontario Energy Board (OEB) in its "Report of the Board Supplemental Report on Smart Grid" (EB-2011-0004 February 11, 2013) has expressed an expectation that

> "…smart grid investments are considered integral to all utility investment and that planning for smart grid development and implementation by electricity distributors and transmitters will be an essential part of the broader network investment planning exercise."

and

> "As metering infrastructure is renewed and replaced over time, distributors must explore mechanisms that facilitate "real-time" data access and "behind the meter" services and applications for the purpose of providing customers with the ability to make decisions affecting their electricity costs."

London Hydro's capital work program continues to align closely with and fulfill these directives for the benefit of its customers and business success.

Electric Metering Department

Spending increases of recent years and in forecasted future budgets reflect three major cost drivers: 1) regulatory requirements, environment stewardship and safety 2) technology obsolescence and 3) new services and customer engagement initiatives.

Measurement Canada (MC) and the Ontario Energy Board (OEB) have mandated changes to metering architecture and equipment including:

1) Smart meter program and requirements for the Advanced Metering Infrastructure systems (OEB)
2) Replacement of all 2.5-element metering with Measurement Canada compliant 3-element metering (MC)
3) Replacement of meters with MIST interval meters on any installation that was forecasted by London Hydro to have an average monthly peak demand during a calendar year of over 50kW (OEB).
4) Adoption of new mandatory pre-sample and compliance requirements for installed smart meters (MC); and
5) Support requirements for distributed generation, such as FIT and microFIT (primarily solar) installations (OEB).

Responding to environmental and safety drivers, London Hydro has initiated a multi-year program to replace all 24 installed oil-filled transformer metering units with new primary metering oil-free units. This multi-year plan deals with the most critically assessed units according to economic prudence and resource restrictions.

London Hydro is one of a very few LDC's to have its own facility for testing, maintenance and re-certification of smart meters to MC standards. This facility features 'in-house' designed test benches that automate routine procedures, thereby saving time and costs.

Communications and Radio Licensing

Since 2012, London Hydro has maintained a wireless communications network to support the smart meter deployment associated with TOU billing as mandated by the OEB. Despite acceptable overall network service since its implementation, the associated AMI and RNI technologies are now considered obsolete and, therefore, have reached the end of their useful lives.

Beyond the obsolescence issue, studies conducted by IBM have shown that the current network is actually overloaded for meeting current service demands. Tuning efforts have been somewhat successful at squeezing out some performance improvements, but, certainly, this network will not be able to handle the traffic demands that the new meters, faster data acquisition rates and new "behind-the meter" services will require.

The communications network and technology, including expanded wireless bandwidth and radio licensing, needs to be replaced.

Finally, London Hydro has made a new communications connectivity option available to its Commercial and Industrial (C&I) customers that will utilize their existing internet connections to eliminate the need for dedicated telephone lines to each of their existing meters.

Meter Database Management Department

The remaining two activities of Figure 2-5, 'Data Systems' and 'Applications' (support and development) are the responsibility of the Meter Database Management Department. Neither of these two business areas existed prior to the smart meter implementation.

Data Systems

Initially, data arriving at London Hydro's offices was simply parsed by small custom applications running on London Hydro servers and passed on through the provided MDM/R application for data handling. Meter data from each 24-hour period was required to be forwarded to the MDM/R the following morning. Errors and omissions would be flagged by the IESO MDM/R system and electronically relayed back to London Hydro for manual resolution. These errors and omissions were, in turn, forwarded to the MDM/R for consolidation into a complete record of that period. Meters that were off-line had to be repaired within 15 days and billing for that meter was not permitted until the problems were corrected.

This arrangement quickly proved to be inefficient and prone to network congestion and timing errors as the many unlinked applications of the processing chain often fell out of synchronization. Furthermore, if customers wanted access to their data with reasonable response times, it became clear that the meter data would have to be processed and stored locally.

Obsolete and unsupportable access databases have been replaced with company standard SAP functionality.

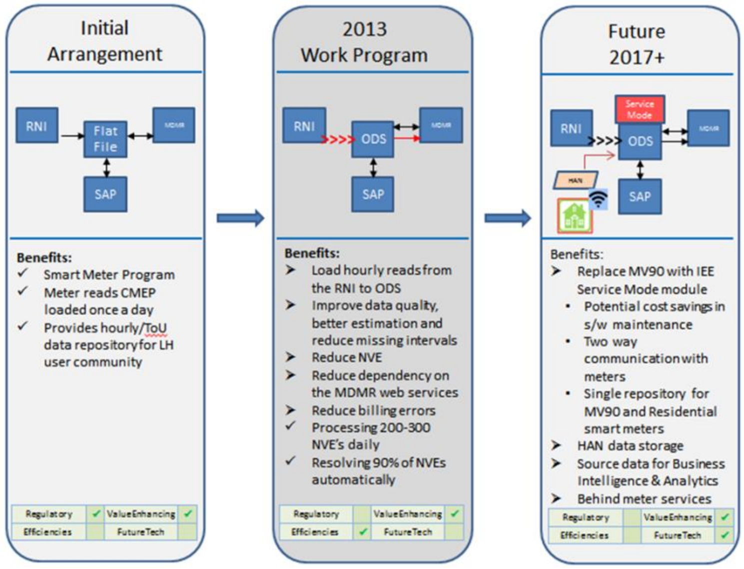
An Operational Data Store (ODS) has been implemented to be not only the one source of smart meter consumption data but also other operational data. It is anticipated that eventually a myriad of other meter status and alarm data (currently not transmitted from the meter) and customer-provided ‘behind-the-meter’ data will be included.

Adjunct applications have been implemented to automate data validation and corrective routines prescribed by the OEB for billing and MDM/R uses.

The Meter Data Management Group handled over a half-million (500,000) data exceptions in 2013, which ensured accurate and timely billing for our customers. This requirement gave rise to several improvement projects that redefined and automated the data processing paths for customer and MDM/R purposes. Similarly, due to the complexity of the smart meter network, many isolated access databases used for meter management had to be upgraded and integrated into the London Hydro enterprise systems.

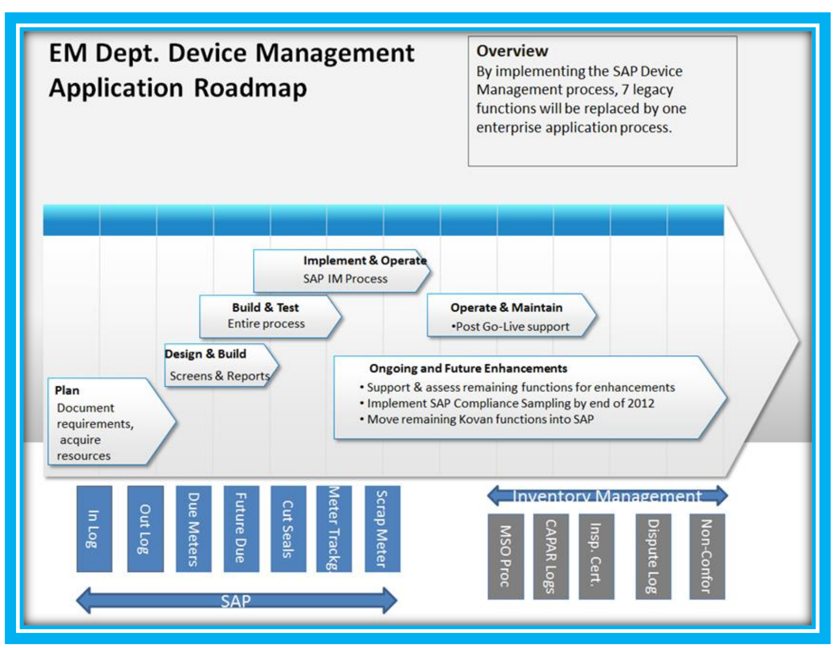
Figure 2-6 illustrates the evolution of the data management processes and work flow accomplished to achieve an efficient and responsive meter data validation and store.

Figure 2-6 – Meter Data Management Evolution



Investment in new IT system functionality that supports metering business processes continues to be made. Obsolete and unsupportable Access databases have been replaced with company standard SAP functionality. These new systems allow for inventory tracking and bar coding, improving inventory management and enabling London Hydro to fully support the ISO9001:2008 quality system and MC's SS-06 compliance sample meteorology requirements.

Figure 2-7 – Introduction of Remote Mobile Workforce Management System



Applications

A detailed discussion of Application Development can be found further within this Exhibit, (Page 133).

Capital Spending

Table 2-30 presents Metering capital spending for the years 2013 through 2015 and the planned budgets for the 2016 Bridge Year and the 2017 Test Year.

Table 2-30 – Metering Capital Spending by Project Category 2012 - 2017

METERING CAPITAL SPENDING								
Annual Spending	**2013 Actual**	**2013 Board Approved**	**2014 Actual**	**2015 Actual**	**2016 Bridge**	**2017 Test**	**2013 Actuals to 2017 Test**	**CAGR**
	$	$	$	$	$	$	$	%
Metering and installations	633,937	527,000	680,197	895,391	660,000	668,000	34,063	*1.3%*
Primary metering	109,785	121,000	112,549	85,368	354,000	354,000	244,215	*34.0%*
Testing and validation equipment	-	-	44,865	293,280	-	-	-	
AMI Communications Renewal	-	-	-	-	625,000	649,000	649,000	
Wholesale metering upgrades	-	-	-	-	-	-	-	
Total	**743,722**	**648,000**	**837,612**	**1,274,040**	**1,639,000**	**1,671,000**	**927,278**	**22.4%**
Annual Change	3,886	(95,722)	93,890	436,428	364,960	32,000		

Metering and Installations

Capital spending in connection with customer metering equipment relates to the installation and replacement of Measurement Canada approved electricity revenue metering devices. This cost includes items such as electric meters, meter adapter bases, transformers, test blocks, communication equipment (e.g., modems) and wiring.

Metering equipment and related assets typically have a long service life (25 years for meters themselves) and the capital budget reflects a relatively stable expenditure pattern from year to year as there is an opportunity to level required workload and resources.

It should be noted that these costs are higher than equivalent pre-smart meter era costs due to:

- increased equipment costs;
- greater systems complexity and support services needed (increased troubleshooting and change management effort; and

- new required automation of routine tasks through specific tools or new data systems, which, in turn, are required to offset greater volumes of work effort introduced.

Ongoing spending each year is incurred as new services are created and old services are replaced or removed. The new electronic meters are now more expensive than electro-mechanical meters. For example, an electro-mechanical single phase meter cost $37.50 in 2003, but today's electronic counterpart costs $150. Similarly, a single-phase kWh bidirectional meter cost $187.00 in 2003, but now a meter for such an installation costs closer to $800.00 due to the communications technology required to meet the billing and utility settlement requirements.

In addition, process improvements have been made to the installation and testing of the meters to help ensure metering and ultimately billing accuracy. Improvements involve accuracy testing of the meter, instrumentation transformers and installation, which is required whenever London Hydro exchanges a meter, whenever the customer does maintenance and needs access to the CT/PT compartment, or for any wiring change that affects the meter.

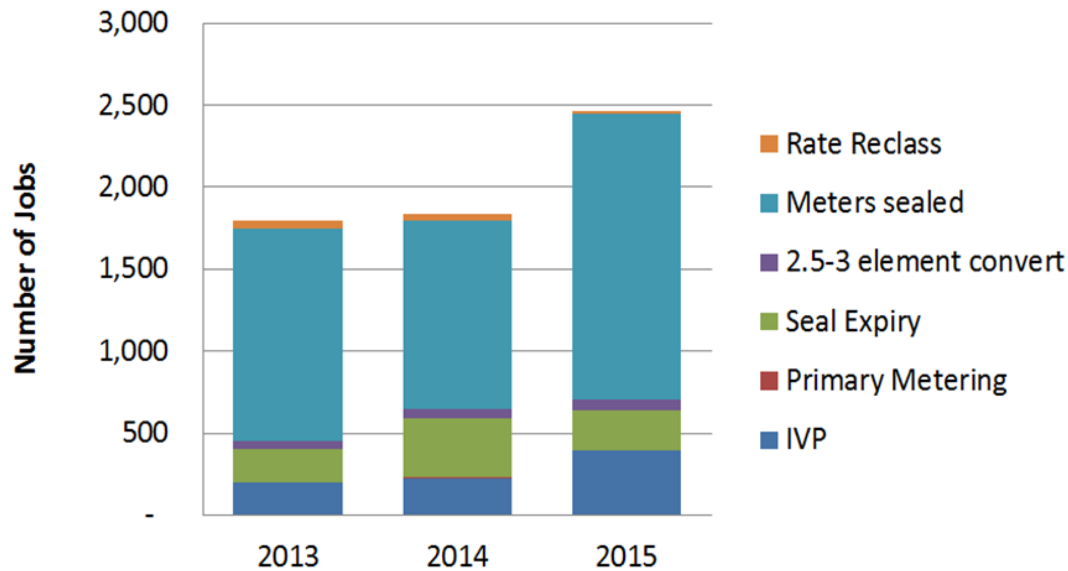
Accomplishments

In 2013, the following results were achieved:

- The meter sealing shop received 'ISO 9001:2008 Measurement' Canada accreditation.
- In addition to meeting internal workload, the department re-certified and sealed over 1,600 external client meters.
- Over 500 new meters were installed, over 1,200 meters were replaced and over 3,700 metering installations were inspected and tested.
- In support of electrical contractors' requirements for new installations, over 140 back-plates were created.

The Electric Meter Department has seen increases in meter sealing and replacement of meters with expired seals (See Figure 2-8 below).

Figure 2-8 – Meter Sealing Regulated Work Levels



Metering installations for FIT, microFIT and other distributed generation

London Hydro supports the IESO administered programs for renewal distributed generation such as FIT and microFIT. In London, a number of these programs have bidirectional interval metering in place to support billing and settlements business functions. Initially these programs were supported by manual meter reading and billing processes. As volumes have increased, automated cellular based meter reading has been considered to read meters remotely and assist integrating with London Hydro's information systems. For the larger FIT installations, the metering has been linked with protection and control functionality as well as with power quality monitoring and measurement.

Primary Metering

Program to replace aging primary metering tanks

London Hydro has a program to replace all 24 installed oil-filled transformer metering units over time through removal or replacement with new primary metering units. Oil field units that are recovered from the field are returned to London Hydro and, pending inspection results, they are used as safety stock or scrapped.

The installed list of meters is reviewed annually to identify a prioritized list of tanks for replacement through planned maintenance. A site visit is made to the locations and a visual inspection is performed. Replacements are planned and scheduled by London Hydro's

Engineering Department and coordinated with the customer and the customer's electrical contractors.

London Hydro plans to replace three units each year with the expectation that by 2022, these oil-filled units will be fully removed from service. Units planned for replacement are prioritized by urgency based on condition and other factors such as lack of spare units or the ability to perform the work concurrent with customer service changes or customer-planned shutdowns. The metering units are regularly inspected through a metering test, inspection and installation verification process.

Figure 2-9 – Primary Metering Examples

Program to replace 2.5-element metering with 3-element metering

London Hydro has a program to replace all 2.5-element metering with Measurement Canada compliant 3-element metering. Effective April 1, 2003, Measurement Canada stated that all new/reconstruction of existing 3-phase 4-wire wye configured metering installations shall use metering that is compliant with Blondel's theorem, such as 3-element metering. This work is being completed on an opportunity basis through the upgrade of services in conjunction with customer switchgear upgrades and London Hydro network voltage conversions.

Program to replace GS>50 demand meters with Interval communicating meters

On May 21, 2014 the OEB issued a Notice of Amendment to the Distribution System Code (Board File No.: EB-2013-0311). Starting on August 21, 2014, distributors were required to install MIST interval metering on any installation that was forecasted to have an average monthly peak demand during a calendar year of over 50kW.

Existing installations were to be migrated out within six years of the Notice. In response, London Hydro had several options, the best of which required further evaluation of the existing smart meter system to determine if it could handle this requirement. London Hydro submitted and was granted an exemption to delay installation until the end of 2015 to allow for further technology evaluations.

At the time of the analysis, London Hydro had over 1,000 meters that would need to be changed out. Many would be changed in due course as part of their Measurement Canada seal life. However the OEB's target requirement for conversion completion meant that several hundred meters would be stranded assets and need to be removed prior to their completed seal life. New meters would have to be purchased rather than being re-tested and re-deployed for existing meters. This result represents additional workload for the Electric Meter Department related to the technology evaluation and selection as well as additional costs related to the meter replacement.

Figure 2-10 – GS>50 Proposed Meter Replacement Schedule

Billing Class Meters GS>50
EG>50_DISN is GS>50kw Distribution (non-interval)

Seal Expiry Year	# of Meters Due	2020 Replacement Goal	Additional Workload
2014	143	143	
2015	95	130	35
2016	279	279	
2017	37	131	94
2018	78	131	53
2019	8	131	123
2020	135	135	0
2021	73		
2022	67		
2023	128		
2024	37		
Total	1080	1080	305

Wholesale Metering Points

With the market opening in 2002, wholesale market participants, including London Hydro, were charged with the responsibility of upgrading all their wholesale meter points to IESO compliant standards within specified time lines. This new responsibility required significant resource commitments – mainly financial. London Hydro managed this effort through its ongoing relationship with Hydro One – which serves as the transmitter, legacy wholesale meter service provider and contracted meter service provider.

Seven physical locations involve London Hydro wholesale metering; all but one directly involves a Hydro One-owned transformer station. These locations include Buchanan TS, Highbury TS, Clarke TS, Talbot TS, Wonderland TS, Nelson TS, and Highway 4 PME.

Given the scope, financial state, labour commitment, resource availability and other limitations, including IESO compliance timelines, these specific, significant projects have been planned, committed and completed over a period of eight years. The last significant project was completed in 2011; No future wholesale metering capital projects are foreseeable at this time.

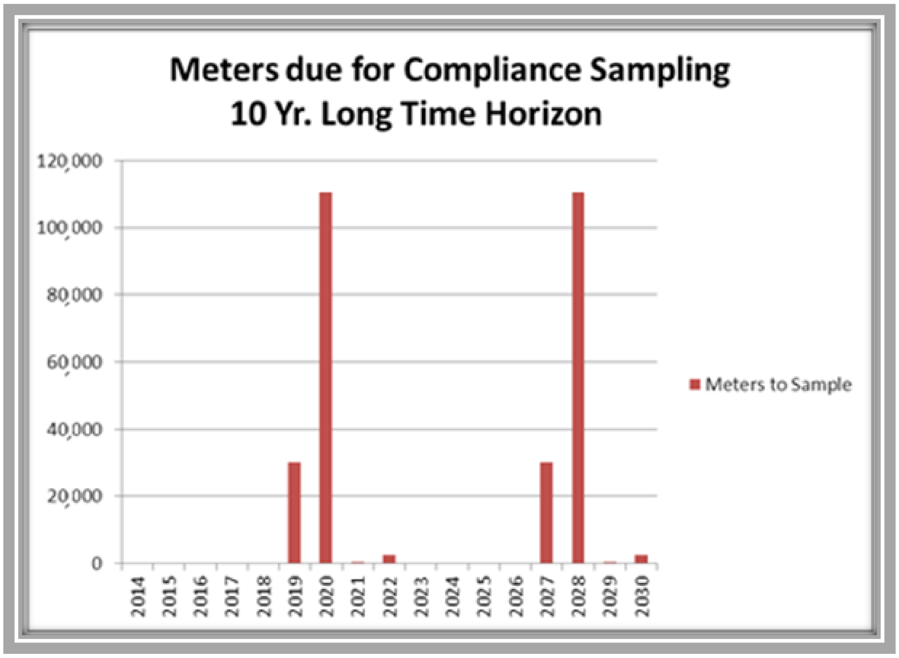
Testing and Validation Equipment

Significant annual cost avoidance has been achieved with the smart meter Validation Test Bench and the Measurement Canada (MC) calibration test bench. These in-house designed and built tools have allowed for the automation of smart meter troubleshooting, calibration and certification to MC standards. These tools have saved an estimated $40,000 in avoided associated labour costs for London Hydro's own meter needs and have also generated a revenue stream of approximately $25,000 per year by providing these services to external clients. Additional savings can be realized from the quick turnaround times involved in sealing our own meters; that is, we do not need to endure long wait times involved in sending them out to external sealing houses. This benefit is important because we must comply with test-time requirements for sample meters and the quick turnaround time that results from sealing in-house translates to needing fewer in stock meters.

Measurement Canada Certification Effort

The majority of the smart meters were installed in 2009-2010 with some installed in 2011-2012. The meters were accounted for with a 15-year amortization and thus are expected to be fully-depreciated in 2024-2025. However, the useful life of the meter is influenced by several other factors, including technological obsolescence and Measurement Canada seal period expiry.

Figure 2-11 – Meters Due for Re-verification



The smart meters deployed at London Hydro have a Measurement Canada 10-Year seal life and must be re-verified prior to this seal expiry period. The requirement to install all the meters at essentially one time to meet the TOU schedule will lead to equally intense re-certification efforts. In the past, groups of meters would be re-verified annually to level this workload.

The wide range of meter communications firmware in the network only complicates and compounds the re-certification process, creating an enormous challenge to achieve all re-certifications on schedule. To help meet this challenge, an additional new test console for day-to-day work capacity and backup for reliability was required for the meter shop's accreditation and sealing business.

The London Hydro Smart Meter Validation Test Bench

Soon after the initial implementation of smart meters, several technology problems and challenges emerged.

Firstly, the meters are part of a complex IT system that consists of the hardware and firmware within the meters, as well as the AMCC, AMRC systems for collecting and making the data available. Troubleshooting the problem of missing meter data became much more complicated with many more branches of potential failure causes to assess.

Many unforeseen meter issues relate to the meter vendor not performing comprehensive quality assurance and firmware validation prior to release of its products. In most cases, the vendor did not provide 'last-time-buy' or 'end-of-life' notifications related to specific meter types. As a result, new firmware versions with defects could be unknowingly introduced into service at the customers' location, causing unnecessary interruption and rework.

In order to troubleshoot these types of defects, a skillset is required that includes software/hardware and firmware design and troubleshooting as well as radio frequency propagation and interference analysis. This broad skillset has driven the Electric Meter Department from their core electrical expertise into these new areas that have taken time to learn.

Additionally, the fact that these new firmware versions continually change has meant that over 91 different hardware/firmware communications systems are currently interoperating within the mesh-like network at London Hydro. This situation has added an increased level of complexity that required additional meter management activities, such ensuring firmware upgrades had forward and backward compatibility and that the end-to-end system reliability was not compromised.

The key to addressing the significant workload increase and service problems identified above was to design and build an automated smart meter validation bench, which London Hydro did. The purpose of the meter test bench is to mitigate the many issues identified above and provide a controlled environment to identify and prevent potential issues from being introduced into our production network. The benefit of the validation bench is that with it we can use automation to perform many routine tests and thus help to offset the increased manual effort and cost created by the complexity of smart meters.

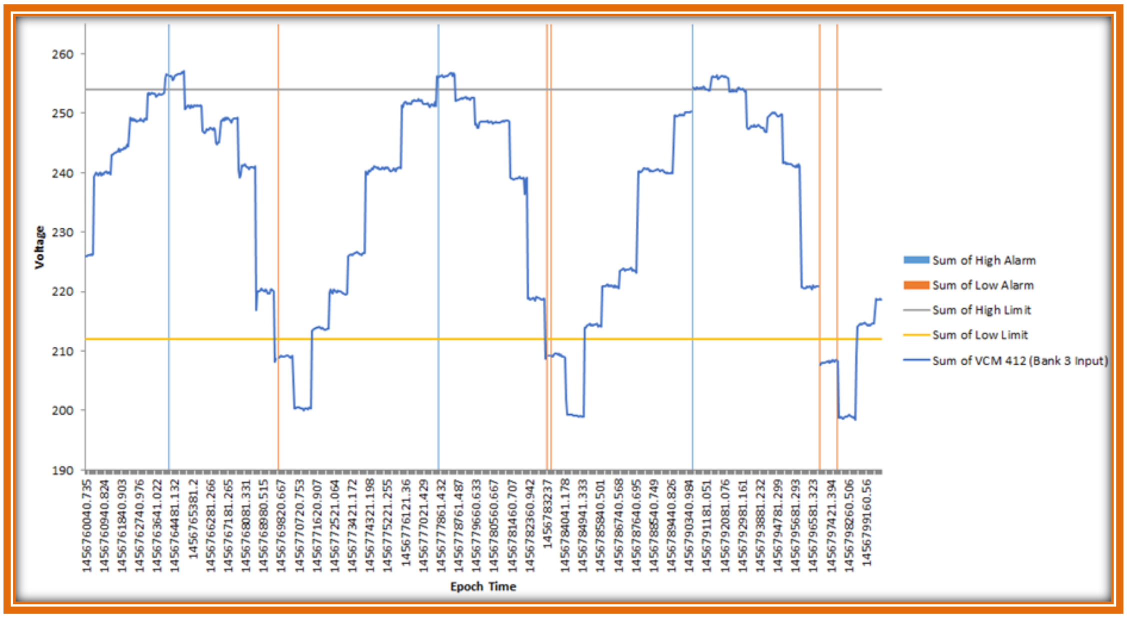
This test lab provides pre-deployment testing to ensure that new meter-related technology is evaluated and verified before being introduced into the customer domain. The lab itself is a place for staff to have operational rehearsals, thus providing a method of developing operational procedures and processes in a safe internal environment. The lab addresses ongoing challenges inherent in backwards compatibility to help ensure that new systems work with existing investments.

Figure 2-12 – Automated Meter Test Bench Design

Some examples of technical issues found through the use of the validation bench include

1) Identifying inaccuracies in the meter measurements versus communicated values
2) Coordinating meter to thermostat time display differences
3) Identifying faulty meter transmissions resulting in false power outage messages
4) Identifying faulty meter transmissions having an impact on communications system performance
5) Testing new meters and communications technology and configurations
6) Validating dependable and reliable voltage measurement capability
7) Validating power Failure Alarms for use with the AMI-OMS systems
8) Introducing and rehearsing operational procedures regarding meter encryption
9) Validating AMI functionality in the presence of simulated power quality conditions

Figure 2-13 – Automated Voltage Threshold Validation Testing



Investment in metrology test console to support compliance sampling

The building of the Measurement Canada calibration test bench was also a key piece of post-smart meter deployment work. Electromechanical meters are electrically inductive as they are basically small motors. On the other hand, smart meters are electrically capacitive as they are basically small computers. The electrical load the meters consume is called the burden. In order to accommodate the capacitive burden of the smart meters, the testing console required a full upgrade and re-calibration, which represented a major project for the Electric Meter Department in 2013. This work involved meter technicians and our Quality Management System team.

AMI Communications Renewal

Since 2012, London Hydro has maintained a wireless communications network to support the smart meter deployment associated with TOU billing as mandated by the OEB. At the time of implementation, this technology was rather new with limited technical options and vendor offerings. Despite these limitations, a network was built and has provided satisfactory service.

Additionally, the anticipated demand for increased wireless capacity to support near real time data and "behind the meter" initiatives are driving the need for a replacement communications network and technology that provide significantly increased capacity. Studies have shown that the current network is overloaded with current demands and cannot handle the traffic demands that the new meters, faster data acquisition rates and new "behind the meter" services will generate.

London Hydro has taken steps to secure additional wireless bandwidth (30 MHz of utility-only Radio Frequency (RF) spectrum) while study and consultation with industry experts has determined the best approach to dealing with obsolescence issues related to the unlicensed 5.8 GHz BelAir system and the Wireless Backhaul Network (WBN).

The costs of the new communications systems and radio licensing are encompassed in a multi-phase AMI renewal project budgeted at $625,000 in 2016 and $649,000 in 2017.

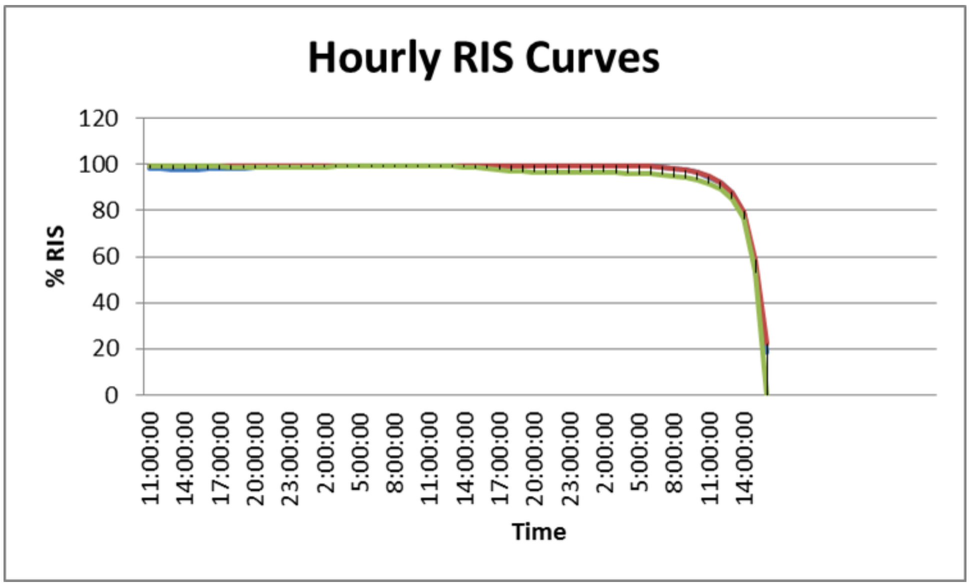
Looking forward, several IT systems will need to be refreshed to maintain the existing operating performance levels and to accommodate growth in data volume. Projects include refreshes to AMCC systems, ODS and MV90 systems as a result of new vendor versions and related software requirements. In addition, new capabilities, such as having Home Area Network integration support, allow for automatically managing the support for the Peaksaver Plus program. The support for the Peaksaver Plus program was initially handled with a manual process. As the volume of enrolled participants increases, an automated solution is required as the manual process does not scale and would become excessively costly.

Purchasing communication equipment (e.g., modems and IVP testing equipment) in order to support TCP/IP metering conversions has also added to increased costs in this budget period.

Meter data is communicated to London Hydro offices by wireless radio frequency communications. The network utilizes 'Sensus' supplied equipment for the 'Head End' IT information systems and the communication modules within the electric meter.

The smart meter system installed in London Hydro's service territory currently has over 153,000 metering endpoints for residential and small commercial (GS<50kW) with installations both inside and outdoors. Nine base stations are located throughout the city. At a programmed interval (typically set to two hours), the meter wakes up and transmits the last 11 hours of data. In Figure 2-14 below, the RIS (Receive Interval Success) curves illustrate the performance of the smart meter data collection system. Ideally, the system will collect all the reads completely (100%) and quickly (within a few hours). The top line on the left side of the figure shows how close to 100% the system receives. The RIS as a percentage of the total number of expected reads. Each meter is expected to have 24 reads (one for every hour in the day). The curved section on the right of the graph shows how quickly the reads are coming into the system. A steep slope indicates the reads are coming in quickly, a gradual slope indicates the reads are delayed. The difference between the current day's performance (green) and a best day's performance (red) is shown with black shading. The graph is linked to the minimum regulated system requirements of having no less than 98% of the reads delivered to the Ontario MDM/R by 5:00am each day. London Hydro is meeting these regulated requirements through active management and monitoring of the system.

Figure 2-14 – Smart Meter System Performance



Program to replace customer telephone metering with internet TCP/IP

Today, London Hydro is using the internet to connect to meters at several customer locations. In the longer term, it is expected that internet-connected meters will be the typical installation and legacy phone lines will be rarely used for meter data, if at all.

London Hydro will offer the following options for interval-style revenue metering:

1) TCP/IP VPN internet connected meters (hard wired or cellular),
2) Dedicated telephone lines,
3) Shared telephone lines, or
4) Cellular-based communications.

The Internet has proven to be a viable alternative communication system to telephone lines. Today approximately 690 interval-metered accounts are being read by phone lines through London Hydro's MV90 system. These phone lines are provided by customers at an assumed rate of $50 per month per line or approximately $415,000 per year. If a customer has an available internet connection, London Hydro can enable these cost reductions for the customer.

To enable TCP/IP communication, the customer's meter is connected to a London Hydro specified VPN (Virtual Private Network) Router. The router is configured by London Hydro to establish an IPSec VPN tunnel to London Hydro's firewall, encrypting all meter communication. If required, London Hydro can configure third party access to the meter at an additional cost.

The internet connection eliminates many problems encountered using the Plain Old Telephone Service (POTS) lines as well as cost implications for London Hydro. As customers take advantage of Voice-Over-IP (VOIP) systems or end-of-life fax lines, MV90 often calls disconnected lines. A variety of conditions lead to non-communication with the meter. Sometimes the customer is unaware that the phone line is for a London Hydro meter and then inadvertently cancels the phone line. Communication can also be lost due to busy phone lines or unanswered phone lines. Customers can change their phone system within their company or change service providers who are unaware that a connection must be provided for the London Hydro meter. Customers who upgrade their phone systems to VOIP introduce problems due to the fact that this system has different call quality characteristics. In some instances the customer's service provider can change the phone switching system without informing the customer. Shared phone lines can interfere with other devices (such as a fax machine) if the line sharing device is not set up properly.

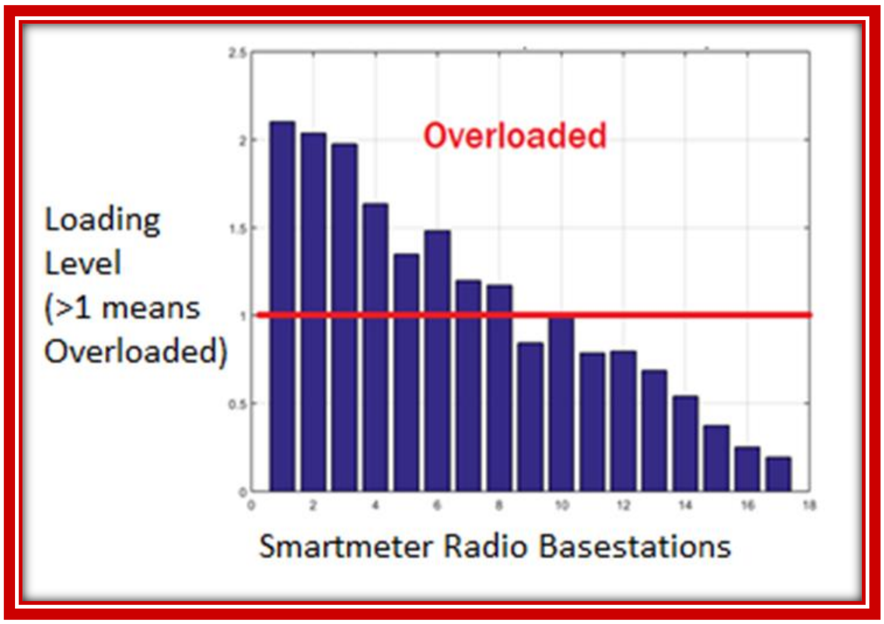
Hydro One meter communications

London Hydro presently reads eight Hydro One meters via TCP/IP. These meters represent the total number of Hydro One meters that affect the London Hydro service territory. The meters are located at the Clarke TS M2 main and alternate, the Wonderland TS main and alternate, the Highbury TS main and alternate and the Buchanan TS main and alternate. The main and alternate meters that affect the Buchanan Delivery Point presently require communication through a cellular modem (which is on a 2G network) as Hydro One is using a Hydro One owned virtual private network (VPN) for wholesale metering.

Enhancements to AMI communications

As shown in Figure 2-15, the smart meter system installed in 2009 and augmented in 2011 is overloaded from a network capacity point of view. To accommodate future growth and the ability to operate the network effectively, additional capacity is required in the network.

Figure 2-15 – Smart Meter Tower Overloading



Adding capacity, in essence, means adding bandwidth and this, in turn, means adding more licensed RF Radio spectrum. This requirement is due to anticipated additional smart meter base stations. These base stations could either be co-located at existing sites or, due to radio propagation drivers, located at new radio station sites.

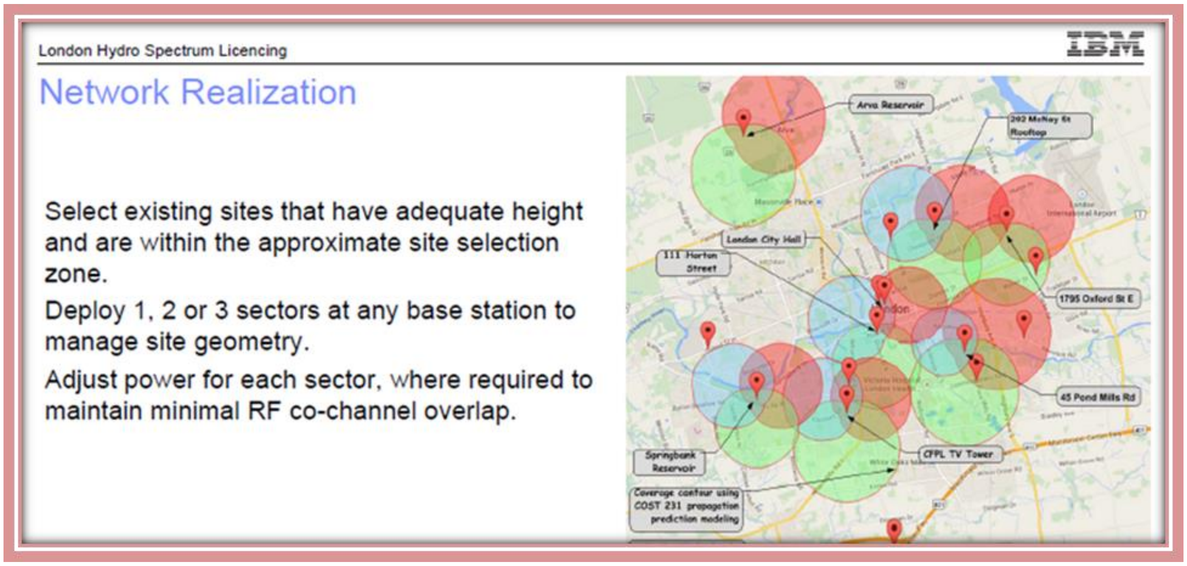
London Hydro has secured the use of 30MHz of 1.8GHz band spectrum for utility applications. Potential applications for this asset include smart-grid, remote workforce management, and machine-to-machine and Industrial Internet-of-Things connectivity for energy management. While the Electric Meter Department has risen to the challenge of operating the smart meter Vendor RF metering systems, an enhanced and focused skillset is needed to address these future challenges.

In the fall of 2014, London Hydro engaged IBM in a consulting role to recommend considerations for technological and business options for the expansion and development of the London Hydro Wireless Networks. A main consideration was that London Hydro qualifies for

30MHz of utility-only RF spectrum, which is deemed not only a valuable future investment in a very limited resource but as an essential need as well.

London Hydro submitted an application to Industry Canada to obtain the licence and was granted all 30MHz of spectrum pending further application. This spectrum is currently used by Hydro One, THESL, Powerstream, BC Hydro, Manitoba Hydro, and Hydro Quebec. From a technology perspective, WiMax Radio Technology is available that uses this radio spectrum.

Figure 2-16 – RF Network Realization Planning



This radio renewal program is expected to address some existing concerns regarding smart metering supply management, such as existing vendor supply management issues for meters and communications, competition limited by communications sourcing and limited RF Bandwidth C&I meters and future applications. London Hydro expects to benefit from new capabilities that are progressive and responsive by working with AMI technology innovation partners.

In addition to the growth and wireless spectrum issues discussed above, London Hydro needs to plan for 'end-of-life' RNI technology and obsolescence of the WBN. While the risk has been mitigated by buying spares on the secondary market, the need to plan to replace the network is becoming more urgent each year.

The two key technological issues involved are 1) the obsolescence of the unlicensed 5.8GHz BelAir system and 2) the Wireless Backhaul Network (WBN).

In pursuit and selection of the appropriate technology, evaluations will be required to consider present and future needs. Further, the identification of the application use cases and the opportunities for developing new networks to service these applications are essential.

A pilot project with the following applications should consider, but not necessarily limited to the following:

1) Replacement of obsolete Wireless Backhaul Radio system
2) AMI for GS>50 interval metering requirements and need for open standards and interoperability
3) Monitoring underground cabling for temperature, power flow and video
4) Monitoring distribution system re-closer and coordination, and large solar control (FITs)
5) Two way customer energy management and Internet of Things Applications
6) Nomadic services (Mobile Workforce)

In addition, the potential network architectures that could support these applications include, one or combination of, but not necessarily limited to:

1) 1.8-1.83 GHz utility-only licensed spectrum
2) 902-928 MHz ISM Band unlicensed spectrum for Internet of Things and/or mesh connectivity
3) Optical/Copper networks – Leased or owned
4) Cellular network(s) (e.g., Custom APN or UPNS)
5) RF/Microwave links/extensions (i.e. Licensed or Unlicensed)
6) Vehicle Area Networks (VAN)
7) Home Area Networks (HAN)

Fleet and Facilities

Forecasted spending for Fleet and Facilities for the proposed 2017 Test Year is $2,528,000, an increase of $468,285 or 5.3% CAGR compared to the 2013 Actuals. Table 2-31 below divides Fleet and Facilities spending into four major project categories. Project categories are then broken down and discussed further.

Table 2-31 – Fleet and Facilities Capital Spending by Project Category 2012 - 2017

FLEET AND FACILITIES CAPITAL SPENDING 2012 - 2017									
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 Actuals to 2017 Test	CAGR
	$	$	$	$	$	$	$	$	%
Fleet and Facilities									
Vehicles & Major Equipment	1,675,405	1,310,236	1,410,000	771,500	1,195,208	1,130,000	1,099,000	(211,236)	*-4.3%*
Operating Equipment	168,837	136,016	155,000	195,509	212,466	445,000	320,000	183,984	*23.8%*
Office Furniture & Equipment	84,536	101,296	80,000	121,041	79,805	455,000	197,000	95,704	*18.1%*
Buildings & Fixtures	1,053,422	512,167	650,000	1,171,402	746,658	1,200,000	912,000	399,833	*15.5%*
	2,982,199	**2,059,715**	**2,295,000**	**2,259,453**	**2,234,137**	**3,230,000**	**2,528,000**	**468,285**	**5.3%**

Vehicles and Major Equipment (N)

Overview

London Hydro's Fleet Department manages the maintenance, repair, licensing and inspection requirements to ensure that the vehicles, trailers and specialty-powered equipment required to build, maintain and provide prompt outage response are available when needed and that they operate in a safe, efficient manner. London Hydro's rolling stock assets consist of 149 vehicles, trailers and specialty-powered equipment to operate, maintain, and construct the distribution system.

Capital Spending

Forecasted spending for Vehicles and Major Equipment for the proposed 2017 Test Year is $1,099,000; $211,236 lower than the 2013 Actuals. Table 2-32 below breaks down Vehicles and Major Equipment spending to the specific types of equipment.

Table 2-32 – Vehicles and Major Equipment Capital Spending 2012 - 2017

VEHICLES & MAJOR EQUIPMENT CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Vehicles and Major Equipment	1,675,405	1,310,236	1,410,000	771,500	1,195,208	1,130,000	1,099,000
Total	**1,675,405**	**1,310,236**	**1,410,000**	**771,500**	**1,195,208**	**1,130,000**	**1,099,000**
Annual Change		(365,168)	99,764	(538,736)	423,707	(65,208)	(31,000)

In 2013, an extensive review of all Fleet processes was conducted, including the operating life of all London Hydro vehicles. When a vehicle comes due for replacement, an overall assessment of the vehicle's mileage, engine hours, repair history and future intended usage is performed. If the life of a vehicle can be extended based on this pre-determined criteria, the vehicle will also be inspected in relation to any applicable government regulations to ensure it will still meet requirements if it is to remain in service. London Hydro also uses the E3 Fleet Economic Life model as part of the replacement evaluation. E3 Fleet is a Canada-wide program that helps public and private sector organizations reduce the carbon footprint of their vehicle fleets. The E3 Fleet information and tools help companies increase fuel efficiency in the fleet, reduce harmful emissions, manage expenses, and incorporate new technologies or fuels.

Finally, the Department using the vehicle is consulted to determine whether the vehicle still performs as required or if replacement with a vehicle that has newer or enhanced features would provide enhanced safety or work efficiencies. This assessment may result in the vehicle replacement being deferred to the next budget year when the vehicle would be assessed again to see if replacement is necessary. While this deferral extends the vehicle beyond the fully-depreciated life cost, it also results in savings related to avoiding purchasing a new vehicle. From 2013 to 2015, ten out of fifteen vehicles that were budgeted to be replaced were kept in service using the abovementioned review process. More information regarding fleet replacements, the E3 model, and rolling stock of fleet can be found within the DSP, Appendix 2-6 to this Exhibit.

The following major items relating to vehicles and major equipment are budgeted for 2016:

- 4 pickup trucks
- 5 SUV's
- 1 dump truck
- 1 commercial van
- 1 aerial bucket truck

The following major items relating to vehicles and major equipment are budgeted for 2017:

- 4 pickup trucks
- 1 SUV
- 1 commercial van
- 1 double bucket truck
- 2 trailers

Operating Equipment (O)

Overview

Operating equipment includes specialty tools, test equipment or large material items, such as outdoor transformer storage racks or specialty ergonomic battery operated tools, required by the various Operations Departments to perform their duties. As technology improves and tools and testing methods are required to change, enhanced testing equipment and tools are needed to increase efficiency improve ergonomics and help staff provide service to our customers more quickly.

Capital Spending

Forecasted spending for Operating Equipment for the proposed 2017 Test Year is $320,000; $183,984 higher than the 2013 Actuals. Table 2-33 below illustrates spending on Operating Equipment from 2012 to 2017.

Table 2-33 – Operating Equipment Capital Spending 2012 – 2017

OPERATING EQUIPMENT CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Stores Equipment	119	5,499	5,000	3,348	65,707	165,000	40,000
Miscellaneous Operating Equipment	168,718	130,517	150,000	192,161	146,759	280,000	280,000
Total	**168,837**	**136,016**	**155,000**	**195,509**	**212,466**	**445,000**	**320,000**
Annual Change		(32,821)	18,984	59,493	16,957	232,534	(125,000)

Stores Equipment – 2016

- Yard storage racks – the storage yard at 111 Horton Street is not large enough to house all the required transformers and equipment at grade level. The Materials Management Department utilizes racking to increase the storage capacity, thereby avoiding procuring offsite storage space and associated costs.
- Material Handling Equipment – assisted material lifting and handling equipment will be purchased, such as hydraulic lift tables, as recommended in an ergonomics review, to reduce injuries to staff when handling heavy items in Materials Management.

Miscellaneous Operating Equipment – 2016

- Cable Testing and Fault Locating – with the change in cable types and installation methods, especially in the downtown core, the current cable fault testing and locating equipment is undersized and hinders proper testing or fault locating. As a result, energized cables could quickly fail, extended outages during fault locating could occur or system capacity could be jeopardized while a cable is out of service. A new Time Domain Reflectometer (TDR), suitable for the London Hydro underground system, will be purchased to address these issues.
- Smart meter test and analyzing equipment – items such as spectrum or cross phase analyzers are scheduled to be purchased in 2016 and 2017 as part of an overall project in the Electric Meter Department to help in the processing of meters and service orders.
- Safety Equipment – Equipment such as specialized lead handling and construction tools, road work zone safety signs and barricades and specialized personal protective equipment.

Stores Equipment – 2017

- The existing material handling equipment, such as hydraulic pump carts, requires extensive repairs; it is less expensive to replace this equipment than it is to repair it.

Miscellaneous Operating Equipment – 2017

- Based on historical trends and age of existing tools and test equipment in various Operations Departments, the tools and equipment will need to be replaced or more innovative test equipment will need to be purchased.

Office Furniture and Equipment (Q)

Overview

Office furniture and equipment includes items such as workstations, cubicles, desks, chairs, and building security devices such as card access equipment and cameras. Many sections of the London Hydro office have furniture and equipment dating back to a major building renovation and expansion completed in 1987, and, in addition to being worn out, this furniture and equipment do not meet current requirements for ergonomics and accommodating individual employees' requirements. Additionally, building security devices have become obsolete with technology changes and need to be replaced on an on-going basis.

Capital Spending

Forecasted spending for Office Furniture and Equipment for the proposed 2017 Test Year is $197,000; $95,704 higher than the 2013 Actuals. Table 2-34 below illustrates Office Furniture and Equipment spending on an annual basis from 2012 to 2017.

Table 2-34 – Office Furniture and Equipment Capital Spending 2012 – 2017

OFFICE FURNITURE & EQUIPMENT CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Office Furniture/Equipment	84,536	101,296	80,000	121,041	79,805	455,000	197,000
Total	**84,536**	**101,296**	**80,000**	**121,041**	**79,805**	**455,000**	**197,000**
Annual Change		16,760	(21,296)	19,745	(41,236)	375,195	(258,000)

Furniture

Replacement of London Hydro's modular furniture began in 2016. The current Steelcase furniture is over 30 years old, is fully-depreciated, is outdated and needs constant repairs. The electrical components are malfunctioning and are no longer safe. Replacement of all workstations has been budgeted over the next five years beginning in 2016. Additionally, adjustable desks/workstations will be purchased in 2016 and 2017 to address the ergonomic needs and, therefore, the health of our staff as identified by London Hydro's Ergonomic Committee. The ergonomic furniture is adding $150,000 in cost in 2016 and $61,000 in cost in

2017 to the budget. Providing employees with proper work areas will improve attendance, productivity, and assist with recruitment and retention.

Security System

London Hydro repairs and replaces components of the Security System (Card Access, CCTV cameras etc.) every year. In 2016, London Hydro will replace the card access system that was installed in 1999. This system is outdated and parts and service are very difficult to procure. The new system will cost approximately $150,000 and will ensure London Hydro's Security program meets industry standards, keeping our resources (especially employees) safe and able to function without unnecessary interruptions or inconvenience. Each year, a few security cameras and digital video recorders (DVRs) are replaced as they become obsolete. No other significant security projects are expected in the next 5 years.

Buildings and Fixtures (R)

Overview

London Hydro owns four major buildings located at 111 Horton Street and 41 municipal substations, both outdoor metalclad and building style, located throughout the City of London. These buildings and substations were built at various times dating back to 1912 with the newest main building being built in 1987. The main buildings are situated on 11 acres of land leased from the City of London and are valued at approximately $12.8 million. The buildings require ongoing upgrading and major component replacements in order to maintain their value and functionality.

In 2013, the City of London (our landlord) began discussions about the possibility of acquiring a portion of the building space and land located at 111 Horton Street. Due to this possibility, only the following items were completed in 2014: minimum maintenance and repairs; capital projects that were not affected by the possible acquisitions; and capital projects that were necessary due to safety or efficiency of operations. This uncertainty regarding the land acquisition has subsided; therefore, 2015 and 2016 budgets were restored to previous levels and building repairs, maintenance and capital budgets were reallocated to catch up from 2014.

Capital Spending

Forecasted spending for Buildings and Fixtures for the proposed 2017 Test Year is $912,000; $399,833 higher than the 2013 Actuals. Table 2-35 below breaks down Buildings and Fixtures spending to the specific project type.

Table 2-35 – Buildings and Fixtures Capital Spending 2012 – 2017

BUILDINGS & FIXTURES CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Heating/Venting & A/C	39,931	-	100,000	24,453	73,410	150,000	154,000
Paving	440,753	230,555	250,000	140,550	66,750	345,000	346,000
Improvements/Renovations	247,548	138,560	175,000	896,314	464,798	530,000	360,000
Garage Fixtures	-	-	125,000	-	127,520	-	-
Roofing	10,153	-	-	-	-	-	-
Yard Environmental Controls	-	-	-	-	-	50,000	-
Standby Generator	293,762	75,649	-	-	10,952	50,000	52,000
Uninterrupted Power Supply & Battery Banks	21,275	67,403	-	110,086	3,229	75,000	-
Total	**1,053,422**	**512,167**	**650,000**	**1,171,402**	**746,658**	**1,200,000**	**912,000**
Annual Change		(541,255)	137,833	659,235	(424,744)	453,342	(288,000)

Paving

Paving expenditures in 2012 and 2013 related to the vehicle and equipment parking and staging area, originally paved with asphalt in 1968, in the Operations yard. For safety and operational efficiencies, this area was redeveloped with new pole lighting, security camera coverage and asphalt replacement. In 2013, the Facilities Department began a project to replace the asphalt over 5 years. Some areas had been delayed due to the previously mentioned property uncertainty, however all areas are now scheduled to be completed by 2018. This grouping includes paving at London Hydro-owned substations.

Improvements/Renovations – 2014

Spending in Improvements/Renovations during 2014 was higher than normal due to the following significant items:

- Smart Meter Lab (related to smart meter validation bench, discussed in Metering section, Page 96)
- Replacement of windows in the Operations and Administration buildings
- Replacement of data cable wiring in the Administration building
- Cafeteria renovations – to meet health code standards as well as provide a more comfortable environment for employees to gather for breaks and informal meetings, including those with customers, rather than leaving the office to attend local coffee shops and restaurants; no renovations had been done since 1987; impact to corporate culture

Figure 2-17 – Smart Meter Lab Infrastructure

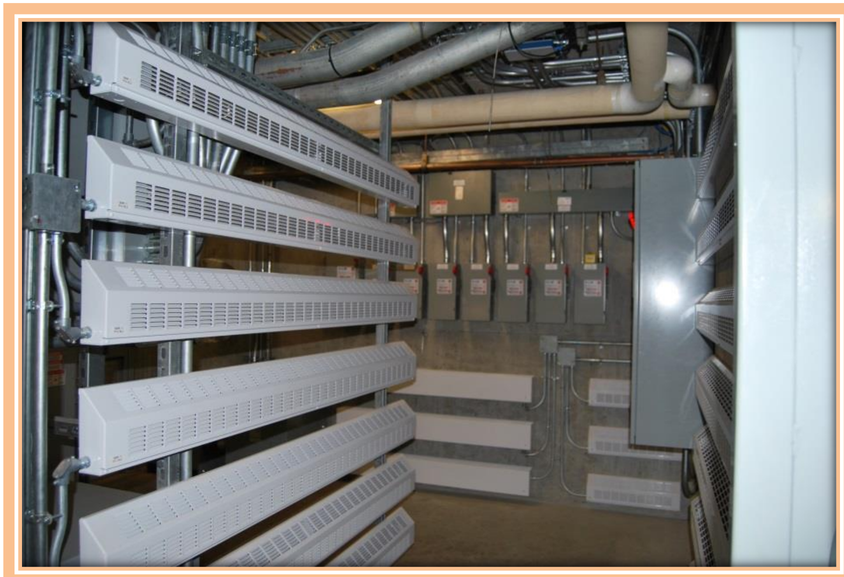


Figure 2-18 – 2014 Cafeteria Renovations (Before and After)

Garage Fixtures – 2015

In 2015, the Fleet Department obtained a new hoist for the garage. The existing in-floor hoists, installed in 1982, were at end of life and becoming increasingly difficult to repair. They also were not suitable for some of the newer, larger vehicles. The new hoist is portable and can be configured to lift different trucks of various sizes and weights.

Buildings and Fixtures – 2016

Budgeted capital expenditures for Buildings and Fixtures in 2016 are higher than normal, due to the following significant scheduled projects:

- Energy saving lighting and controls – London Hydro is updating lighting and controls that are at end of life and using more efficient replacements to reduce operating costs.
- New HVAC equipment – London Hydro's aging buildings require replacement of major components of the HVAC system. Heating and cooling is controlled by a building automation system commissioned in 2010; however, many heat pumps are original to the building (some close to 40 years old) and they have outlived their life expectancy. Until now, the Facilities Department had been replacing heat pumps only when they required major repair. Beginning in 2016, and for a period of five years, Facilities will replace all aging heat pumps to reduce energy usage.
- Yard paving (discussed above)
- Control Room building upgrades (related to Control Room improvements discussed in the Automation section above (page 71))
- Elevator control system replacements – London Hydro will replace the two main passenger elevators, which are original to the building (1987). In the past two years, a number of safety incidents have occurred as a result of elevator malfunction, and these incidents have resulted in at least two injuries and a number of near misses. These elevators have surpassed their end of useful life. The safety standards when these elevators were installed allowed for a six inch misalignment with the floor (creating a serious trip/fall hazard); current standards allow for only a few millimeters, thereby reducing the hazard. New elevators will meet the new, higher standard and are more energy efficient.
- UPS battery replacements – the batteries in the main uninterruptable power supply (UPS) for the Data Centre are scheduled to be changed in 2016. The Control Centre UPS batteries changed in 2012 and the Engineering building batteries are scheduled for replacement in 2019. These battery banks need to be replaced every five years to ensure they can supply critical loads until the standby generator is activated.
- Interior Renovations – London Hydro's office space has never undergone a major renovation. Until recently, renovations were small, and areas were pieced together to

accommodate small changes in staffing or department realignments. Beginning in 2016, with the assistance of office space consultants, the Facilities Department has begun a five-year plan to completely renovate most office areas in the facility, in order to provide most employees with natural light, better heating/cooling, improved working environment and to better utilize space.

Buildings and Fixtures – 2017

The following significant building improvement projects are scheduled to take place in 2017:

- Energy saving lighting and controls (discussed above)
- New HVAC equipment (discussed above)
- Yard paving (discussed above)
- Engineering building UPS batteries (discussed above)
- Control Room building upgrades (related to control room improvements discussed in Automation above)
- Stand-by power and electrical projects – In order to address critical loads as technology equipment is modified or added, increasing demands are placed on the UPS and standby generator systems. This budget item is for a review of loading and any modifications or additions required to increase the capacity of the standby power systems. This review is scheduled to be completed on a five-year cycle.
- Facility environmental upgrades – The existing storm water protection system does not cover the entire transformer storage area, which could pose an environmental threat. This item will extend coverage to a transformer storage area to protect the river in the case of an accidental oil spill.

Information Systems

Forecasted spending for Information Systems for the proposed 2017 Test Year is $4,510,000, a decrease of $2,365,635 or -10.0% CAGR compared to the 2013 Actuals. Table 2-36 below divides Information Systems spending into the two project categories. Project categories are then broken down and discussed further.

Table 2-36 – Information Systems Capital Spending by Project Category 2012 - 2017

INFORMATION SYSTEMS CAPITAL SPENDING 2012 - 2017									
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test	2013 Actuals to 2017 Test	CAGR
	$	$	$	$	$	$	$	$	%
Information Systems									
Hardware / Software	1,343,575	1,747,356	1,210,000	1,126,199	1,417,956	810,000	735,000	(1,012,356)	*-19.5%*
Application Development	4,329,368	5,128,280	4,790,000	3,299,393	4,146,021	4,130,000	3,775,000	(1,353,280)	*-7.4%*
	5,672,943	**6,875,635**	**6,000,000**	**4,425,591**	**5,563,977**	**4,940,000**	**4,510,000**	**(2,365,635)**	**-10.0%**

Capital expenditures for Information Technology (IT) are divided into two categories: Infrastructure and Application Development (AD). Infrastructure designated budget items are those incurred in the general provision of IT assets and services across all or multiple business units of London Hydro. The AD budget captures the budget items that exist for specific initiatives or for the dedicated purposes of a single business unit.

For the management of the annual capital budgets and their alignment with the London Hydro IT strategy, London Hydro typically tracks the budgets within the key goals of sustainment, enhancements and new systems.

Hardware and Software (V)

Overview

In 2013, London Hydro's IT strategy was concentrated on building an agile and scalable "internal Cloud" infrastructure that efficiently and cost effectively supports mission critical business applications. The core of this strategy focused on consolidated storage, server virtualization and standardization, high availability and high performance.

The Consolidated Networked Storage project will help us supply the required storage capacity with fewer physical resources, such as using shared disks on the network. This initiative is also an essential enabler for server virtualization.

Server virtualization enables consolidation of multiple physical servers used for sharing workload. London Hydro continues to virtualize its premise-based server environment and currently has 47 physical servers, 193 virtual servers and 78 new Cloud-based instances. With this "internal Cloud" strategy, London Hydro has avoided purchasing over 100 physical machines to meet its business needs.

Figure 2-19: Server Counts

Item	2013	2016
Number of Physical Servers	63	47
Number of Virtual Servers	125	193
Number of Amazon Virtual Machines	0	16
Number of Google Virtual Machines	0	62
Number of Smart Phones	100	185

Although London Hydro continues to build, harden and secure the "internal Cloud" environment, it has also adopted the new "Cloud strategy".

Currently, London Hydro has a number of business systems deployed in the Cloud and, as a result, internet availability has become more critical and bandwidth requirements have increased. As bandwidth increases, a range of network traffic - storage read/write blocks, files, voice, video, multimedia, etc. – must share a single network. Advances in smart devices and mobility are driving new ways to connect with employees and customers and include more unstructured data as part of the content.

The mobile workforce project and operations initiatives, such as Automatic Vehicle Location (AVL), all rely on mobile devices to capture pictures and videos as part of the verification and evidence requirements of new programs.

Customer Service is testing new ways of communicating with customers, such as web chatting. This increase in rich media communications drives the need for additional bandwidth as well as additional storage for premise-based systems.

Figure 2-20 highlights some of the major infrastructure changes implemented since 2013.

Figure 2-20: Infrastructure Changes Since 2013

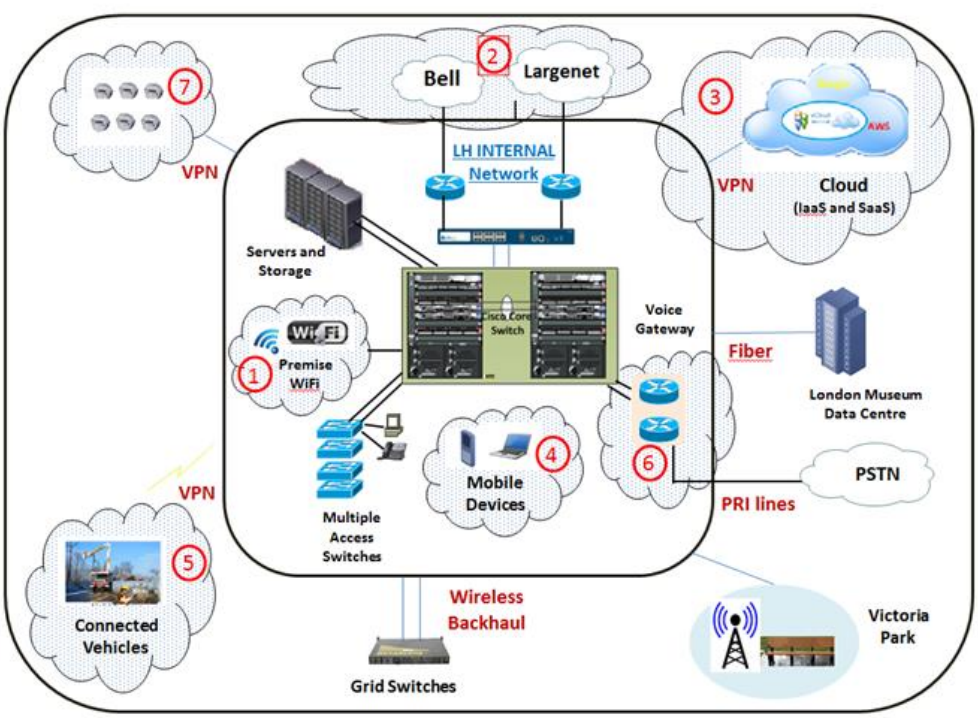
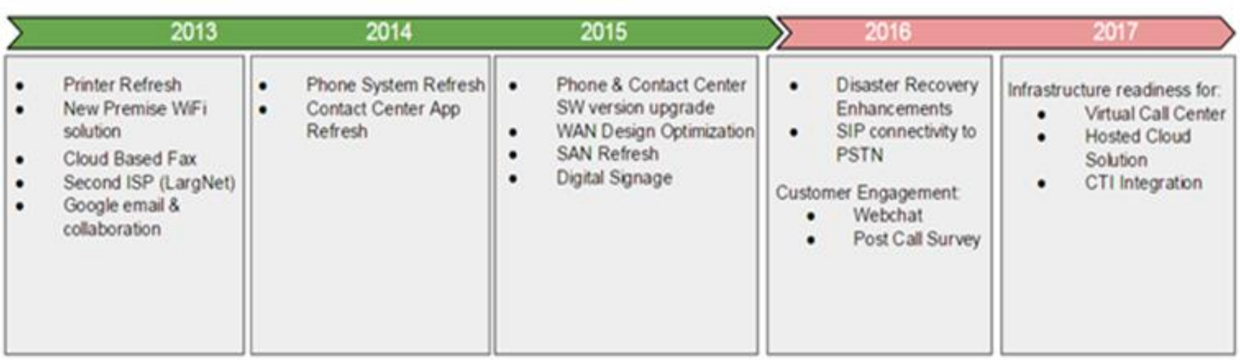


Figure 2-21: New Features

Ref #	Audience	Description
1	London Hydro Employees	New premise Wi-Fi solution
2	All Customers	Network Optimization to achieve ISP redundancy for all applications
3	All Customers	Cloud platform for Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS)
4	London Hydro Employees	Support for increased number of mobile devices
5	Operations	Connected vehicles
6	London Hydro Employees	New phone system
7	Metering	TCP/IP connected meters

In addition to what is depicted above (Figure 2-21), the following timeline (Figure 2-22) and the following accomplishments section cover all major initiatives within the IT Infrastructure environment at London Hydro.

Figure 2-22: Infrastructure Initiatives



To continue to support its business needs efficiently and effectively, London Hydro's strategic goals for the infrastructure can be summarized as follows:

- Continue to enable server consolidation including support of virtualized infrastructure
- Expand capacity to meet rapidly increasing requirements (e.g. documents, voice and data, videos, multi-media rich content) by utilizing:
    1. Cloud technologies, resources and services when business case supports them
    2. High performance storage
    3. Increased bandwidth
    4. Investments in archiving technologies
- Provide an enhanced platform for faster and more efficient replication and backup of system images and enterprise data and for improved disaster recovery
- Support London Hydro's high availability and disaster recovery strategy by providing redundancy at all levels of the storage area network, infrastructure, networking and devices that support the virtualization and the automatic failover of services
- Provide management tools to monitor and automate common housekeeping activities
- Minimize ongoing operational costs associated with maintenance, product integration, operational support and process documentation
- Minimize risk-based business costs associated with downtime of services during the migration and ongoing operations

The following elements have contributed to increasing the reliability of the core infrastructure, increasing the mean-time-between failures (MTBF), reducing the mean-time-to-recover (MTTR) and improving the resiliency of the core infrastructure:

- Implementing virtualization has allowed London Hydro to move towards self-insurance on server hardware maintenance
- Improving disaster recovery and business continuity posture through virtualization and system replication
- Aligning software licensing and support with application lifecycles to reduce costs
- Migrating selected customer-facing systems to the Cloud infrastructure to enhance availability and accessibility

Due to obsolescence, London Hydro has historically been required to replace hardware based on a five-year life cycle, making the choice of on-premise ownership or Cloud-based service offering neutral over this timeframe. London Hydro has a goal of keeping vendor supplied systems current or within one version of their current offering to assure reliability and vendor support.

Capital Spending

Forecasted spending for Hardware/Software for the proposed 2017 Test Year is $735,000; $916,739 lower than the 2013 Actuals, an overall decrease of 56%. Table 2-37 below divides Hardware/Software spending to the more detailed level.

Capital cost savings have been realized through:

- Infrastructure standardization and consolidation efforts by creating opportunities to leverage Ministry of Government Services (MGS) Vendor of Record agreements.
- Opting for Cloud-based services and systems, which have reduced hardware investments at London Hydro’s premises.

Capital cost increases have resulted from:

- Network refresh of on-premise facilities and devices (switches, cabling, routers, servers)
- Expanded rollout of mobile devices for field work (harden laptops and cellular devices)
- New software acquisitions and associated licence costs
- Purchase strategy of printers (previously leased) and new capability implementations such as site wide Wi-Fi, requiring additional hardware

Table 2-37 –Hardware and Software Capital Spending 2012 – 2017

HARDWARE / SOFTWARE CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Desktop solutions	75,417	75,858	45,000	112,079	136,377	129,000	120,000
Network development	394,167	819,070	200,000	109,615	374,664	195,000	250,000
Servers and storage	641,703	347,304	760,000	127,129	821,405	315,000	220,000
Back up solutions	13,510	23,550	25,000	49,467	38,246	50,000	30,000
Miscellaneous software	50,890	211,109	85,000	200,422	2,023	25,000	25,000
Miscellaneous hardware	1,545	109,812	5,000	18,953	21,428	21,000	15,000
Miscellaneous IT tools	136,622	3,681	5,000	9,289	-	10,000	10,000
Phone system	9,566	28,103	10,000	499,246	2,204	65,000	50,000
Physical plant	10,787	30,230	75,000	-	21,611	-	15,000
Wireless Communication	9,368	98,639	-	-	-	-	-
Total	**1,343,575**	**1,747,356**	**1,210,000**	**1,126,199**	**1,417,956**	**810,000**	**735,000**
Annual Change		403,781	(537,356)	(621,157)	291,758	(607,956)	(75,000)

Network Development

New Premise Wi-Fi Solution (2013)

With increased needs to support mobile workers and access to mobile applications, London Hydro made investments to expand its very limited premise based Wi-Fi coverage to ubiquitous voice and data grade 802.11n wireless coverage at London Hydro's buildings located at 111 Horton Street and in the yard for all employees and guests.

By providing ubiquitous coverage for the London Hydro buildings and yard, London Hydro has achieved the following benefits for employees, guests and customers:

- Provided complete Wi-Fi coverage and roaming capability for knowledge workers who are often engaged in group meetings and conferences and are away from their office but still connected via smart devices
- Provided a better Wi-Fi experience to partners and guests when visiting London Hydro for meetings, collaborations and project activities
- Provided a better Wi-Fi experience for employees when bringing their personal Wi-Fi devices to work and positioning London Hydro for "bring your own device" in the future
- Improved baseline support capabilities for the health, safety and security of employees on London Hydro premises.

Introduction of the Second ISP (LargNet) (2013)

Considering London Hydro's Cloud strategy and the number of Cloud-based services used by London Hydro, it quickly became evident that London Hydro needed to strengthen its WAN design and introduce redundancy with internet service providers.

In late 2012, London Hydro established a fibre connection between London Hydro's primary location at 111 Horton and an off-site secondary site. This connectivity provided capability for enhanced Disaster Recovery and it also delivered a route to connect to the LargNet point of presence in downtown London in order to gain secondary connection to the internet.

London Hydro selected the local provider LargNet as a cost effective solution for establishing this second connection to the internet and finalized the connectivity in 2013.

As London Hydro continues working to enhance Disaster Recovery readiness, its LargNet connection is going to be its connection of choice for supplying additional bandwidth at low cost.

WAN Design Optimization (2015)

As London Hydro embraces its Cloud and mobility strategy, the needs for internet bandwidth, availability and reliability continue to increase. Following few provider outages experienced in past years, London Hydro introduced secondary WAN connection and continues to work on hardening its network design to provide full failover for all applications. Since the cost of bandwidth has decreased, London Hydro was successful in increasing bandwidth availability without increasing expenditures.

Technical Evaluations of Web Chat and Post Call Survey Features (2016)

To further enhance communication channels with customers, London Hydro is planning to complete technical evaluations of "chat" and "post call survey" functionality. Both features will be configured and tested in house. The goal of these technical evaluations is to better understand deployment needs as well as develop necessary business processes required to support additional communication channels in the future.

Servers and Storage

SAN Refresh (2015)

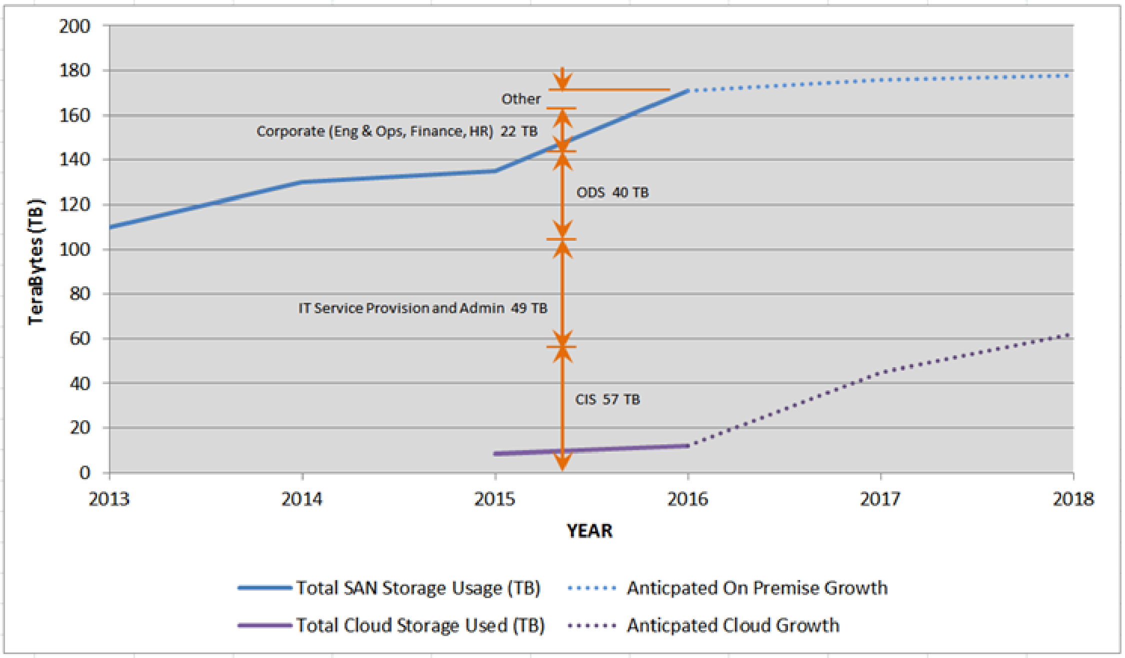
Consolidated Networked Storage involves supplying the required storage capacity with fewer physical resources such as using shared disks on the network or a Storage Area Network (SAN). Fewer physical storage resources mean less hardware to purchase, less physical complexity to manage, and less space requirement. Consolidated networked storage is also an essential enabler of server virtualization. When servers provide storage from a common pool, utilization is optimized. No storage is wasted in inaccessible silos. A single storage management toolset makes monitoring and tuning storage easier for the system administrators and speeds servicing requests for storage for both production and project activities.

The storage requirement is depicted in Figure 2-23 below. The two largest single storage consumers are ODS and SAP. The 'Corporate' allocation, while in total is large, serves over 200 virtual machines, supporting such business applications such as GIS, JDE, HR ADP, Bill Print, Backups, Files Shares, EBT, Prime Infrastructure, Street Sweeper, Infrastructure monitoring tools and SCADA Web.

Historically, the rate of storage growth has been about 20% to 30% per year. Data storage usage is typically about 10% for the application code itself while the other 90% relates to transactional data created by each application. With this ratio and considering the efforts to increase customer engagement and (increases in frequency of) real time metering, the expectation is that these growth rates will be maintained or may likely increase. To address this growth, London Hydro refreshed the storage system in 2015. As part of this refresh, London Hydro selected new technology, fully scalable, with additional storage in order to meet the growth needs forecasted for next five years.

With a growing shift to Cloud computing and its attendant data storage schema, the storage growth scenario has shifted somewhat. While growth rates remain unchanged, the bulk of this growth is expected to occur in the Cloud, while very little capacity growth will be required on premise (also as depicted in Figure 2-23). Where Cloud storage growth is due to a move of an existing data store from on-premise capacity, the resulting freed up on-premise capacity will be re-allocated to remaining on-premise systems, thereby deferring real (additional hardware) increases in this capacity.

Figure 2-23: SAN Storage Growth



Miscellaneous Software

Google Apps for Business (2013)

Based on a Business Impact Analysis (BIA) review conducted in the fall of 2012, email services were identified as a critical service that must be available immediately in the event of a disaster to facilitate communications and recovery efforts with staff, customers, partners, utility field workers, utility partners, City Councillors and the media.

Prior to adopting Google Apps for Business, London Hydro maintained its own on-premise Microsoft Exchange 2010 mail service (email).

The environment was complex and costly to protect and operate. The on-premise solution, although important to daily operations, was not core to the business and it was limited in the available features and capabilities. It was determined that commercially available offerings from industry leaders, such as Microsoft and Google, provided a feature-rich set of functionalities that can be delivered anywhere, anytime to any device securely from the Cloud.

With the increased number of mobile devices and the need to support an increasing mobile workforce, it was determined that a Cloud-based SaaS (Software as a Service) solution would address disaster recovery and user needs. London Hydro investigated different options and selected Google Apps for Business as both cost effective and the solution that best addresses the user expectations.

The summary of benefits includes enhanced disaster recovery, reduced IT operational costs, consistency with the IT strategy and enhanced end user productivity gains.

Miscellaneous Hardware

Printer Refresh (2013)

In 2013, London Hydro refreshed its fleet of Multi-functional Device (MFD) units. With this refresh, London Hydro achieved the following objectives:

- Improved print quality
- Reduced operating costs when compared to leased units
- Reduced the number of colour devices by increasing the number of monochrome devices
- Provided features for scanning to Google
- Eliminated most fax boards and analog lines by embracing a Cloud-based fax solution that supports sending and receiving faxes from any device, from any location at a significantly lower cost than the cost of maintaining analog lines

Digital Signage (2015)

Digital signage can be thought of as the electronic version of the old cork 'Employee Bulletin Board.' At London Hydro, a dedicated computer system displays current information of relevance to its employees on a collection of computer monitors. These monitors are centrally driven by a single source computer for easy administration and quick management of content. The monitors are large, looking very much like flat screen televisions and are strategically distributed throughout the company headquarters and Operations areas. They are mounted on walls in areas of high employee traffic.

The purpose of digital signage is to share information with employees. London Hydro made investments to expand the number of media displays in various locations at 111 Horton used for sharing of corporate communications and business specific content (PMO news, health and safety updates, etc.).

This solution leveraged investments made in the past and added additional displays in designated areas while centralizing content management and simplifying IT operations and maintenance activities.

Examples of these digital monitors are shown in Figure 2-24.

Figure 2-24: Typical Digital Signage Stations

Phone System

Phone System and Call Centre Application Refresh (2014, 2015)

As part of the phone system lifecycle management, London Hydro replaced its old Mitel telephony infrastructure with Cisco based technology. Project objectives concentrated not only on replacement of legacy infrastructure but also on introducing new features and capabilities for customers and employees.

London Hydro has leveraged its investments in wired and wireless networks. London Hydro's technology refresh has further integrated its new telephone infrastructure in order to provide better support to customers by providing rich media communication channels, additional call centre features, and additional options for supporting our growing mobile workforce while reducing total cost of ownership and operational risks related to a very complex multi-vendor environment.

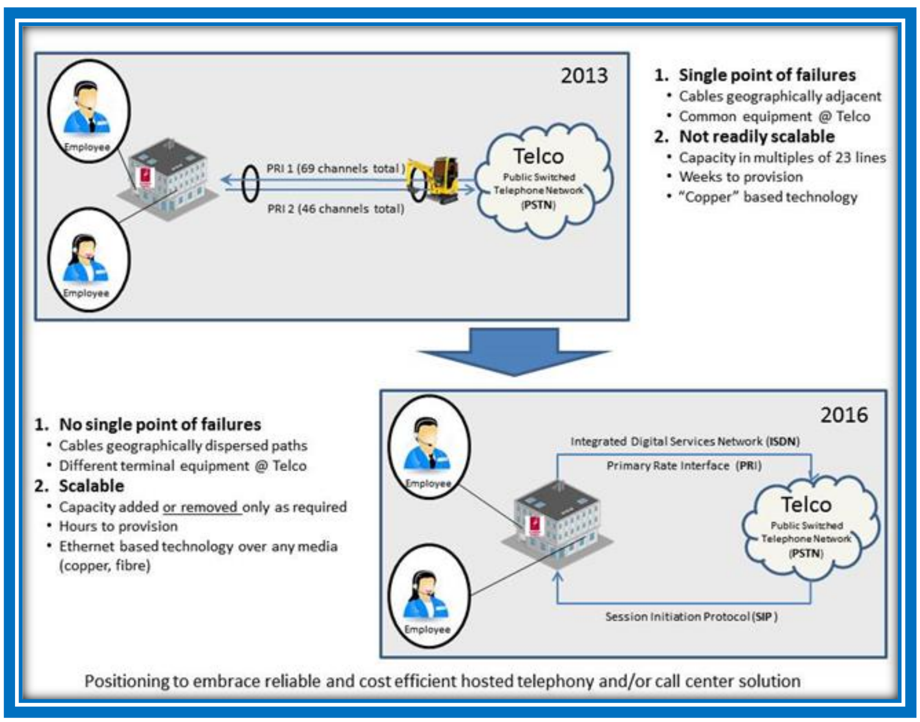
This refresh has also provided capabilities for a virtual call centre in the future.

Session Initiated Protocol (SIP) Connectivity Enhancements (2016)

London Hydro will be updating its infrastructure by introducing SIP connectivity to its Public Service Telephone Network (PSTN). The main objectives of this change are to:

- Reduce operating costs
- Enable voice channel scalability (both increase and decrease) and improve monitoring
- Quicken provisioning times
- Improve PSTN connectivity and technology diversity
- Position London Hydro for enhanced disaster recovery (DR)
- Prepare for hosted or Cloud telephony, contact centre or virtual contact centre (VCC)

Figure 2-27: Migrating from Dedicated Phone Lines to Internet Based Communications



Computer Telephony Integration (CTI) (2017)

With the integration of the CRM system and the contact centre application, agents can place, receive and transfer customer interactions with full, real-time access to customer data, and thereby improve monitoring and enhance customer service without switching between screens. This improvement will also automatically record call details in CRM for future reference. While doing so, the call centre application will also forward the customer details (such as customer account number, phone number from where the call is being placed, queue name etc.) so the Customer Service Representative (CSR) has enough information about the customer before accepting the customer's call. The term called "Screen Pop" is used to refer to the process, which results in the CSR receiving the caller's history and information before answering the call. This integration system not only reduces the call wait time for the customer but also improves the customer interaction experience.

Hosted Telephony and Call Centre (2017)

The increasing availability of commercial Cloud-based telephony and call centre solutions has given London Hydro an opportunity to refresh its infrastructure and position for a future virtual call centre.

While most businesses are attracted to Cloud-based solutions solely for the cost savings, there is a broad set of additional benefits to consider in terms of disaster recovery and business continuity planning.

London Hydro refreshed its legacy telephony and call centre solution in 2014 with a long term goal of achieving diversity and redundancy to support the corporate objective of enhanced customer engagement. With a browser-based call centre agent application and provision for Session Initiation Protocol (SIP) trunking, London Hydro's voice infrastructure will be prepared to support the Virtual Call Centre concept and be able to provide a more robust disaster recovery and business continuity strategy as the application will be accessible anywhere and on any device as long as internet connection is available.

Figure 2-25: IVR Call Flow and Hosted Telephony Evolution

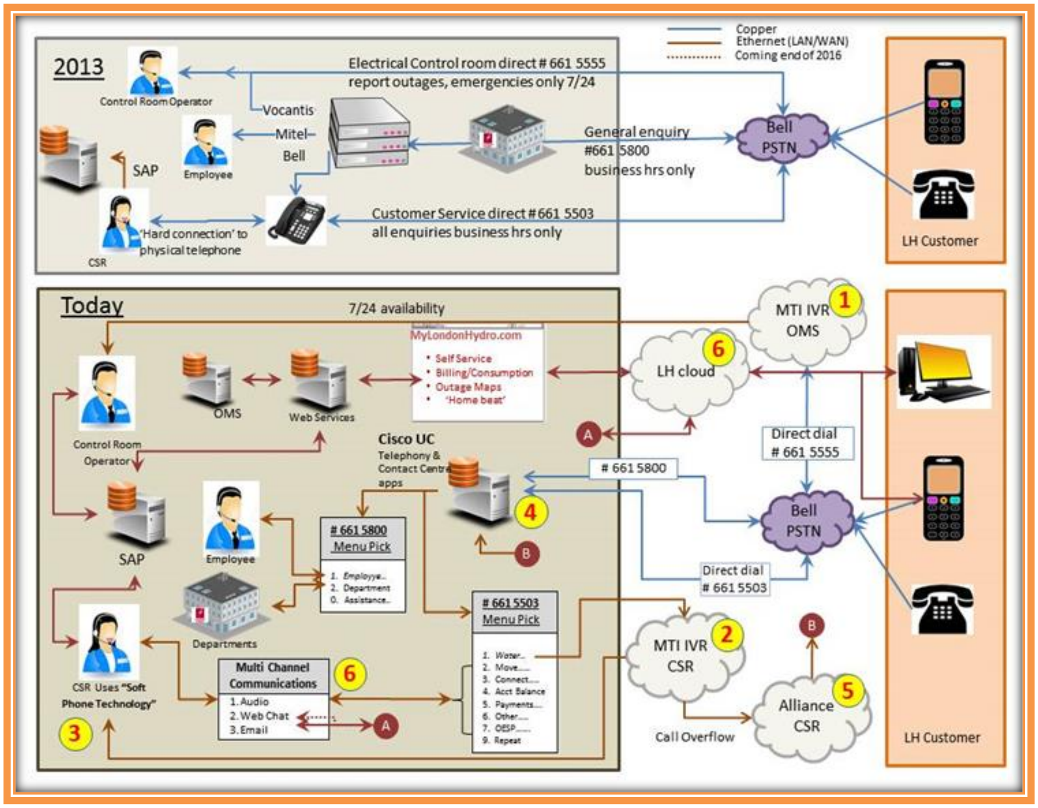


Figure 2-26: Legend of the Numbered Items in Figure 2-25

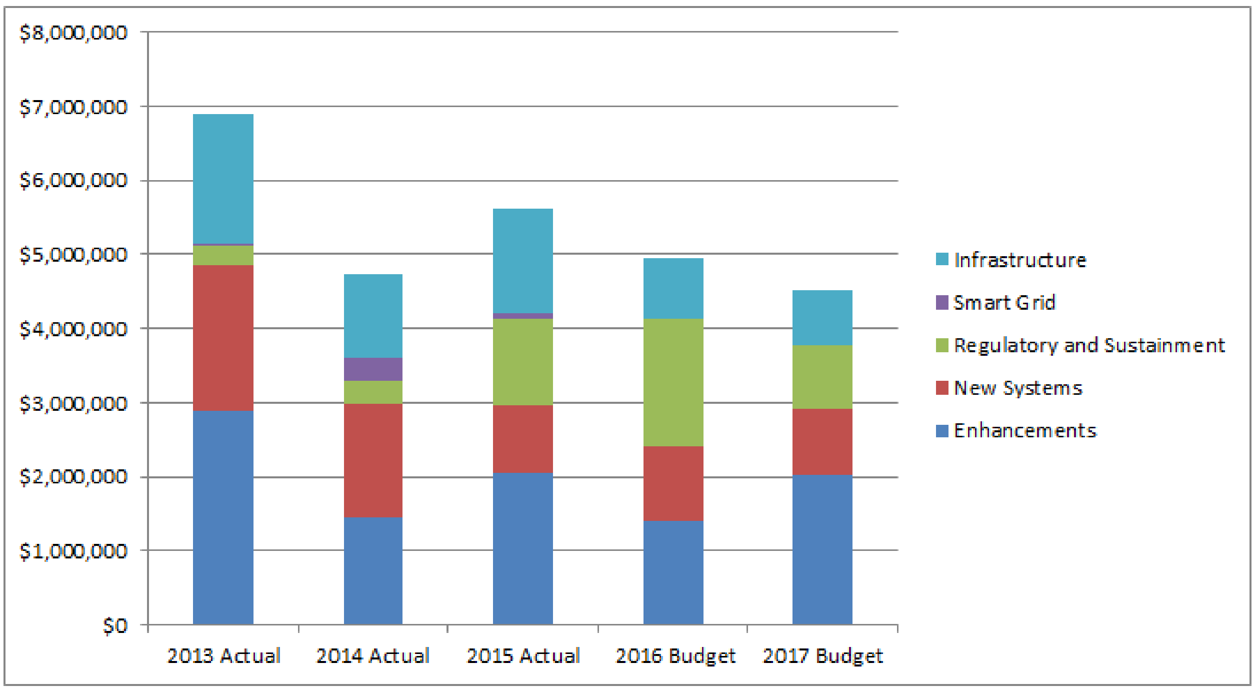
Item #	Feature	Benefit
1	Call-in capacity increased to handle larger call volumes especially in cases of major outages	Concurrent calls capacity raised from 115 up to 1000 before a customer would get a busy signal
2	Automation of caller ID to improve inbound message handling and added capability for 'outbound' broadcast of messages	Simpler process and reduced customer efforts to identify issues and receive updates
3	Implemented "soft" technology	Staff no longer bound to 'fixed' workstations and can work from any where
4	Consolidated multi vendor environment into one - Cisco	Unified communications capability gives more options for call handling
5	Added peak demand overflow capacity with external vendor	Engage additional CSR 'on-demand' resources during peak periods such as student 'move in/out' times
6	Increased customer choice of how they interact with the utility	Customer chooses the method of communication that meets their preference or current needs

Application Development (W)

Overview

The trend of the combined budgets for Infrastructure and Application Development, including the subsets mentioned, is presented below in Table 2-38. In each budget year, the focus of the IT strategy for each of the key goals is determined by the business needs, and those needs define and evolve into specific projects for implementation and, eventually, the capital budget.

Table 2-38: IT Capital Spend Profile



As noted in the last London Hydro rate filing, the focus of the IT projects until 2013 was to build a solid, reliable “back end office” for the management of business data and business process support. This effort was dictated by the provincial mandated move to smart metering and TOU rate billing.

During the 2013 to 2017 period, the focus switched to front end or customer facing systems, applications and services such as MyLondonHydro, the Builders’ and Property Management Portals, IDC and Event Assist. London Hydro continues to develop its Metering Department capabilities, such as expanded RNI wireless services, to provide greater customer communications, such as real time outage notifications and up to the last hour consumption data (limited to select customers) for meaningful cause and effect data displays.

London Hydro's key technology focus areas for next 3 to 5 years are to

- Continue to focus on developing ground-breaking features to engage customers in a meaningful manner
- Continue to focus on Cloud technologies – Continue the migration of old systems and the building of new systems using the Cloud platform
- Continue to build an Outage Management System that enhances response agility and information availability
- Continue to build a foundation for Enterprise Resource Planning ("ERP") implementation as per the Ernst & Young (E&Y) "Evaluation of JDE Upgrade and Deployment Options" (refer to Exhibit 4, Appendix 4-1)
- Start building Business Intelligence capability to realize the value of smart metering and OMS/GIS data
- Optimize current solutions through standard software upgrades that provide enhanced functionality
- Continue to focus on remaining compliant with regulatory requirements

However, as noted in the section above regarding life cycles, the completion of a capital project is not the end of the work or capital expenditures for that item, service or function. Whether it is an Infrastructure or Application Development solution that has been implemented, it must be recognized that the completed system/application/function does not go on indefinitely but has a specific life (cycle) that cannot be sustained forever even with the best operational support.

Significant increases in network bandwidth usage from Cloud-based applications and the computing requirements from additional local systems have raised costs in these areas to the point where optimization efforts are warranted and cost effective. Therefore, Application Load Balancing and WAN Optimizer tools and processes will be implemented in an effort to maximize the efficiency of existing resources to reduce these impacts as much as possible and avoid costs associated with additional purchases that would be required without optimization.

Capital Spending

Forecasted spending for Application Development for the proposed 2017 Test Year is $3,775,000; $1,353,280 lower than the 2013 Actuals. Table 2-39 below divides Application Development spending to the specific project type.

Table 2-39 – Application Development Capital Spending 2012 - 2017

APPLICATION DEVELOPMENT CAPITAL SPENDING							
Annual Spending	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
Customer Information System (CIS)	383,121	874,096	835,000	601,952	406,743	855,000	300,000
CIS retailer requirements	767,734	-	-	-	-	-	-
CIS Customer Relations Management upgrade	-	726,038	525,000	417,044	-	175,000	-
Cyber Security	-	-	-	-	266,760	125,000	50,000
System Foundations	-	-	-	-	250,242	305,000	150,000
Customer Engagement - Residential	-	-	-	539,465	648,647	300,000	825,000
Customer Engagement - Commercial & Industrial	-	-	-	-	8,121	740,000	400,000
CIS regulatory requirements	260,602	266,879	480,000	9,017	304,583	140,000	250,000
Geographic Information System (GIS)	453,662	-	-	-	158,736	40,000	-
Outage Management System (OMS)	707,427	1,194,718	1,500,000	514,796	107,614	350,000	-
Customer Engagement / Web Presentment & TOU	208,782	1,524,585	500,000	45,314	-	-	-
Meter data	1,548,041	4,696	-	229,753	314,117	150,000	400,000
Mobile Workforce (MWFM)	-	518,019	450,000	489,533	781,324	300,000	300,000
Business intelligence	-	19,249	500,000	1,912	150,814	175,000	250,000
Enterprise Resource Planning (ERP)	-	-	-	450,607	748,319	475,000	850,000
Total	**4,329,368**	**5,128,280**	**4,790,000**	**3,299,393**	**4,146,021**	**4,130,000**	**3,775,000**
Annual Change		798,912	(338,280)	(1,828,887)	846,628	(16,021)	(355,000)

Support to IT projects for Interval Data Center customer facing applications

As electricity prices continue to rise and become more volatile (HOEP, Global Adjustment), having a customer facing application that can enable a collaborative conversation about energy use between London Hydro and the customer has proven valuable.

London Hydro has found that there is additional value in meter data beyond the business process of bill creation for its customers. Meter data is valuable for the internal operations of its customers to understand their electricity consumption and demand characteristics. 'Value-added' applications can extract data from the ODS and make it available for business use to better manage the consumption and operating costs.

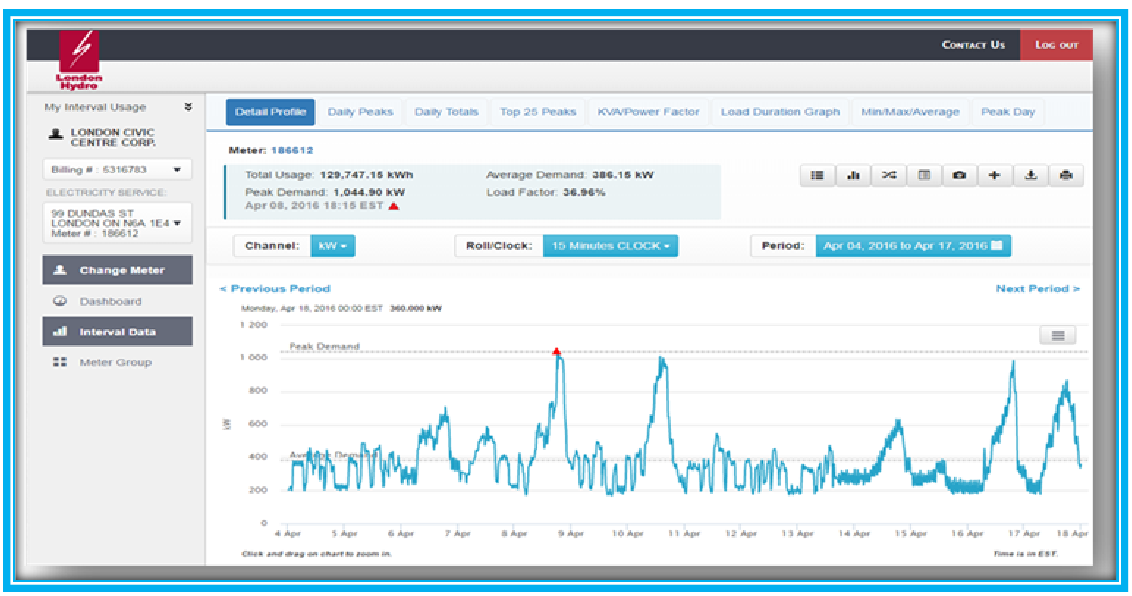
London Hydro has created the 'Interval Data Center' application and has made it available to all interval metered London Hydro customers. This application was developed by London Hydro with the input from a cross-section of customers to ensure that the features and usability met their needs. For example, having a mobile tool that could be accessed from a cell phone was a key feature for providing meter and energy data at the customers' finger tips.

Based on the Green Button platform and standards, London Hydro customers can access data and aggregate not only from any property within London Hydro's service area but from any property served by an LDC also employing the Green Button platform.

Figure 2-28 illustrates the Interval Data Center's main data screen.

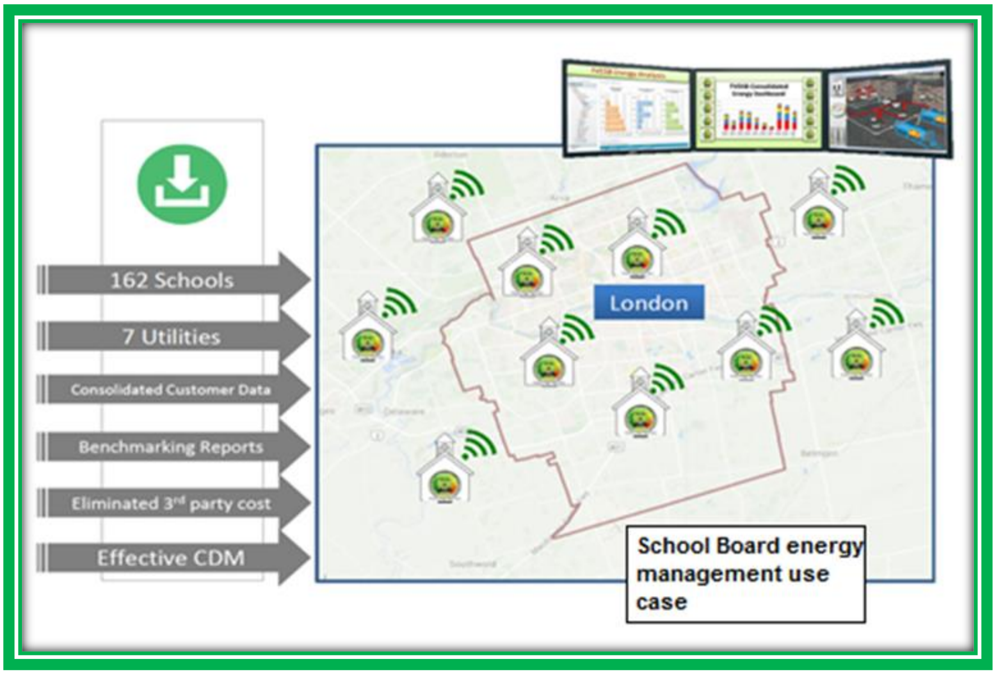
Customers are able to use this data directly or delegate 3rd parties to use the application on their behalf. Providing customers with access to their own data has empowered them and has also reduced the increasing number of requests received by London Hydro for such data. As a result, London Hydro has been able to reduce the amount of manual effort required to create individual responses to each enquiry.

Figure 2-28: Interval Data Center MyAccount tool



One example of an IDC application was created for the Thames Valley District School Board. The Interval Data Center became the single energy management dashboard for 162 schools across 7 utilities and the underlying data source was provided from the Green Button standard. The application allowed the school board to get a single view of all their facilities without paying for 3RD party aggregation services. In addition, initiatives are also planned for the creation of new applications to support AMI data (i.e. Voltage, Alarms, and Power Quality).

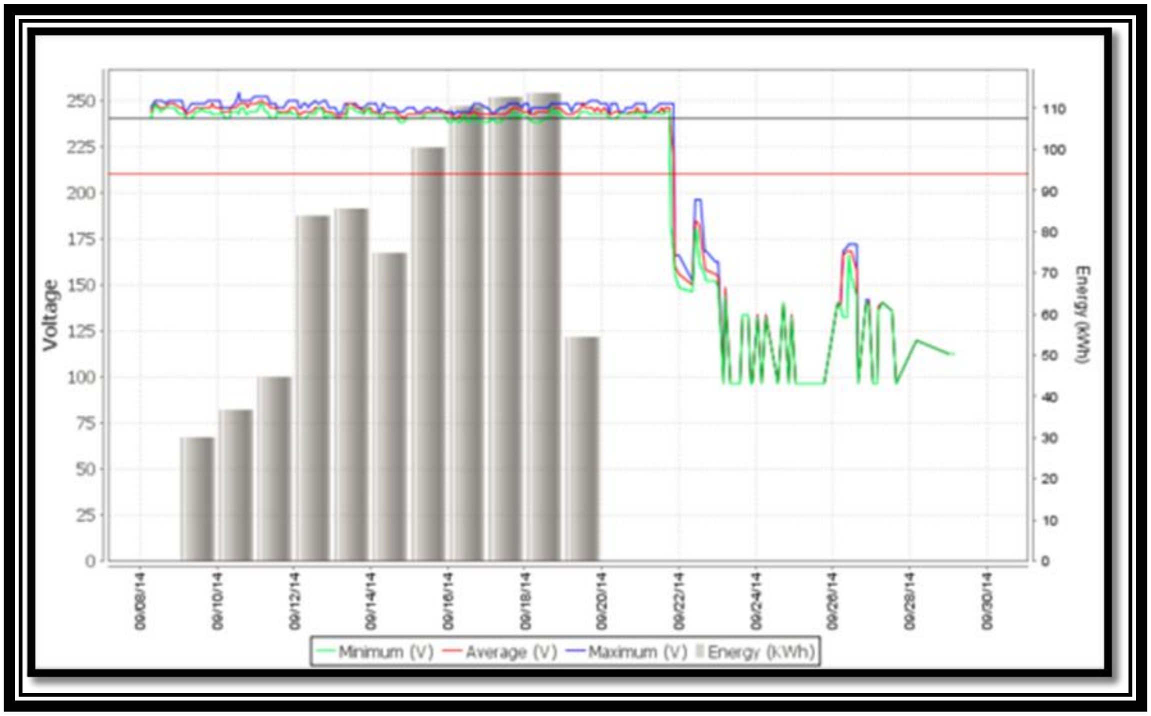
Figure 2-29: London Area School Board Green Button Use Case



Other data sources from the meters are currently being integrated into London Hydro's business systems. The availability of voltage, outage and power quality alarms are becoming new sources of business value that London Hydro can use to enhance internal operation and customer value. The outage map website is another example.

Another example of internal monitoring is the metering anomaly and reporting protocol tool as shown in Figure 2-30. This tool sets voltage thresholds for meters and can identify meter failures, phase outages, voltage spikes, incorrectly set transformer taps, seasonal voltages and tampering situations. The tool provides a Quality System Technician operator with all the required information in one screen and allows for tracking and disposition status to keep track of issues. The tool was developed internally and has found many system and equipment issues that have been corrected proactively without the customers' awareness.

Figure 2-30: Smart Meter Voltage Monitoring Application



Capital Spending Cost Drivers

Capital spending related to Application Development fluctuates from year to year as a result of the following factors:

- Life cycle of enterprise systems (e.g. CIS, GIS) require regular investments for patches, upgrades and enhancements to activate new functionality delivered by the vendor (e.g. EBT, BI)
- Variable demand for regulatory requirements from the OEB and Measurement Canada
- Adjustments to project plans based on the capacity/capability and business priorities (e.g. OMS, ODS, MDMR, Customer Self Service)

Capital cost avoidance has been realized through the:

- Reduced use of professional external services as more internal labour can be directed to capital projects
- Increased employment of SaaS Cloud-based applications

Capital costs have increased through:

- Increased IT landscape architecture and complexity
    - System capacity and increased performance requirements
    - Increase in the number of new systems, interfaces and integration
    - Increase in data volumes to be managed and distributed
- New system licences (e.g. OMS, mobile work force management, new HR system, mobile devices)

Additional infrastructure projects related to phone system enhancements include:

- CTI integration
- Strategy development for Cloud-based contact centre and phone system solution

Other infrastructure projects planned for 2017 include:

- SAN growth to accommodate additional Virtual Desktop Infrastructure (VDI) deployments
- SAN fabric lifecycle refresh
    - The hardware that connects workstations and servers to storage devices in a SAN is referred to as a "fabric." The SAN fabric enables any-server-to-any-storage device connectivity through the use of *Fibre Channel* switching technology
- Network refresh strategy including Networking components in DR site
- Migration to Windows 10 OS for end users

2016 Plan - IT Capital Projects

Table 2-40: 2016 IT Capital Project Plan

Project Description	Budget	Rationale / Benefits
Regulatory & Sustainment		
Enhanced Disaster Recovery	$125,000	Increased system reliability for critical systems like CIS, OMS etc.
Security System Upgrades	$75,000	Enhance cyber security
Automated System Monitoring and Alerts	$80,000	Reduced system downtime
SAP Personas/ECC EhP7 Upgrade	$150,000	Maintain currency of SAP platform
Infrastructure Upgrades - Application Enhancements	$100,000	Accommodate infrastructure upgrades within existing applications
Regulatory Changes	$140,000	OEB mandated changes
End Point Security Initatives	$50,000	Provides comprehensive threat protection and data security
Specialized Systems Upgrades	$100,000	Incorporate custom made applications into enterprise level platforms and
Bill Print Refresh	$555,000	Replace obsolete bill print system
OMS Upgrade	$350,000	Maintain currency of OMS for vendor support
Sub-total Regulatory and Sustainment	**$1,725,000**	
Enhancements		
Customer Engagement Solutions	$300,000	Customer engagement tools (e.g. proactive alerts, outage map)
Mobile Workforce phase 3	$300,000	Automate Service Orders (EUS, Collections and Construction depts)
Commercial & Industrial Apps	$300,000	Customer engagement tools for commercial & industrial customers
SAP Business Process Improvement	$150,000	Automation of AP Collection email, Service Order processing
Mobile Link Enhancement	$40,000	Tool to conduct field inspection/Audits by operations
Green Button	$150,000	Design and Implement new features for green button standard
Customer Relationship Management (E/O)	$175,000	To enable CRM for operations and CDM groups
Sub-total Enhancements	**$1,415,000**	
New Systems		
Builders' Portal	$240,000	Manage order tracking and notifications for builders
New Property Management Portal	$200,000	Host existing property management portal on supported platform
Learning Management System	$150,000	Enterprise level training to improve skills / reduce compliance risks
Fleet Maintenance System	$225,000	Improve LH fleet management (uptime, efficiency, useful life)
Analytics Systems Phase 1	$175,000	Data analytics - interval & smart meter with grid connectivity and billing data
Sub-total New Systems	**$990,000**	
Infrastructure	$810,000	Asset refresh, enhanced backup capability, system upgrades as part of life cycle management
Sub-total Infrastructure	**$810,000**	
2016 Total Capital Budget	**$4,940,000**	

2016 Regulatory & Sustainment Projects

Enhanced Disaster Recovery (DR)

London Hydro has a large portfolio of IT systems that are integral to the effective operation of the business. Many of these systems are highly integrated and not only exchange data regularly, but also ensure that the correct data is exchanged only when interim processing steps are completed successfully in proper sequence. In the event of a disaster, whether of a natural source (e.g., fire) or not (e.g., cyber-attack), it is essential that the IT Department is able to return these systems to a reliable, accurate operating state as quickly as possible in either the IT centre or the DR facility.

The IT Department will design, test and implement a comprehensive DR plan that spans all systems and clearly indicates not only the proper procedure for the return to service of an individual system but also the proper order of the return of all systems and to confirm that a normalized state of service is achieved.

Security System Upgrades

Cyber-attacks on utility systems have increased in frequency, and it is critical for London Hydro to safeguard its systems in the event of such an attack.

This project will implement and enhance security for London Hydro's IT systems, including performing a security audit, virtual firewall enablement and upgrades. These measures are necessary to make sure London Hydro systems are secure and protected from malicious targets.

With improved cyber security, London Hydro reduces the risk of exposure to malicious attacks that could compromise customer data privacy, operational efficiency and reliability.

Refer to Exhibit 4, Table 4-27 "Number of Daily Attempted Intrusions Chart" for information regarding quantities of cyber-attacks.

Automated System Monitoring and Alerts

This project will provide automated enterprise system level monitoring and alerts that will lead to early detection of system performance issues and enable quicker and more proactive resolution. This enhanced system monitoring will increase uptime of London Hydro's systems by reducing resolution time.

The purpose of this project is to upgrade and incorporate custom-made applications into enterprise level platforms and systems. As part of the overall IT strategy, London Hydro will move a number of discrete IT applications to enterprise systems to facilitate the reduction of internal infrastructure usage. This project will cover the implementation of integration technologies to manage on-premise and Cloud communications, thereby setting the groundwork for later migration of major enterprise systems. Many small, discrete systems are maintained on obsolete platforms and need to be upgraded. This project will address these applications with the aim of moving them to the supported platforms. With the move of these discrete applications into enterprise-wide systems, London Hydro reduces the manual effort required for maintenance, thereby improving system efficiencies and reliability.

SAP Persona/ECC EhP7 Upgrade

This project involves deploying the latest SAP enhancement package P7 and upgrading SAP personas to version 3 to maintain eligibility for vendor support of this product suite and to follow the IT strategy of maintaining vendor software at the current or "current -1" level. This upgrade to the core SAP system will introduce new billing and AMI-related features delivered by SAP to reduce London Hydro's need to maintain custom coding. As part of this upgrade, SAP's user interface framework will also be deployed, simplifying and optimizing business processes through custom screen layouts as well as reducing the support burden by moving to a web-based primary interface. This enhancement will reduce the manual effort required to maintain custom code and thereby increase efficiency. Efficiency also increases due to the ease of use of the user interface framework.

Infrastructure Upgrades - Application Enhancements

The purpose of this two-year project is to implement changes to applications due to infrastructure upgrades. London Hydro has embraced virtualization and Cloud technologies and most of London Hydro's applications have already been migrated to these platforms. As part of this initiative, London Hydro will be focusing on enhancing overall resiliency of applications within virtualized and Cloud environments. London Hydro will also pursue a data prevention loss strategy and implement various tools to ensure London Hydro's applications are further safeguarded and to keep up with platform upgrades. These upgrades will reduce the risk of system obsolescence and ensure London Hydro's IT infrastructure aligns with the latest technologies, thereby increasing system reliability and efficiency.

Regulatory Changes

Throughout the course of a year, regulatory changes with low to high complexity can occur with deadlines for implementation within the same year. This project represents a container for such changes and is completed year to year to address ongoing regulatory changes. Examples of regulatory changes include system changes to accommodate fixed distribution rates and debt reduction. With these changes, London Hydro will ensure regulatory compliance and, in doing so, will enhance customer value since many of the regulatory changes relate to improvements for customers. The twice yearly rate changes to the RPP electricity commodity prices are implemented under this project. It is further anticipated that project work will be required regarding the collection of additional data associated with each smart meter for inclusion into the 'Distribution and Commodity Rates' as described in the "Smart Meter Entity (SME) EB-2015-0297 document (effective Jan, 1 2017).

Endpoint Security Initiatives

As London Hydro continues to develop and deploy mobile applications across departments, the need for endpoint security that provides comprehensive threat protection increases.

The purpose of this project is to design and implement endpoint security initiatives.

This initiative ensures robust cyber security to guard against possible data breaches. Data security is required to protect users and corporate information across every device and application. With robust end-point security in place, London Hydro ensures minimal exposure to security breaches and thereby increases both the reliability and efficiency of the mobility platform.

Specialized System Upgrades

A variety of discrete specialized systems within London Hydro's IT landscape are maintained on obsolete or near-obsolete platforms. In order to provide continued support for the business processes managed using the functionality of these systems, we need to upgrade and/or replace the capabilities provided. This project will better align these systems with our core enterprise systems support and Cloud strategy.

To enable the long-term support of the corresponding business processes, this project will include the implementation of integration technologies to manage 'on-premise' and Cloud communications, thereby setting some of the groundwork for later migration of major enterprise systems.

Bill Print Refresh

London Hydro's current bill print system is a custom solution built on Oracle reports and custom PL/SQL code. The version being used is outdated and no longer supported by Oracle. This system is also limited in terms of allowing modifications to existing invoice layouts, putting London Hydro at a risk of not being compliant with certain OEB regulations.

This project will deliver a replacement solution that will provide required business functionality and address risks associated with the current legacy systems, including:

- Provide a robust, scalable and fully functional bill printing and customer communication solution
- Implement a full-featured solution that meets current and future business requirements, is vendor supported and uses industry standard technology components
- Implement a solution with multi-site disaster recovery capabilities

The solution for a new bill print service is consistent with London Hydro's IT Strategy of moving from fixed cost on-premise solutions to variable cost Cloud-based, Software as a Service (SaaS) solutions. Customer invoicing data would reside in Canadian data centres with this solution.

Changes are needed in London Hydro's bill printing and presentment solution for the following reasons:

- The current tool is functionally deficient and inflexible for modifying invoice document layouts
- The current bill printing solution is not supported by a resilient and geographically diverse disaster recovery platform
- London Hydro needs to create a platform to support and maintain high levels of customer service in the short and long term
- London Hydro wants to enhance its brand by being able to communicate with specific customer groups
- The current solution is not aligned with London Hydro strategic objective of maximizing the benefits of Cloud-based solutions

The following summary features are required in the selected solution, and they are expected to provide the following benefits: address validation, archiving, disaster recovery, document handling, document inserts, grouping and sorting, interfaces, mail handling, monitoring, reporting, multiple formats, process capacity, security, QR codes and targeted communications.

With the availability of these new features, London Hydro can deliver enhanced customer value.

OMS Upgrade

The purpose of this project is to upgrade the Outage Management System (OMS) to its latest version and remove dependencies on an unsupported platform. London Hydro went live with OMS in early 2013; since then, OMS has been the backbone of operations. OMS has provided ease of use and effectiveness in the Control Room since its inception; however, OMS has recently experienced unplanned downtimes arising from platform obsolesce. London Hydro needs to complete the OMS upgrade as soon as possible to avoid any further downtimes and to increase the system reliability. With the implementation of the latest version, London Hydro aligns with its strategy of maintaining vendor software inventory to either *current* or "*current-1*" versions to ensure critical system reliability, which is integral to the safety of field crews.

2016 Enhancement Projects

Customer Engagement Solutions

This project is designed to increase Customer Engagement (CE), value and satisfaction through the addition of enhanced features on London Hydro's customer portal. This project will further enhance the customer-facing website, MyLondonHydro, with improved customer engagement features such as fully automated "move in/move out" capability, additional notification choices, outage restoration confirmation and improved website performance.

Mobile Workforce Phase 3

The purpose of this project is to implement a Mobile Workforce system for the EUS, Construction and Collection Departments. This project is a continuation of the Mobile Workforce project that started in 2014. This phase will involve further automating field work completion by EUS, Collections and Construction Departments. The scope will be expanded to include features such as Utility Work Protection Code (UWPC), access to safety documents, automation of collection orders, trouble orders, etc. The use of mobile workforce increases efficiency by providing a single source of information related to service order completion that is available to all parties in real time. Having a single source of information available to all parties in real time eliminates the misunderstandings that can result from multiple versions of hard copies being used by different parties; also the convenience of having immediate access to safe work practices will support worker and public safety. In terms of interoperability, this project will enable seamless integration between workforce management system and London Hydro's ERP systems.

Commercial & Industrial Apps

With this project, London Hydro will continue to develop a number of customer engagement offerings for its commercial customers, delivering significant value to a traditionally underserved customer class. Responding to customer requests, London Hydro will provide advanced solutions to improve energy forecasts and facilitate energy conservation. These solutions will provide proactive information and actionable insights for commercial customers to identify areas of improvement of their operations, while optimizing their energy consumption. A number of successful use cases, presented in Exhibit 4, Appendix 4-2, have already been developed in consultation with commercial customers, helping them save costs related to energy consumption.

Some of the upcoming features for the Interval Data Centre (IDC):

- Enhance how we track users in IDC; improve engagement (IDC Site Analytics Enhancement)
- Improve data download capabilities of IDC and User Options (Data Download for All Channels > 6 Months Enhancement)
- Enhance interface to increase usability by showing customers what data is available for each meter (Meter Data Availability Indication Feature)
- Add a Help Feature to IDC
- Create broader offering (and enhancement) of the Financial Report tool
- Enhance customer energy notifications
- Improve annotation engine (enhancing user energy accountability)

SAP Business Process Improvements

These enhancements projects aim to continue leveraging the value of the SAP investments by enabling new business processes or enhancing and optimizing existing business processes using the technology available in the existing system. This project comprises several sub-projects addressing specific objectives on a per-department basis.

These SAP enhancements will support all departments that use SAP and increase both efficiency and system reliability by enabling new business processes and enhancing existing processes.

Mobile Link Enhancements

The objective of this project is to enhance the Mobile Link product to conduct field inspections/audits by Operations Departments. In 2015, the Field Sketch system was replaced with the Mobile Link product as a way of automating and streamlining these processes for "in-field" inspections and audits of distribution assets. With this project, the Mobile Link product will be enhanced to include added fields to support more accurate and detailed inspection and audit information. The more accurate and detailed field audits and asset information will increase efficiency in asset planning and reliability. More detailed and accurate field inspections will result in more timely replacement of assets that may be at risk of posing a safety threat or harm to the environment. The cyber security and data privacy related to affected systems/platforms will be maintained or enhanced.

Green Button

This project aims to provide additional functionality for customers using the Green Button Standard and thereby enhance customer value. London Hydro has championed the Green Button initiative across North America and has been at the forefront in the development of the standard. Under this initiative, London Hydro will continue to develop applications that will take advantage of the Green Button platform and continue to provide support to third party vendors for developing customer-focused applications to help customers reduce their energy consumption.

Customer Relationship Management - Process Improvements (E/O)

The purpose of this project is to facilitate Customer Relationship Management (CRM) for Operations and Engineering groups. This project is a follow up to CRM implementation in 2014. Using CRM, Operations and Engineering groups will be able to capture customer interactions, including history, times and details of subject matter in order to better serve customers during subsequent interactions. Efficiency will be increased related to the recording of customer interactions using the CRM system in the Engineering, Metering and Operations Departments. Customer value is enhanced as any person at London Hydro taking a call will be able to see the call history of the caller and thereby facilitate service and/or problem resolution. Interoperability is enhanced as all departments will be working with the same information related to customer interactions.

2016 New Systems Projects

Builders' Portal

The purpose of this project is to design and implement a web-based portal that will allow builders to manage and track service requests and receive update notifications regarding their construction projects. This project stems from customer feedback that was received upon the success of the Property Management Portal application and will function in a similar manner. This service enhancement is a direct result of London Hydro's response to customers' (builders') requests to provide an online way to request service and track the progress of those requests. Using this portal, customers/builders will be able to set up alerts to receive notifications for any updates to their service request in real time. This self-help portal will enhance service to builders by providing them with a simpler method for requesting services and for checking the status of their requests. This self-service functionality is expected, as in the case of the property management portal, to eliminate a significant number of repeat phone enquiries by builders to the Customer Service Department, freeing CSR staff to address other issues that are not as easily automated.

New Property Management Portal

This project will replace the current Property Management Portal to provide greater functionality to the customer and reduce the internal support requirements of London Hydro IT staff.

This portal will be re-hosted within the London Hydro's Customer Engagement website, which will require a significant rewrite of the supporting code, and this project provides an excellent opportunity to add new and enhanced functionality requested in customer feedback and surveys.

Improved value for property managers will be realized since enhancements will be responding to their requests. By integrating the property management function into London Hydro's Customer Engagement website, support efforts will be reduced since the IT Department will no longer be required to maintain these two as separate systems.

Figure 2-31: Dashboard View from the Property Management Portal

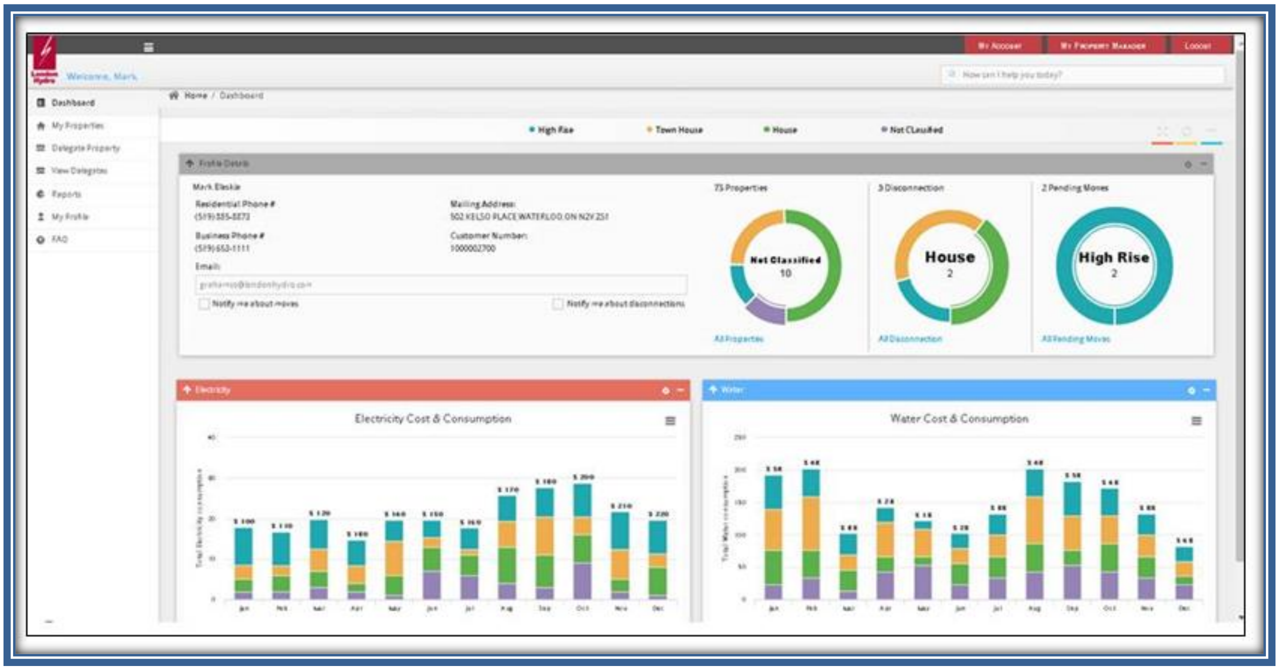
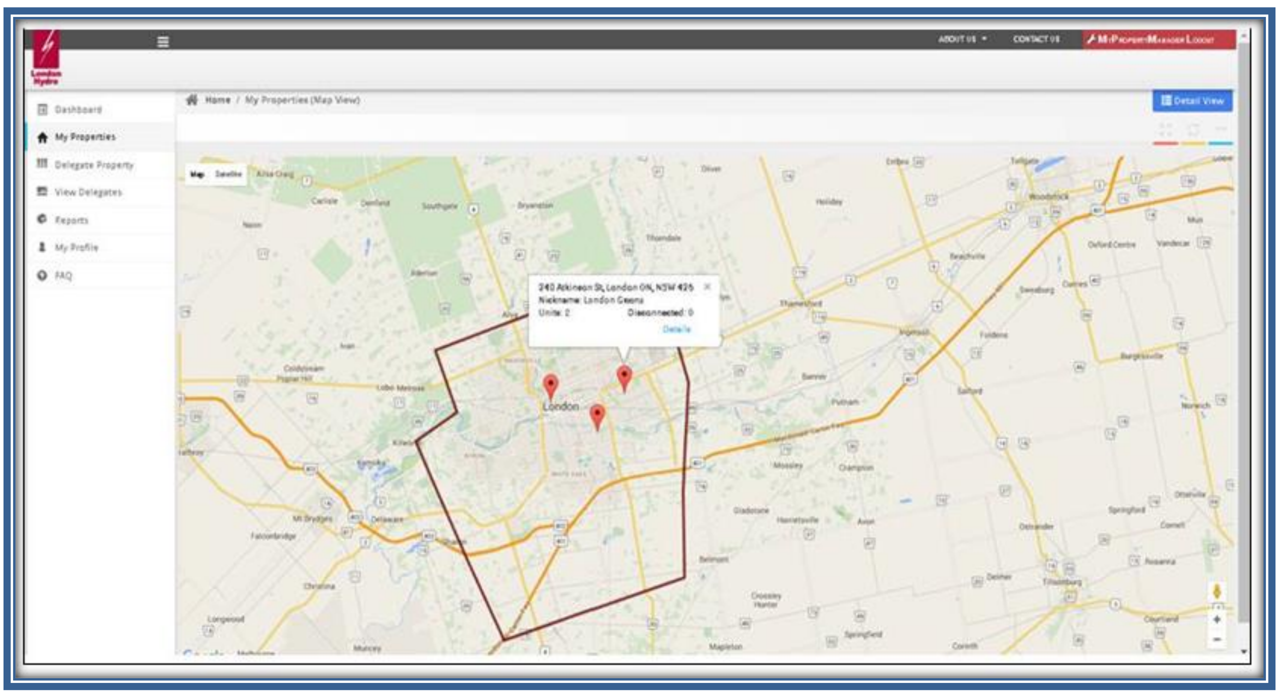


Figure 2-32: Map from the Property Management Portal



Learning Management System

London Hydro will implement a Learning Management System (LMS), which is an industry best practice, to improve skills, reduce compliance risks and enable training management at an enterprise level. The implementation of a LMS will simplify the tracking and scheduling of training and thereby create efficiencies and reduce the risk of non-compliance. By automating the tracking and scheduling of training, London Hydro ensures that no employee "falls through the cracks" and misses safety-related training.

Fleet Maintenance System

This project will enable the fleet maintenance functionality of the JD Edwards System. This capability will increase uptime, efficiency and the overall useful life of London Hydro's fleet of vehicles. This automated system will replace the current manual processes, including the tracking and scheduling of Preventive Maintenance (PM), thus reducing the likelihood of unexpected vehicle breakdowns. Fewer breakdowns equates to more vehicles being available to effect repairs such as service outages and downed lines. Vehicles that are up-to-date in terms of PM are safer to operate.

Analytics System Phase 1

The overall project objective is to deliver a platform that provides the base capabilities to support all current and future data analysis and retrieval objectives with guaranteed integrity in a cost-effective manner. This project involves the consolidation of data, reporting tools, queries and reports from all of London Hydro's systems (operational and financial) in an effort to streamline information gathering. This system will provide efficiencies by removing redundancies and providing more timely and accurate information to support decision-making.

The first phase of the Analytics Systems Implementation project will enable more effective use of interval and smart meter data in conjunction with grid connectivity and billing data using "big data" technologies. This functionality will support improved distribution system planning processes and enable the development of analytical processes that can provide more context to customers with respect to their individual energy usage.

This increased efficiency will allow more effective use of interval and smart meter data. Customers will have access to more detailed data regarding their energy usage, improving customer value. This project involves leveraging the interoperability of London Hydro's systems to enhance analytic processes.

2017 Plan - IT Capital Projects

Table 2-41: 2017 IT Capital Project Plan

Project Description	Budget	Rationale / Benefits
Regulatory & Sustainment		
Oracle Upgrade	$100,000	Implement changes to existing applications due to Oracle upgrades
Security System Upgrades	$50,000	Enhanced cyber security
HRIS Enhancements	$150,000	Implement deferred HRIS features
Infrastructure Upgrades - Application Enhancements	$50,000	Accommodate infrastructure upgrades within existing applications
Regulatory Changes	$250,000	OEB mandated changes
ODS Upgrade	$250,000	Upgrade ODS to mitigate obsolescence risk
Sub-total Regulatory and Sustainment	**$850,000**	
Enhancements		
Customer Engagement Solutions	$425,000	New customer engagement features (proactive alerts, billing forecasts etc.)
Timesheet Field Automation	$300,000	Integrate field time sheets with mobile workforce system
Asset Management System	$200,000	Implement enterprise wide asset tracking
Commercial & Industrial Apps	$400,000	Customer engagement tools for commercial and industrial customers
SAP Business Process Improvements	$300,000	Implement SAP enhancements to incorporate process changes
Green Button	$150,000	Design and implement new features for Green Button standard
Analytics System Phase 2	$250,000	Develop and optimize business intelligence
Sub-total Enhancements	**$2,025,000**	
New Systems		
Automated Billing Payments	$200,000	Enable automatic billing payment from IVR/CE website
Residential Customer Mobile Application	$200,000	Deploy residential customer mobile app to increase customer engagement
JDE Upgrade	$500,000	Upgrade JDE system to avoid obsolescence risk
Sub-total New Systems	**$900,000**	
Infrastructure	$735,000	Asset refresh, enhanced DR capability, new communication channels with our customer and system upgrades as part of life cycle management
Sub-total Infrastructure	**$735,000**	
2017 Total Capital Budget	**$4,510,000**	

2017 Regulatory & Sustainment Projects

Oracle Upgrade

Oracle is an industry standard relational database product used to store application data in customizable formats that are appropriate to computer applications.

The purpose of this project is to implement an essential Oracle upgrade and the required changes to related applications (that use the Oracle database function to store their data). The Oracle upgrade is significant and the protocols with which it interfaces and exchanges data with other London Hydro IT systems will be affected. This project will ensure that necessary code changes due to the Oracle upgrade for both backend services and systems are implemented. A number of systems will be affected by this upgrade including the Outage Management System (OMS), GIS and JDE.

The Oracle upgrade will reduce the risk of system failure due to obsolescence and ensure that key systems that affect reliability and customer value, including OMS, GIS and JDE, are functioning properly.

Security System Upgrades

This project will include a security audit, virtual firewall enablement and upgrades. These measures are necessary to make sure London Hydro systems are secure and protected from malicious targets and are in response to increased cyber-attacks on utility systems. It is critical for London hydro to safeguard its systems from the threat of these attacks.

HRIS Enhancements

With the implementation of the Human Resources Information System (HRIS) in 2015, a conscious decision was made not to automate or replace a number of features in order to lower the risk of this significant system replacement, ease the transition between old and new systems, and reduce the learning curve for HR staff and users.

This project will target full automation of additional HR activities and processes that were not covered under the 2015 implementation, such as benefits calculation and automated pay stubs. By purposely deferring some aspects of implementation, London Hydro also benefits by having the opportunity to work with the system and identify gaps in processes that need to be addressed.

These HRIS system enhancements will further augment London Hydro’s ERP implementation and create efficiencies related to Payroll and Finance functions.

Infrastructure Upgrades - Applications Enhancements

The purpose of this two-year project is to implement changes to applications related to infrastructure upgrades. London Hydro has embraced virtualization and Cloud technologies, and most applications have already been migrated to these platforms. As part of this initiative, London Hydro will be focusing on enhancing overall resiliency of applications within virtualized and Cloud environments. London Hydro will also pursue a data prevention loss strategy and implement various tools to ensure London Hydro’s applications are further safeguarded and to keep up with platform upgrades. These upgrades will reduce the risk of system obsolescence and ensure London Hydro's IT infrastructure aligns with the latest technologies, thereby increasing system reliability and efficiency.

Regulatory Changes

Included in this project are the twice a year rate changes to the "RPP Electricity Commodity Prices." It is anticipated that in addition to this activity, additional changes may result from the discussions that will be occurring within the microFIT program regarding Net Metering versus Parallel Contract Price models.

ODS Upgrade

The Operational Data Store (ODS) is an on-premise, platform-based OTS system. With increased data gathering from meters, this system needs to be upgraded to provide scalability, low cost maintenance and also address the technology platform obsolescence. With the upgrade of ODS, the reliability of the ODS system will increase and customer value will be enhanced as London Hydro will be in a better position to provide more detailed usage analytics.

2017 Enhancement Projects

Customer Engagement Solutions

In this project, London Hydro will evaluate the usage patterns for its consumer-facing applications, including MyLondonHydro, Interval Data Centre and Property Management Portal. On the basis of customer usage statistics and customer focus groups, we will make changes to the user interface of these applications in order to improve the overall customer experience. The overall objective for this project is to optimize and enhance features that our customers find most valuable and minimize the development and maintenance of features that are little used.

As part of the technical elements of this project, we will update the open source user interface frameworks utilized to provide a responsive design for the applications. This update will ensure ongoing compatibility with both new and old devices that our customers use while allowing us to continue providing services that meet requisite accessibility guidelines.

Timesheet Field Automation

The purpose of this project is to integrate a time and attendance system into the Mobile Workforce Management System. This enhancement will enable the automation of time entry for field crews using the Mobile Workforce Management System.

The objective of this project is to reduce the manual effort required by field workers to enter the time details for service orders, and, as a result, it will also reduce the potential for error. This project will help automate the time and attendance approval process for supervisors, thereby reducing the post-processing steps, and enable seamless integration between the workforce management system and London Hydro's ERP systems.

Asset Management System

This project will implement a centralized and computerized Asset Management System that London Hydro currently lacks. London Hydro utilizes multiple disparate databases and spreadsheets to track assets, which can lead to lost material and inefficient tracking. With a robust, automated Asset Management System, London Hydro aims to identify and track changes regarding the location of assets, the increase or decrease in the number of assets, assignment status and user information. This project will enhance both efficiency and reliability as it will capture the complete lifecycle of all major assets, which will result in detailed and accurate asset reporting and alerting and a decrease in missing inventory, and also automate and consolidate London Hydro's EIAM process. See Exhibit 4, Section "London Hydro's Electrical Inspection and Maintenance Program ("EIAM"), for more information.

Commercial & Industrial Apps

This project will be a continuation of London Hydro's effort to provide advanced customer engagement solutions to commercial customers to improve their energy forecasts and facilitate energy conservation. Leveraging the initial success of London Hydro's Interval Data Centre (IDC) and Event Assist (EA) solutions, London Hydro will continue to roll out enhancements that have been identified and prioritized by our customers.

SAP Enhancements

The SAP Enhancements project aims to continue leveraging the value of SAP investments to date by enabling new business processes and enhancing and optimizing existing business processes using the technology available in the existing system deployments. This project will be comprised of several sub-projects addressing specific objectives on a per-department basis.

Implementation decisions for new discretionary SAP enhancements will typically be based on either a direct business value (e.g. business process simplification) or an indirect benefit (e.g. improving the customer experience through backend system enhancements).

Green Button

London Hydro plans to enhance its Green Button platform with the latest version of the published standards. It is expected that enhancements will deliver additional functionality for customers using the Green Button Standard and thereby enhance customer value. London Hydro has championed the Green Button initiative across North America and has been at the forefront in the development of the standard. Under this initiative, London Hydro will continue to develop applications that will take advantage of the Green Button platform and continue to provide support to third party vendors for developing customer-focused applications to help customers reduce their energy consumption.

Analytics System Phase 2

Phase 2 of this project will be a continuation of Analytics Systems implementation that will enable more effective use of interval and smart meter data in conjunction with grid connectivity and billing data using "big data" technologies. This functionality will support improved distribution system planning processes and enable the development of analytical processes that can provide more context to customers with respect to their individual energy usage. This project will realize the following benefits:

- Facilitate executives and senior managers to see critical data presented in a highly visual and engaging manner, such as customer service data (problem resolution and customer satisfaction statistics), credit and collection bad payments by month, metering disconnection, reconnection orders, and billing - monthly rebills
- Provide tactical dashboards and reports for:

- ○ Balance analysis
- ○ Profitability analysis
- ○ Product development
- ○ Flexible Portfolio analysis
- ○ Demand side management
- ○ Energy settlement
- ○ Unbilled revenue

- Provide self-service BI with Web Intelligence – Business user autonomy from IT/power users
- Generate reports from multiple data sources – Ease of report creation, broad adoption with simple user experience

2017 New System Projects

Automated Billing Payments

This project will involve the design and implementation of a feature that addresses customer requests for an automated billing and payment option. Currently London Hydro does not offer such an option for customers to make online payments directly from their MyAccount service provided in the MyLondonHydro portal. As a result of this project, London Hydro customers will have a convenient method of making secure payments via web and IVR channels, and be able to make payments with an Interactive Voice Response (IVR) option. This project is focused on increasing customer satisfaction. This enhancement will also improve London Hydro's efficiency as time and costs associated with manual cheque processing will be reduced.

Residential Customer Mobile Application

This project will involve building and deploying a mobile application aimed at improved and varied communications with the residential customer. As the shift towards smartphones and tablets intensifies, London Hydro wants to give its customers more control over where, when and how they engage with the utility.

Under this project, London Hydro will develop a customer-facing mobile application that will encourage greater customer engagement through gamification, and it will be designed keeping the individual customer needs in mind. This application will have innovative features such as instant complaint registration (the ability to register a complaint, such as a broken line, by simply clicking a picture), location-based outage notifications, billing alerts, online chat etc. This project will increase customer engagement by providing a feature-rich mobile application that will be intuitive and user-friendly.

This application will enable greater user interaction since it will reach customers on their most used devices. Due to instant customer feedback, London Hydro will be able to address any safety-related complaints quickly. By putting control of electricity usage into the hands of customers, London Hydro expects to help them reduce energy consumption.

JDE Upgrade

As part of London Hydro's ERP Strategy (see Exhibit 4, Appendix 4-1 for details), London Hydro will upgrade its JD Edwards system to a more current version.

London Hydro implemented JDE for its Finance and other ERP functions in 2004. Since then, London Hydro has not upgraded JDE or replaced it with a new platform. London Hydro's current JDE system is no longer supported by the vendor, and it has become very difficult to include any new business processes into the current system. Therefore, London Hydro has decided to upgrade JDE to its latest version and thereby mitigate the risks associated with an unsupported and obsolete system.

For this upgrade, London hydro aims to maintain the existing functional scope while moving to an IAAS (public cloud) infrastructure model with hybrid application support (in-house supplemented by external resource augmentation).

In addition, this upgrade will provide London Hydro with an opportunity to take advantage of the new functionalities such as job costing, vehicle preventive maintenance and warehouse bar-code integration offered under the latest version of JDE to further improve efficiencies.

Capital Spending by DSP Investment Category

Pursuant to the OEB Chapter 5 Distribution System Plan Filing Requirements, London Hydro has submitted its Distribution System Plan as a component of this Rate Application (See Appendix 2-6).

Table 2-42 below categorizes London Hydro's capital spending into 5 investment categories: System Access, System Renewal, System Service, General Plant and Other. Additionally, this table reconciles the total of these categories to the total capital spending in Table 2-16 (Page 42). This reconciliation confirms that all capital spending documented in this Application has also been documented in the DSP.

Table 2-42 – Capital Spending by DSP Investment Category 2012 - 2017

CAPITAL SPENDING 2012 - 2017
SUMMARY BY OEB CHAPTER 5 GROUPING

Annual Spending Summary by Grouping	2012 Actual	2013 Actual	2013 Board Approved	2014 Actual	2015 Actual	2016 Bridge	2017 Test
	$	$	$	$	$	$	$
System Access	7,077,665	6,038,038	6,111,400	7,419,807	8,966,380	7,893,000	8,441,000
System Renewal	10,866,993	10,869,290	11,673,000	11,740,647	13,786,694	14,849,000	14,319,000
System Service	1,948,635	1,625,550	1,774,000	1,476,143	1,248,710	975,000	895,000
General Plant	8,666,600	8,935,351	8,295,000	6,763,153	9,741,642	10,002,000	8,920,000
Other	(787,340)	241,807	-	(450,497)	757,661	-	-
	27,772,554	**27,710,036**	**27,853,400**	**26,949,253**	**34,501,087**	**33,719,000**	**32,575,000**
Capital Contributions	(3,780,997)	(2,418,672)	(2,700,000)	(1,870,692)	(3,788,551)	(2,087,000)	(2,101,000)
Total	**23,991,557**	**25,291,364**	**25,153,400**	**25,078,561**	**30,712,535**	**31,632,000**	**30,474,000**

The 'Other' line above contains "Inventory held for capital projects", which represents spending on capital-related inventory items such as transformers that have been purchased but not yet assigned to a specific capital job, as well as the "CGAAP to MIFRS Burden Adjustment" amount, which refers to the 1576 IFRS-GAAP Transitional PP&E Amounts that were discussed fully in London Hydro's 2013 Cost of Service Rate Application.

Capitalization Policy

A copy of London Hydro`s capitalization policy can be found in Appendix 2-2, at the end of this Exhibit. No significant changes have been made to the policy since the 2013 rebasing.

Overview

As of January 1, 2015, London Hydro follows International Financial Accounting Standards (IFRS). Effective January 1, 2012, following a detailed review of the useful lives analysis conducted by Kinetrics, London Hydro implemented certain changes in accounting estimates related to useful lives of certain assets. Although London Hydro deferred its adoption to IFRS until January 1, 2015, it was determined that these changes needed to be applied under CGAAP as additional and more relevant information had been made available.

Recognition

An item of Property, Plant and Equipment (PP&E), or an intangible asset, is recognized as a capital asset if and only if,

1. it is probable that *future economic benefits* associated with the asset will flow to the Company,
2. the cost of the item can be measured reliably and
3. expenditures incurred will provide benefits lasting beyond one year.

Expenditures incurred to improve (betterment) an existing asset will be capitalized if it is probable that future economic benefits will flow to the Company.

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.

Measurement

Whether capital assets are purchased or constructed by the Company, they are stated at cost and include expenditures that are directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended.

The cost of self-constructed assets includes direct materials, initial delivery and assembly, labour, employee benefits, professional fees and any other costs directly attributable to bringing the asset to a working condition for its intended use. Other costs could include expenditures directly attributable to the asset from engineering, overheads, contracted services, and interest or borrowing costs.

Costs that are not included in the cost of an item of PP&E include training costs, administration and other general overhead costs, feasibility studies conducted prior to project approval.

Depreciation

Depreciation is discussed in full in Exhibit 4, Section 'Depreciation and Amortization Expense', Page 379.

Derecognition (Retirements and Disposals)

An item of PP&E or Intangibles will be removed from the capital assets on the balance sheet when it is taken out of service or abandoned where no future benefits are expected or when sold. The resulting loss equal to its net book value less disposal costs will be recognized in profit and loss. In the case of a sale of an item of PP&E or Intangibles, gains and losses are determined by comparing the proceeds from the disposal with the net book value of the item disposed with the gain or loss recognized in profit or loss.

Impairments

At the end of each annual reporting period, the Company assesses whether there is any indication that an asset may be impaired, and if so, determines and measures the impairment loss.

If there is an indication that an impairment loss on assets exists, the recoverable amount is estimated. The impairment loss is the amount by which the asset's carrying amount or net book value exceeds its recoverable amount. The impairment loss is recognized in profit or loss.

Betterment

Expenditures for betterments are capitalized if the capital asset will provide future economic benefit to the Company.

Materiality Limits

All expenditures for capital assets are subject to materiality limits.

While an expenditure might meet the definition to qualify as a capital asset, a materiality limit has been established to minimize the cost disadvantages where administration costs of capitalizing an asset may outweigh the intended benefits.

Componentization of Assets

For each part of an item of PP&E with a cost that is significant in relation to the total cost of the item, the item shall be depreciated separately.

A significant part of an item of PP&E may have a useful life and a depreciation method that are the same as the useful life and the depreciation method of another part of the same item. Such parts may be grouped in determining the depreciation charge.

Interest or Borrowing Costs

Borrowing costs that are directly attributable to the construction or acquisition of qualifying assets are capitalized as part of the cost of the asset. The OEB usually identifies borrowing costs that are capitalized as being Allowance for Funds Used in Construction (AFUDC). Only those assets with construction periods of over one year are to be considered for having their interest or borrowing costs capitalized.

Replacement Parts

The cost of replacing part of an item of PP&E is recognized in the carrying amount of the item if it is probable that the future incremental economic benefits embodied within the part will flow to the Company and its costs can be measured reliability. The carrying amount of the replaced part is derecognized.

Capital Spares

Spare parts and stand-by equipment are considered PP&E when the Company expects to use them during more than one period (year). Therefore, spare transformers and meters and other such items of PP&E that are applicable to this guidance, are accounted for as an item of PP&E as they are: i) not intended for resale, ii) have a longer period of future benefit as compared to inventory items, iii) form an integral part of the original distribution plant by enhancing reliability of the original distribution plant, and iv) provide future benefits because they are expected to be placed in service.

Spare parts commence to be amortized when the spare part is available for use (rather than put to use).

Contributed Capital

Certain assets may be acquired or constructed with financial assistance in the form of contribution from customers or developers.

Capital contributions received are treated as a liability on the balance sheet.

Amortization of the deferred customer contributions is calculated over the average life span of the related assets and, if necessary, would be adjusted to reflect any changes in the remaining useful lives of the underlying capital assets.

Amounts that are amortized are to be recorded as a charge to the revenue deferral account and a credit to the revenue account. For the purposes of reporting to the OEB, contributed capital is considered to be recorded as a capital account (as a credit to the asset contra account).

London Hydro Contributions to PP&E not Owned by London Hydro

Contributions to PP&E made by London Hydro, where ownership is not realized by London Hydro, should be classified as an intangible asset. The contribution is a resource that is controlled by the entity as a result of asset purchase or self-creation and from which future economic benefits (inflows of cash or other assets) are expected.

Computer Software Expenditures

Computer software expenditures are to be classified as an intangible asset if it is probable that the expected future economic benefits attributable to it will flow to the entity. Only major application software projects with total “acquisition and enhancement expenditures” in excess of the established materiality limit and with an expected future life exceeding two years are capitalized. All other software expenditures are charged to operations as incurred.

Capitalization of Overhead

London Hydro capitalizes three types of overhead expenses: Employee Benefits, the Fleet Department, and the Materials Management Department.

Employee Benefits

Employee benefit costs can be broken down into three groupings: Statutory (such as CPP, EI, EHT, WSIB), Active Employees (such as OMERS, health, dental, life insurance, long-term disability insurance, pension contributions) and Retired Employees (such as life insurance premiums, employee future benefit costs).

Total benefit costs are allocated amongst OM&A, capital and billable jobs, based on actual labour hours, by applying benefit rates. These rates are derived by comparing the relationship between estimated total benefits and estimated total base salaries for the year and calculating an appropriate percentage to ensure all benefit costs are accounted for.

London Hydro's fully burdened rate for full-time employees is 63.75%. This rate accounts for both the benefit costs mentioned above, as well as a factor for non-productive time (vacation, sick, etc.). This method ensures all employee-related benefits culminate in the proper OM&A/capital accounts, based on direct labour hours. See Table 2-43 below for complete information on various allocation rates.

Fleet Department

Fleet Department costs include labour, materials, fuel, repairs, vehicle depreciation, and other costs associated with maintaining London Hydro's fleet of vehicles and equipment. Hourly fleet burden rates are based on vehicle/equipment type and reviewed annually. Rates are calculated using an estimation of annual costs and usage per type of vehicle/equipment. These rates are allocated to capital and billable jobs based on actual vehicle/equipment usage, which is tracked by employee via timesheet. Fleet costs are also allocated to various OM&A Departments based on vehicle availability. For example, a vehicle designated for the Health and Safety Department would be allocated 40 hours/week of fleet burden, based on the respective vehicle's predetermined rate.

Materials Management Department

Materials Management Department costs to be allocated include labour and benefits of the employees who monitor inventory, issue materials and supplies, and oversee this department. Non-capital allocations also include administrative costs such as telephone equipment and office supplies. Costs are allocated using pre-determined allocation rates, based on type of project and type of material. Allocation rates to capital are lower than non-capital due to IFRS restrictions regarding costs being directly attributable to bringing an asset to the location and condition necessary for it to operate in the manner intended by management. Table 2-43 below lists all London Hydro's allocation rates.

Table 2-43 – Allocation Rates**

LONDON HYDRO INC. COST ALLOCATION RATES	
Burden Type	**Rate**
Labour	
Full-Time	63.75%
Part-Time	22.0%
Materials Management	
Items >$1k and cable/wire	
Capital	4.0%
Non-Capital	7.0%
Items <$1k and non cable/wire	
Capital	5.0%
Non-Capital	16.0%

**Fleet rates not included above; allocated using flat rate per vehicle type, not percentage allocation

Rates are assessed annually for appropriateness and adjusted if necessary. Burden rates have not changed since the London Hydro's last Cost of Service Rate Application in 2013, other than small fluctuations based on projected budgets and usage rates.

Costs of Eligible Investments for the Connection of Qualifying Generation Facilities

There is significant renewable generation activity across London Hydro's distribution system. As of June 30, 2016, London Hydro has connected one RESOP project with 2.85MW and 41 active renewable FIT generation projects with a total nameplate capacity of 8,125kW.

London Hydro does not expect any capital expenditures related to REG in its DSP. There are no additional OM&A costs related to REG facilities as London Hydro is able to process both microFIT and FIT applications utilizing existing employees. Therefore, London Hydro does not require recovering costs incurred to make eligible investments as described in Section 79.1 of the Act and O. Reg. 330/09 under the Act.

Since London Hydro does not expected any capital expenditures related to REG, London Hydro has not completed nor filed Appendix 2-FA to Appendix 2-FC.

Addition of Previously Approved ACM and ICM Project Assets to Rate Base

London Hydro has not applied for an Incremental Capital Module between the last COS year (2013) and the current Test Year. Therefore, London Hydro is not requesting any ICM capital asset amounts to be incorporated into its rate base.

New Policy Options for the Funding of Capital - Advance Capital Module

Overview

On September 18, 2014, the OEB issued the *Report of the Board - New Policy Options for the Funding of Capital Investments: The Advanced Capital Module (EB-2014-0219)* (the ACM Report). The Advanced Capital Module (ACM) reflects an evolution of the Incremental Capital Module (ICM) adopted by the OEB in 2008.

The ACM expands the ICM concept to incorporate the concept of recovery for qualifying incremental capital investments during the Price Cap IR period with an opportunity to identify and pre-test such discrete capital projects documented in the DSP as part of the cost of service application.

As part of a cost of service application, a distributor may propose qualifying ACM capital projects that are expected to come into service during the subsequent Price Cap IR term. These will be discrete projects as documented in the DSP. The distributor must also identify that it is proposing ACM treatment for these future projects, and provide the cost information and ACM/ICM materiality threshold calculations to show that these would qualify for ACM treatment based on the forecasted information at the time of the DSP and cost of service application. The ACM Report provides further details on the information required. A distributor applying for an ACM must file the completed spreadsheet: Capital Module Applicable to ACM and ICM.

The timing and actual amount of the rate riders used to recover the costs of qualifying ACM projects in the subsequent Price Cap IR period will not be determined in the cost of service application. This determination will be made in the Price Cap IR application for the year in which the capital investment will be made and the project comes into service. At that time, the distributor must file updated information on the forecasted costs and demonstrate that the capital project still qualifies for incremental capital funding and recovery. However, the nature and need for the project will be determined as part of the DSP during the cost of service application.

On January 22, 2016, the OEB issued the *Report of the OEB - New Policy Options for the Funding of Capital Investments: Supplemental Report (EB-2014-0219)*. This report made changes to the materiality threshold on which both ICM and ACM proposals are assessed, but otherwise does not alter the requirements for ACM and ICM proposals by an applicant. The Supplemental Report also reaffirms the applicability of the half-year rule for determining the return on capital in the first year that assets enter service.

Consistent with the OEB Minimum Filing Requirements issued on July 14, 2016, London Hydro has completed the OEB model 2017_Capital_Module_ACM_Model as found on the OEB website. PDF copies of the model can be found in Exhibit 2 Tab 3 Schedule 1 Appendix 2-4, as well the live excel version submitted with this application.

ACM Criteria

An ACM is available to distributors during the Price Cap IR years for capital investment needs that are additional to those approved through the last cost of service application.

Capital projects included in an ACM request must meet three criteria:

Materiality – each incremental capital project or expenditure must be material and clearly have a significant influence on the operation of the distributor,

Need – distributor must pass the Means Test; amounts must be based on discrete projects and directly related to the claimed driver, and must be clearly outside of the base upon which the rates were derived, and

Prudence – amounts to be incurred must be prudent.

In addition to the criterion that each project included in the ACM request be material, the total ACM request must exceed the ACM materiality threshold.

Project Materiality

Each capital project approved for ACM funding must be material to the distributor. Project materiality is 0.5% of distribution revenue requirement for distributors with a revenue requirement greater than $10 million and less than or equal to $200 million. London Hydro's requested distribution revenue requirement is $73.0 M resulting in a project materiality of $365,000. See Exhibit 1 Tab 10 Schedule 1 for calculation.

Need and the Means Test

As part of the criterion of need, the OEB applies the Means Test when reviewing ACM applications. The Means Test states that if a distributor's regulated return exceeds 300 basis points above the deemed regulatory return on equity (ROE) embedded in its rates, the funding for any incremental capital project will not be allowed. London Hydro submits it is herein requesting an adjustment to its regulatory ROE to 9.19% and has not, at any time, exceeded its scorecard ROE deemed equity by the dead band of 300 basis points over the last many years.

Prudence

To be eligible for ACM funding, expenditures must be prudent, illustrating good judgement in the management of capital budgets. London Hydro is confident that the OEB will find that the proposed projects are prudent as described in the presentation of details below.

ACM Materiality Threshold

The OEB expects a distributor to fund its capital expenditures within the ACM materiality threshold, before being eligible to apply for ACM funding. The ACM materiality threshold is deducted from the total ACM request to determine the amount eligible to be recovered from customers.

The OEB has defined the ACM materiality threshold in Chapter 3 of the *Filing Requirements for Electricity Distribution Rate Applications* (the Filing Requirements). It represents a distributor's financial capacities underpinned by existing rates, including growth and a 20% dead band. The equation used to calculate the materiality threshold at the time of London Hydro's application is as follows:

Materiality Threshold Value = 1 + (RB/d) * (g + PCI * (1 + g)) + 20%

Where:

RB = rate base included in base rates ($)

d = depreciation expense included in base rates ($)

g = distribution revenue change from load growth (%)

PCI = price cap index

London Hydro has calculated its preliminary materiality threshold value to be 136%, which is multiplied by the last approved annual depreciation of $17.9M to determine the ACM threshold of $24.4M for 2018 as calculated on Sheet 9. Threshold Test of the OEB model 2017_Capital_Module_ACM_Model and shown in Table 2.2.6.1 below.

Table 2.2.6.1 – Results from Preliminary Threshold Calculation

Depreciation	**$ 17,984,944**	d
Threshold Value (varies by Price Cap IR Year subsequent to CoS rebasing)		
Price Cap IR Year 2018	**136%**	
Price Cap IR Year 2019	**136%**	
Price Cap IR Year 2020	**136%**	
Price Cap IR Year 2021	**137%**	
Threshold CAPEX		$Threshold\ Value \times d$
Price Cap IR Year 2018	**$ 24,378,972**	
Price Cap IR Year 2019	**$ 24,448,961**	
Price Cap IR Year 2020	**$ 24,520,016**	
Price Cap IR Year 2021	**$ 24,592,153**	

Table 2.2.6.2 – Maximum Eligible Incremental Capital (Forecasted Capex less Threshold)

	Cost of Service	Price Cap IR			
	Test Year	Year 1	Year 2	Year 3	Year 4
	2017	2018	2019	2020	2021
Distribution System Plan CAPEX	$ 32,575,000	$ 35,717,000	$ 32,959,000	$ 33,893,000	$ 33,807,000
Materiality Threshold		$ 24,378,972	$ 24,448,961	$ 24,520,016	$ 24,592,153
Maximum Eligible Incremental Capital (Forecasted CAPEX less Threshold)		$ 11,338,028	$ 8,510,039	$ 9,372,984	$ 9,214,847
Maximum Eligible Incremental Capital (Forecasted Capex less Threshold)		$ 11,338,028	$ 8,510,039	$ 9,372,984	$ 9,214,847

Proposed Projects

Table 2.2.6.3 – Proposed Capital Projects Eligible for ACM Treatment

Project Descriptions:	Cost of Service Test Year 2017	Price Cap IR Year 1 2018	Year 2 2019	Year 3 2020	Year 4 2021	Total
Nelson TS Capital Contribution		$ 7,165,590			$ 1,450,000	**$ 8,615,590**
JD Edwards		$ 2,000,000				**$ 2,000,000**
HONI CCRA True-up's Talbot and Buchanan		$ 1,000,000				**$ 1,000,000**
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
Maximum Allowed Incremental Capital		$ 10,165,590	$ -	$ -	$ 1,450,000	

Nelson TS Capital Contribution

The decision to convert Nelson TS from 13.8 kV to 27.6 kV was based on a collaborative approach to long term supply options for the City of London, conducted by London Hydro and Hydro One (Ontario Hydro). The planning started in the early 1980's with the installation of the Talbot TS (near downtown), which provided 27.6 kV supply to the north side of downtown. At that time, 27.6 kV had become the standard distribution voltage for most of Ontario, including much of the City of London outside the downtown core. The Nelson TS was one of the oldest transformer stations in London and had several non-standard designs that made it more vulnerable to some contingencies. The only other 13.8 kV supply point was at Highbury TS to the east, which was approaching end of life and was in need of replacement.

In 1990, London Hydro and Hydro One agreed that new connections would be made only to the 27.6 kV supply (if possible) and existing 13.8 kV load would be reduced over time. With much of the 13.8 kV distribution system approaching end of life, reduction of the 13.8 kV load proceeded at a gradual pace.

By 1999, the 13.8 kV station at Highbury TS was decommissioned, which left the Nelson TS as the sole supply of 13.8 kV for London's downtown core.

In 2005/2006, joint planning meetings with Hydro One examined supply options and needs for the City of London, with the Nelson TS identified as the preferred location for new supply. In subsequent years, different scenarios were reviewed and issues at the 13.8 kV Nelson TS surfaced, which made conversion to 27.6 kV more desirable. Between 2009 and 2014, Hydro One and London Hydro examined the cost and benefits of keeping Nelson at 13.8 kV or converting it to 27.6 kV.

During this time period, London Hydro met with the major customers impacted by the proposed conversion from 13.8 kV to 27.6 kV to address concerns and to educate them on the changing system. A large number of these customers also have equipment that is aging and approaching end of life. Several customers had electrical supplies with no spare transformers or they did not have a restoration plan and were pleased to discuss options with London Hydro. Two government building managers were supportive of a supply from a system that would provide alternate sources with SCADA control. Larger customers understood that if they were not in a position to convert, then the short term solution would be to leverage a step down substation. Two significant customers have an internal supply arrangement that existed before their building was subdivided and would like to move to a standard utility supply. Based on discussions with London Hydro, several of the larger customers that had to replace transformers or switchgear have since installed equipment that will support 27.6kV in the future.

In early 2015, an agreement was reached whereby Hydro One would rebuild Nelson TS at 27.6 kV and London Hydro would be responsible for only the incremental cost of conversion. The terms of the agreement were documented in a CCRA which includes the following payment schedule:

June 15, 2015	$1.6M plus HST
March 15, 2016	$1.75M plus HST
March 15, 2017	$1.75M plus HST
March 15, 2018	$1.75M plus HST

The 27.6 kV portion of the rebuilt Nelson TS will be “ready for service” by December 15, 2018.

A final reconciliation payment of $1.45M plus HST is expected March 15, 2021 at which time the final 13.8 kV supply portion of the Nelson TS will be fully decommissioned.

London Hydro has documented this decision making process in a report entitled, *"London Downtown - 13.8kV/27.6kV - Nelson TS - 5 Year Plan – February 2015*", which is included in DSP Appendix J. In addition, the plan to convert the 13.8 kV distribution system and to accommodate future connections has been documented in the report entitled, *"Downtown Intensification – December 2015",* which is also included in DSP Appendix J. These two reports provide a comprehensive review of the work needed in the downtown core to continue to provide safe and reliable supply for the foreseeable future.

JD Edwards

London Hydro's current JD Edwards financial accounting system, the Company's financial reporting tool (Insight Reporting) and a Cloud-based platform used for sharing knowledge and information with the Board of Directors has been determined to be at end of life and in need of replacement. London Hydro is proposing to move the legacy JD Edwards financial accounting system from an on-premise solution to a Cloud-based solution. The timing for this conversion is to be in 2018. For the purposes of the ACM, London Hydro is currently estimating that it will incur software development capital costs of $2.0M leading up to the planned system activation in 2018.

The current financial system was implemented in 2004 and has now exceeded its end of life. Over the last several years, plans for upgrading the accounting system have been postponed to allow for attention to more urgent matters including the implementation of the SAP Customer Information System and Smart Meters, the transition to HST, the conversion to IFRS, as well as the completion of this rate application. In addition, the Finance division has experienced the retirement of 3 key management personnel since the last cost of Service in 2013. London Hydro has therefore determined that an upgrade will be planned to commence in 2017 and be implemented in 2018.

As the 2004 financial system was deemed to be essentially running on borrowed time and with the view to reducing costs, London Hydro chose to cease payments for Oracle maintenance and support services in 2011. Since 2011, London Hydro has being utilizing third-party support services which has provided for cost savings in excess of $40,000 annually. However, as a result of the upgrade, those Oracle maintenance and support services will be reinstated.

In 2014, London Hydro initiated a cost-benefit analysis on the various options available (for example, JDE vs. SAP, on premise vs. the Cloud). Ernst and Young ("E&Y") was engaged to conduct an "ERP Needs Assessment and Scoping" study in the spring of 2014 and an "Evaluation of JDE Upgrade and Deployment Options" in the summer of 2016 to analyze benefits fulfillment, total cost of ownership and risk factors for a number of options.

The resulting E&Y recommendation is that London Hydro select a strategy of continuing on with JD Edwards and adding on external applications ("point solutions") for certain modules such as the Human Resources Information System ("HRIS"). A copy of the E&Y studies can be found In Exhibit 4 Appendix 4-1 of this application. It should be noted that E&Y has included the ERP Needs Assessment and Scoping study performed in 2014 as Appendix 3 in their attached study labeled Evaluation of JDE and Upgrade and Deployment Options which was performed in 2016.

HONI CCRA True-up Talbot and Buchanan

London Hydro and Hydro One entered into a Connection and Cost Recovery Agreement (CCRA) on January 26, 2006 for the construction of a second 230-28kV transformer station "Talbot TS #2" and for the provision of four new feeder breaker positions at Buchanan TS. Talbot TS #2 and the Buchanan feeder breakers went into service by end of December 2007.

For the first True-Up (January 2007 to December 2011), a revised CCRA reflecting actual costs of the project was not received (however, actual costs with agreed to overage amounts were provided) and guidelines for incorporating CDM and DG, as required in the Transmission System Code (TSC) in the True-Up evaluation was not available. Nonetheless, London Hydro provided their True-Up calculations based on actual historical loads, forecasted loads, CDM/DG contributions in accordance with the TSC as interpreted by London Hydro. The analysis was performed using the actual project costs received via email from Hydro One in 2011.

At the time of submission of London Hydro's first True-Up calculations, Hydro One disputed the inclusion of CDM/DG in the True-Up analysis. On September 17, 2015, Hydro One provided newly developed guidelines on accounting for CDM and DG for the True-Up evaluations and a revised CCRA including actual costs significantly larger than previously stated. London Hydro and Hydro One met on April 19, 2016 to review outstanding items required to complete the first True-Up analysis. Discussions between Hydro One and London Hydro are still ongoing and main items of discussion include the following subjects: the actual cost of Talbot TS #2

($14,129,894 vs $15,078,000), Transformation Connection Charge Rate (fixed $1.50/kW/month rate vs. actual increasing rate since agreement), and the surplus/shortfall parameter for evaluation (MW of load vs actual net present value of revenue collected). The second True-Up analysis covers the period of January 2012 to December 2016.

As discussed in the Enersource Decision and Rate Order EB-2015-0065 dated April 7, 2016 the Transmission System Code (TSC) sets out cost responsibility principles for construction or modification of transmission facilities. It states that load customers shall contribute capital to a transmitter to cover the cost of a facility required to meet their needs where the cost of the facility is not recoverable through revenues. The TSC also requires a transmitter to carry out a true-up calculation, based on actual customer load, for low risk projects, every five years. This ensures that the customer – rather than the transmitter – bears the risk of the investment. This is also set out in the Connection and Cost Recovery Agreement between the transmitter and the distributor.

In this case, London Hydro is Hydro One's customer. Based on internal estimates, London Hydro is estimating amounts for the two True-Up Periods which need to be resolved with Hydro One as follows:

First Period, Year Ending 2011, Estimated Payment = $0
Second Period, Year Ending 2016, Estimated Payment = $0 to $500,000

London Hydro is conservatively place-holding an estimated payment in the amount of $1.0M, subject to final outcome of HONI negotiations.

Service Quality and Reliability Performance

London Hydro follows the Board's Reporting and Record Keeping Requirements Guideline to report its Service Quality Indicators annually. In accordance with the Filing Requirements the Board Appendix 2-G - Service Quality Indicators is included in Exhibit 2 Tab 3 Schedule 1 Appendix 2-5 of this Exhibit. The table provides the performance measurements for the last five historical years 2011 through 2015. London Hydro confirms that the data values presented herein are consistent with our scorecard.

London Hydro has consistently performed within the Board's range of acceptable performance over the previous five years and submits that no corrective action is required.

Reliability Performance

London Hydro tracks service reliability statistics SAIDI (System Average Interruption Duration Index) and SAIFI (System Average interruption Frequency Index) including and excluding loss of supply related incidents. In accordance with the OEB's Report of the Board (EB-2014-0189) Setting System Reliability Performance objectives, dated August 25, 2015, London Hydro has calculated in the tables below its baselines based on an average of the previous 5 years (2011-2015). The following tables show results for the past 5 years as well as the 5 Year historical average as determined in the OEB Appendix 2-G included in Exhibit 2 Tab 3 Schedule 1 Appendix 2-5 of this Exhibit.

Table 2.3.1.1 - Calculation of System Reliability Performance Baseline including Loss of Supply

Index	Including outages caused by loss of supply				
	2011	2012	2013	2014	2015
SAIDI	1.860	0.900	1.020	1.110	1.060
SAIFI	2.360	1.420	1.380	1.620	1.370

5 Year Historical Average

SAIDI		1.190
SAIFI		1.630

Table 2.3.1.2 - Calculation of System Reliability Performance Baseline excluding Loss of Supply

Index	Excluding outages caused by loss of supply				
	2011	2012	2013	2014	2015
SAIDI	1.670	0.890	0.990	0.980	1.040
SAIFI	2.140	1.300	1.240	1.210	1.220

5 Year Historical Average

SAIDI	1.114
SAIFI	1.422

Table 2.3.1.3 - Calculation of System Reliability Performance Baseline excluding Major Event Days

Index	Excluding Major Event Days				
	2011	2012	2013	2014	2015
SAIDI	1.860	0.900	0.853	1.110	0.950
SAIFI	2.360	1.420	1.227	1.620	1.220

5 Year Historical Average

SAIDI	1.135
SAIFI	1.569

London Hydro notes that it has experienced two major event days during 2011 to 2015. On September 11th 2013, a thunderstorm rolled through the City of London in the late afternoon resulting in a large number of interruptions that lasted for a long duration. In total, that single day accumulated over 1.5 million customer-minutes of interruptions and caused sustained power interruptions to over 22,000 customers. Similarly, on June 23rd 2015, a severe lightning storm hit the City of London after midnight resulting in a high frequency and duration of interruptions. This storm resulted in over 1 million customer-minutes of interruptions and over 21,500 customers lost power.

London Hydro is committed to the reliability of the distribution system. Customers have expressed overall satisfaction with the current level of reliability and a desire to keep rates low. This combination of preferences has directed the development of London Hydro's Distribution System Plan (DSP) and Asset Management Plan (AMP) to ensure spending on infrastructure is optimized and targeted at portions of the distribution system most at risk of causing reliability to deteriorate while keeping rates competitive within the industry. A portion of the spending in the coming five years will be allocated to the supply to the downtown core and will address both the long-term capacity requirements and the elimination of a significant reliability risk (single supply point). In order to meet these targets London Hydro will need to continue to invest in capital and maintenance programs. In particular, the capital programs noted in Exhibit 2 with a primary driver of asset renewal are aimed at rebuilding infrastructure with a high probability of failure. Renewal of these assets removes the risk to reliability and safety which would otherwise be unacceptable.

Service Quality

In addition to the reliability indices, London Hydro also measures Electricity Service Quality Requirements (ESQRs).

The following table summarizes London Hydro's reported ESQRs for the historical years 2011 thru 2015.

Table 2.3.1.4 - Electricity Service Quality Requirements

Service Quality

Indicator	OEB Minimum Standard	2011	2012	2013	2014	2015
Low Voltage Connections	90.0%	97.6%	96.8%	99.9%	100.0%	97.6%
High Voltage Connections	90.0%	100.0%	100.0%	100.0%	n/a	100.0%
Telephone Accessibility	65.0%	67.3%	68.3%	67.1%	65.9%	68.0%
Appointments Met	90.0%	99.5%	99.9%	99.9%	99.3%	100.0%
Written Response to Enquires	80.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Emergency Urban Response	80.0%	100.0%	99.2%	98.1%	99.1%	100.0%
Emergency Rural Response	80.0%	n/a	n/a	n/a	n/a	n/a
Telephone Call Abandon Rate	10.0%	2.1%	2.1%	2.4%	3.2%	2.6%
Appointment Scheduling	90.0%	93.4%	97.5%	96.7%	95.3%	98.6%
Rescheduling a Missed Appointment	100.0%	100.0%	100.0%	100.0%	100.0%	n/a
Reconnection Performance Standard	85.0%	96.2%	98.3%	98.6%	99.1%	99.1%

Many of the above measures are discussed in greater depth in our Executive Summary (Exhibit 1 Tab 2 Schedule 1) and Performance Measurement (Exhibit 1 Tab 7 Schedule 1).

Prescribed Tables Listing

As per the Filing Requirements, London Hydro has completed the required tables listed below in connection with rate base. To assist with navigation, the location of this information throughout the Application is provided as follows:

Appendix 2-BA: Fixed Asset Continuity Schedules (2013 – 2017)

- Exhibit 2, Appendix 2-1, Tables 2-44, 2-45, 2-46, 2-47 and 2-48, pages 181-186
- 2016 Filing Requirements Chapter 2 Appendices (Excel workbook)

Appendix 2-AB: Capital Expenditures

- 2016 Filing Requirements Chapter 2 Appendices (Excel workbook)

Appendix 2-AA: Capital Projects Table

- 2016 Filing Requirements Chapter 2 Appendices (Excel workbook)

Appendix 2-D: Overhead Costs

- 2016 Filing Requirements Chapter 2 Appendices (Excel workbook)

Appendix 2-G: Service Reliability Indicators

- Exhibit 2, Appendix 2-4, page 251
- 2016 Filing Requirements Chapter 2 Appendices (Excel workbook)

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Appendix 2-1:
Fixed Asset Continuity Schedules

Table 2-44 – 2013 Fixed Asset Continuity Schedule (OEB Appendix 2-BA)

				Cost				Accumulated Depreciation				Net Book Value
OEB Object	Description	Current CCA Class	Deprec Rate (Yrs)	Balance 12/31/12	Additions	Adjustments / Disposals	Balance 12/31/13	Balance 12/31/12	Provision	Adjustments / Disposals	Balance 12/31/13	31-Dec 2013
1805	Land	n/a	n/a	385,690	-	-	385,690	-	-	-	-	385,690
1612	Land Rights	CEC	25	364,045	2,189	-	366,233	164,137	16,759	-	180,897	185,337
1808	Buildings (Substations & Gagen)	47	30-75	1,128,336	-	-	1,128,336	702,365	11,093	-	713,458	414,877
1820	Equipment (Substations)	47	15-45	15,737,888	127,415	(34,820)	15,830,483	6,300,334	279,177	(34,820)	6,544,691	9,285,793
1610	Intangible Wholesale Meters	CEC	30	1,293,406	-	-	1,293,406	164,817	43,096	-	207,913	1,085,493
1830	Poles, Towers & Fixtures	47	45	38,369,731	1,368,435	-	39,738,167	18,561,593	571,117	-	19,132,710	20,605,457
1835	OH Conductors & Devices	47	45-50	53,161,202	1,975,643	-	55,136,846	21,596,621	790,092	-	22,386,713	32,750,133
1840	UG Conduit	47	30-60	33,594,419	2,158,405	(54,461)	35,698,363	9,032,304	505,992	(54,461)	9,483,834	26,214,529
1845	UG Conductors & Devices	47	25-40	110,187,258	3,367,053	(11,978,155)	101,576,155	62,817,472	3,895,648	(11,978,155)	54,734,965	46,841,190
1850	Transformers	47	35	75,704,254	3,928,409	-	79,632,662	29,214,449	1,768,803	(3,578)	30,979,674	48,652,988
1855	Services	47	30-60	22,721,712	1,999,222	-	24,720,934	7,563,950	485,325	-	8,049,275	16,671,659
1860	Electric Meters	8	15-30	24,670,246	832,303	(421,068)	25,081,481	6,991,958	1,397,374	(402,822)	7,986,510	17,094,971
1908	Buildings (General Plant Area)	1	12-65	23,890,273	434,952	(2,233,572)	22,091,652	11,726,201	866,806	(2,233,572)	10,359,435	11,732,218
1915	General Office	8	5	1,084,565	101,296	(454,002)	731,859	716,113	158,789	(454,002)	420,900	310,959
1920	Computer Equipment - Hardware	50	3	3,301,189	1,427,608	(1,528,471)	3,200,325	2,030,213	734,873	(1,528,471)	1,236,614	1,963,711
1611	Computer Software	12	3-5	25,594,826	4,770,971	(2,124,421)	28,241,375	11,306,525	4,867,907	(2,124,421)	14,050,010	14,191,365
1930	Transportation	10 & 38	8-12	10,845,192	1,140,047	(512,333)	11,472,907	6,140,525	620,730	(470,924)	6,290,330	5,182,576
1935	Stores Department	8	8	276,017	5,499	(3,378)	278,138	256,821	7,600	(3,378)	261,042	17,095
1940	Tools, Shop, Garage Equipment	8	8	1,247,265	112,143	(335,999)	1,023,409	729,160	129,401	(335,999)	522,561	500,848
1945	Meter Department	8	8	131,798	18,374	(30,559)	119,614	42,102	13,720	(30,559)	25,264	94,350
1950	Power Operated (Major) Equipment	38	8	877,841	53,630	-	931,471	328,312	106,171	-	434,483	496,988
1955	Communication Equipment	8	8-35	3,627,554	128,544	-	3,756,098	659,790	215,390	-	875,181	2,880,917
1960	Miscellaneous	8	8	-	-	-	-	-	-	-	-	-
1980	System Supervisory Equip (Scada)	47	10-20	3,465,859	239,274	(1,550,637)	2,154,497	2,089,939	124,593	(1,550,637)	663,896	1,490,601
1995	Contributed Capital	47	40	(36,843,371)	(2,418,672)	-	(39,262,043)	(7,752,231)	(864,118)	-	(8,616,349)	(30,645,694)
2440	Deferred Revenue	47	40	-	-	-	-	-	-	-	-	-
	Total before Work In Progress			**414,817,196**	**21,772,739**	**(21,261,877)**	**415,328,059**	**191,383,469**	**16,746,338**	**(21,205,799)**	**186,924,008**	**228,404,051**
2055	Work in progress			6,720,715	3,505,688	-	10,226,404	-	-	-	-	10,226,404
	Total After Work In Progress			**421,537,911**	**25,278,428**	**(21,261,877)**	**425,554,462**	**191,383,469**	**16,746,338**	**(21,205,799)**	**186,924,008**	**238,630,454**
2075	Renewable Generation	43.2	20	2,249,573	14,412	-	2,263,985	88,860	112,587	-	201,447	2,062,538
	Total London Hydro Inc			**423,787,484**	**25,292,840**	**(21,261,877)**	**427,818,447**	**191,472,329**	**16,858,925**	**(21,205,799)**	**187,125,455**	**240,692,992**

	Provision	Net Book Value
Work in progress	-	(10,226,404)
LH renewable generation	(112,587)	(2,062,538)
Fully allocated vehicle depreciation	(726,900)	-
Amortization of 1576 IFRS-GAAP PP&E Transitional Amounts	78,654	-
Deferred Revenue	-	-
	16,098,091	**228,404,051**

Table 2-45 – 2014 Fixed Asset Continuity Schedule (OEB Appendix 2-BA)

				Cost				Accumulated Depreciation				Net Book Value
OEB Object	Description	Current CCA Class	Deprec Rate (Yrs)	Balance 12/31/13	Additions	Adjustments / Disposals	Balance 12/31/14	Balance 12/31/13	Provision	Adjustments / Disposals	Balance 12/31/14	31-Dec 2014
1805	Land	n/a	n/a	385,690	-	-	385,690	-	-	-	-	385,690
1612	Land Rights	CEC	25	366,233	17,281	-	383,514	180,897	17,264	-	198,161	185,353
1808	Buildings (Substations & Gagen)	47	30-75	1,128,336	-	-	1,128,336	713,458	11,093	-	724,552	403,784
1820	Equipment (Substations)	47	15-45	15,830,483	272,871	-	16,103,355	6,544,691	273,317	-	6,818,008	9,285,347
1610	Intangible Wholesale Meters	CEC	30	1,293,406	-	-	1,293,406	207,913	43,096	-	251,009	1,042,398
1830	Poles, Tow ers & Fixtures	47	45	39,738,167	1,924,767	-	41,662,934	19,132,710	602,360	-	19,735,070	21,927,864
1835	OH Conductors & Devices	47	45-50	55,136,846	3,330,254	-	58,467,100	22,386,713	832,597	-	23,219,310	35,247,790
1840	UG Conduit	47	30-60	35,698,363	2,527,012	(14,268)	38,211,108	9,483,834	540,572	(14,268)	10,010,139	28,200,969
1845	UG Conductors & Devices	47	25-40	101,576,155	3,944,185	(8,793,672)	96,726,669	54,734,965	3,637,493	(8,793,672)	49,578,787	47,147,882
1850	Transformers	47	35	79,632,662	3,907,876	-	83,540,538	30,979,674	1,874,691	(59)	32,854,306	50,686,232
1855	Services	47	30-60	24,720,934	2,287,367	-	27,008,301	8,049,275	540,782	-	8,590,057	18,418,244
1860	Electric Meters	8	15-30	25,081,481	955,008	(261,931)	25,774,558	7,986,510	1,422,492	(261,931)	9,147,072	16,627,486
1908	Buildings (General Plant Area)	1	12-65	22,091,652	1,123,130	(434,692)	22,780,090	10,359,435	892,356	(434,692)	10,817,099	11,962,991
1915	General Office	8	5	731,859	121,041	(120,051)	732,848	420,900	129,719	(120,051)	430,567	302,281
1920	Computer Equipment - Hardw are	50	3	3,200,325	464,181	(283,350)	3,381,156	1,236,614	975,771	(283,350)	1,929,035	1,452,121
1611	Computer Softw are	12	3-5	28,241,375	4,120,230	(228,905)	32,132,701	14,050,010	5,217,828	(228,905)	19,038,934	13,093,767
1930	Transportation	10 & 38	8-12	11,472,907	686,041	(332,449)	11,826,499	6,290,330	705,622	(332,449)	6,663,503	5,162,996
1935	Stores Department	8	8	278,138	3,348	(7,727)	273,759	261,042	6,493	(7,727)	259,809	13,950
1940	Tools, Shop, Garage Equipment	8	8	1,023,409	133,094	(116,499)	1,040,004	522,561	126,202	(116,499)	532,264	507,740
1945	Meter Department	8	8	119,614	82,862	-	202,476	25,264	17,164	-	42,427	160,048
1950	Pow er Operated (Major) Equipment	38	8	931,471	100,000	(80,190)	951,281	434,483	109,352	(57,637)	486,198	465,083
1955	Communication Equipment	8	8-35	3,756,098	236,693	-	3,992,791	875,181	230,548	-	1,105,729	2,887,062
1960	Miscellaneous	8	8	-	-	-	-	-	-	-	-	-
1980	System Supervisory Equip (Scada)	47	10-20	2,154,497	284,577	-	2,439,074	663,896	137,338	-	801,234	1,637,840
1995	Contributed Capital	47	40	(39,262,043)	-	-	(39,262,043)	(8,616,349)	(899,701)	-	(9,516,050)	(29,745,992)
2440	Deferred Revenue	47	40	-	(1,870,692)	-	(1,870,692)	-	(20,811)	-	(20,811)	(1,849,881)
	Total before Work In Progress			415,328,059	24,651,127	(10,673,733)	429,305,453	186,924,008	17,423,639	(10,651,238)	193,696,409	235,609,045
2055	Work in progress			10,226,404	432,133	-	10,658,537	-	-	-	-	10,658,537
	Total After Work In Progress			**425,554,462**	**25,083,261**	**(10,673,733)**	**439,963,990**	**186,924,008**	**17,423,639**	**(10,651,238)**	**193,696,409**	**246,267,582**
2075	Renew able Generation	43.2	20	2,263,985	-	-	2,263,985	201,447	113,203	-	314,650	1,949,335
	Total London Hydro Inc			**427,818,447**	**25,083,261**	**(10,673,733)**	**442,227,975**	**187,125,455**	**17,536,842**	**(10,651,238)**	**194,011,059**	**248,216,916**

	Provision	Net Book Value
Work in progress	-	(10,658,537)
LH renew able generation	(113,203)	(1,949,335)
Fully allocated vehicle depreciation	(814,974)	-
Amortization of 1576 IFRS-GAAP PP&E Transitional Amounts	117,981	-
Deferred Revenue	20,811	-
	16,747,457	235,609,045

Table 2-46 – 2015 Fixed Asset Continuity Schedule (OEB Appendix 2-BA)

				Cost				Accumulated Depreciation				Net Book Value
OEB Object	Description	Current CCA Class	Deprec Rate (Yrs)	Balance 12/31/14	Additions	Adjustments / Disposals	Balance 12/31/15	Balance 12/31/14	Provision	Adjustments / Disposals	Balance 12/31/15	31-Dec 2015
1805	Land	n/a	n/a	385,690	-	-	385,690	-	-	-	-	385,690
1612	Land Rights	CEC	25	383,514	31,245	-	414,759	198,161	17,569	-	215,730	199,029
1808	Buildings (Substations & Gagen)	47	30-75	1,128,336	-	-	1,128,336	724,552	11,093	-	735,645	392,691
1820	Equipment (Substations)	47	15-45	16,103,355	166,791	-	16,270,145	6,818,008	280,134	-	7,098,142	9,172,003
1610	Intangible Wholesale Meters	CEC	30	1,293,406	-	-	1,293,406	251,009	43,096	-	294,105	999,302
1830	Poles, Towers & Fixtures	47	45	41,662,934	1,462,624	-	43,125,558	19,735,070	637,346	-	20,372,416	22,753,143
1835	OH Conductors & Devices	47	45-50	58,467,100	2,727,289	-	61,194,389	23,219,310	895,073	-	24,114,383	37,080,006
1840	UG Conduit	47	30-60	38,211,108	5,093,586	(7,843)	43,296,851	10,010,139	595,660	(7,843)	10,597,956	32,698,895
1845	UG Conductors & Devices	47	25-40	96,726,669	5,009,616	(10,932,504)	90,803,781	49,578,787	3,502,825	(10,932,504)	42,149,108	48,654,673
1850	Transformers	47	35	83,540,538	5,679,475	-	89,220,013	32,854,306	2,008,373	-	34,862,679	54,357,334
1855	Services	47	30-60	27,008,301	2,450,919	-	29,459,220	8,590,057	590,947	-	9,181,004	20,278,216
1860	Electric Meters	8	15-30	25,774,558	1,299,238	(242,150)	26,831,646	9,147,072	1,472,935	(242,150)	10,377,857	16,453,790
1908	Buildings (General Plant Area)	1	12-65	22,780,090	673,316	(56,452)	23,396,955	10,817,099	919,069	(56,452)	11,679,716	11,717,238
1915	General Office	8	5	732,848	79,805	(291,749)	520,905	430,567	122,832	(291,749)	261,650	259,254
1920	Computer Equipment - Hardware	50	3	3,381,156	631,317	(1,489,367)	2,523,106	1,929,035	959,362	(1,489,367)	1,399,030	1,124,076
1611	Computer Software	12	3-5	32,132,701	4,995,403	(11,252,279)	25,875,825	19,038,934	4,976,787	(11,252,279)	12,763,442	13,112,383
1930	Transportation	10 & 38	8-12	11,826,499	1,150,226	(163,461)	12,813,264	6,663,503	754,474	(163,461)	7,254,516	5,558,747
1935	Stores Department	8	8	273,759	-	(6,161)	267,598	259,809	6,033	(6,161)	259,681	7,917
1940	Tools, Shop, Garage Equipment	8	8	1,040,004	89,981	(188,855)	941,130	532,264	122,990	(188,855)	466,399	474,730
1945	Meter Department	8	8	202,476	316,421	(2,290)	516,606	42,427	33,574	(2,290)	73,712	442,895
1950	Power Operated (Major) Equipment	38	8	951,281	147,000	(65,998)	1,032,283	486,198	110,778	(65,998)	530,978	501,305
1955	Communication Equipment	8	8-35	3,992,791	71,394	-	4,064,185	1,105,729	247,985	-	1,353,714	2,710,470
1960	Miscellaneous	8	8	-	4,039	-	4,039	-	42	-	42	3,997
1980	System Supervisory Equip (Scada)	47	10-20	2,439,074	946,159	-	3,385,233	801,234	162,396	-	963,629	2,421,604
1995	Contributed Capital	47	40	(39,262,043)	-	-	(39,262,043)	(9,516,050)	(899,701)	-	(10,415,752)	(28,846,291)
2440	Deferred Revenue	47	40	(1,870,692)	(3,788,551)	-	(5,659,243)	(20,811)	(78,721)	-	(99,531)	(5,559,712)
	Total before Work In Progress			429,305,453	29,237,293	(24,699,109)	433,843,637	193,696,409	17,492,952	(24,699,109)	186,490,251	247,353,386
2055	Work in progress			10,658,537	1,652,885	-	12,311,422	-	-	-	-	12,311,422
	Total After Work In Progress			**439,963,990**	**30,890,178**	**(24,699,109)**	**446,155,059**	**193,696,409**	**17,492,952**	**(24,699,109)**	**186,490,251**	**259,664,808**
2075	Renewable Generation	43.2	20	2,263,985	-	-	2,263,985	314,650	113,203	-	427,853	1,836,132
	Total London Hydro Inc			**442,227,975**	**30,890,178**	**(24,699,109)**	**448,419,044**	**194,011,059**	**17,606,154**	**(24,699,109)**	**186,918,104**	**261,500,940**

	Provision	Net Book Value
Work in progress	-	(12,311,422)
LH renewable generation	(113,203)	(1,836,132)
Fully allocated vehicle depreciation	(865,252)	-
Amortization of 1576 IFRS-GAAP PP&E Transitional Amounts	117,981	-
Deferred Revenue	78,721	-
	16,824,401	247,353,386

Table 2-47 – 2016 FORECAST Fixed Asset Continuity Schedule (OEB Appendix 2-BA)

				Cost				Accumulated Depreciation				Net Book Value
OEB Object	Description	Current CCA Class	Deprec Rate (Yrs)	Balance 12/31/15	Additions	Adjustments / Disposals	Balance 12/31/16	Balance 12/31/15	Provision	Adjustments / Disposals	Balance 12/31/16	31-Dec 2016
1805	Land	n/a	n/a	385,690	-	-	385,690	-	-	-	-	385,690
1612	Land Rights	CEC	25	414,759	-	-	414,759	215,730	18,715	-	234,445	180,314
1808	Buildings (Substations & Gagen)	47	30-75	1,128,336	40,000	-	1,168,336	735,645	11,360	-	747,005	421,331
1820	Equipment (Substations)	47	15-45	16,270,145	116,100	-	16,386,245	7,098,142	282,855	-	7,380,997	9,005,248
1610	Intangible Wholesale Meters	CEC	30	1,293,406	-	-	1,293,406	294,105	43,096	-	337,201	956,206
1830	Poles, Towers & Fixtures	47	45	43,125,558	1,954,100	-	45,079,658	20,372,416	684,522	-	21,056,938	24,022,721
1835	OH Conductors & Devices	47	45-50	61,194,389	3,282,200	-	64,476,589	24,114,383	968,409	-	25,082,792	39,393,797
1840	UG Conduit	47	30-60	43,296,851	4,552,300	-	47,849,151	10,597,956	700,503	-	11,298,459	36,550,692
1845	UG Conductors & Devices	47	25-40	90,803,781	5,897,300	(6,190,659)	90,510,422	42,149,108	3,395,271	(6,190,659)	39,353,720	51,156,702
1850	Transformers	47	35	89,220,013	4,270,000	-	93,490,013	34,862,679	2,179,781	-	37,042,460	56,447,553
1855	Services	47	30-60	29,459,220	1,514,900	-	30,974,120	9,181,004	654,800	-	9,835,804	21,138,316
1860	Electric Meters	8	15-30	26,831,646	1,093,600	-	27,925,246	10,377,857	1,549,534	-	11,927,391	15,997,856
1908	Buildings (General Plant Area)	1	12-65	23,396,955	1,160,000	(56,452)	24,500,503	11,679,716	952,683	(56,452)	12,575,948	11,924,555
1915	General Office	8	5	520,905	455,000	(177,974)	797,931	261,650	142,206	(177,974)	225,883	572,048
1920	Computer Equipment - Hardware	50	3	2,523,106	323,200	(1,083,069)	1,763,237	1,399,030	748,030	(1,083,069)	1,063,991	699,246
1611	Computer Software	12	3-5	25,875,825	4,551,800	(3,592,822)	26,834,803	12,763,442	5,659,508	(3,592,822)	14,830,128	12,004,675
1930	Transportation	10 & 38	8-12	12,813,264	1,130,000	(723,954)	13,219,310	7,254,516	893,524	(723,954)	7,424,086	5,795,223
1935	Stores Department	8	8	267,598	80,000	(2,057)	345,540	259,681	7,429	(2,057)	265,052	80,488
1940	Tools, Shop, Garage Equipment	8	8	941,130	155,000	(106,544)	989,586	466,399	126,144	(106,544)	485,999	503,586
1945	Meter Department	8	8	516,606	210,000	-	726,606	73,712	77,744	-	151,456	575,151
1950	Power Operated (Major) Equipment	38	8	1,032,283	-	-	1,032,283	530,978	125,906	-	656,884	375,399
1955	Communication Equipment	8	8-35	4,064,185	770,500	-	4,834,685	1,353,714	273,998	-	1,627,712	3,206,972
1960	Miscellaneous	8	8	4,039	-	-	4,039	42	505	-	547	3,492
1980	System Supervisory Equip (Scada)	47	10-20	3,385,233	331,000	-	3,716,233	963,629	213,472	-	1,177,101	2,539,132
1995	Contributed Capital	47	40	(39,262,043)	-	-	(39,262,043)	(10,415,752)	(899,701)	-	(11,315,453)	(27,946,590)
2440	Deferred Revenue	47	40	(5,659,243)	(2,087,000)	-	(7,746,243)	(99,531)	(167,569)	-	(267,100)	(7,479,143)
	Total before Work In Progress			**433,843,637**	**29,800,000**	**(11,933,531)**	**451,710,106**	**186,490,251**	**18,642,725**	**(11,933,531)**	**193,199,445**	**258,510,661**
2055	Work in progress			12,311,422	1,832,000	-	14,143,422	-	-	-	-	14,143,422
	Total After Work In Progress			**446,155,059**	**31,632,000**	**(11,933,531)**	**465,853,528**	**186,490,251**	**18,642,725**	**(11,933,531)**	**193,199,445**	**272,654,083**
2075	Renewable Generation	43.2	20	2,263,985	-	-	2,263,985	427,853	113,203	-	541,056	1,722,929
	Total London Hydro Inc			**448,419,044**	**31,632,000**	**(11,933,531)**	**468,117,513**	**186,918,104**	**18,755,928**	**(11,933,531)**	**193,740,501**	**274,377,012**

	Provision	31-Dec 2016
Work in progress	-	(14,143,422)
LH renewable generation	(113,203)	(1,722,929)
Fully allocated vehicle depreciation	(1,019,430)	-
Amortization of 1576 IFRS-GAAP PP&E Transitional Amounts	118,000	-
Deferred Revenue	167,569	-
	17,908,864	**258,510,661**

Table 2-48 – 2017 FORECAST Fixed Asset Continuity Schedule (OEB Appendix 2-BA)

				Cost					Accumulated Depreciation					Net Book Value
OEB Object	Description	Current CCA Class	Deprec Rate (Yrs)	Balance 12/31/16	Transfers from Reg Deferrals	Additions	Adjustments / Disposals	Balance 12/31/17	Balance 12/31/16	Transfers from Reg Deferrals	Provision	Adjustments / Disposals	Balance 12/31/17	31-Dec 2017
1805	Land	n/a	n/a	385,690	-	-	-	385,690	-	-	-	-	-	385,690
1612	Land Rights	CEC	25	414,759	-	-	-	414,759	234,445	-	18,715	-	253,160	161,599
1808	Buildings (Substations & Gagen)	47	30-75	1,168,336	-	42,000	-	1,210,336	747,005	-	11,906	-	758,911	451,425
1820	Equipment (Substations)	47	15-45	16,386,245	-	114,500	-	16,500,745	7,380,997	-	286,323	-	7,667,320	8,833,425
1610	Intangible Wholesale Meters	CEC	30	1,293,406	-	-	-	1,293,406	337,201	-	43,096	-	380,297	913,110
1830	Poles, Towers & Fixtures	47	45	45,079,658	-	2,193,800	-	47,273,458	21,056,938	-	730,610	-	21,787,548	25,485,911
1835	OH Conductors & Devices	47	45-50	64,476,589	-	3,510,900	-	67,987,489	25,082,792	-	1,037,964	-	26,120,756	41,866,733
1840	UG Conduit	47	30-60	47,849,151	-	4,321,900	-	52,171,051	11,298,459	-	780,908	-	12,079,367	40,091,684
1845	UG Conductors & Devices	47	25-40	90,510,422	-	5,530,700	(3,505,306)	92,535,816	39,353,720	-	3,401,814	(3,505,306)	39,250,228	53,285,588
1850	Transformers	47	35	93,490,013	19,000	4,275,800	-	97,784,813	37,042,460	4,117	2,305,664	-	39,352,241	58,432,572
1855	Services	47	30-60	30,974,120	-	1,595,800	-	32,569,920	9,835,804	-	695,097	-	10,530,901	22,039,019
1860	Electric Meters	8	15-30	27,925,246	-	1,113,500	-	29,038,746	11,927,391	-	1,615,894	-	13,543,285	15,495,462
1908	Buildings (General Plant Area)	1	12-65	24,500,503	-	870,000	(2,273,932)	23,096,571	12,575,948	-	745,229	(2,273,932)	11,047,245	12,049,326
1915	General Office	8	5	797,931	-	197,000	(134,227)	860,704	225,883	-	179,238	(134,227)	270,894	589,810
1920	Computer Equipment - Hardware	50	3	1,763,237	-	297,200	(1,427,608)	632,829	1,063,991	-	473,050	(1,427,608)	109,433	523,396
1611	Computer Software	12	3-5	26,834,803	419,897	3,662,800	(2,656,748)	28,260,752	14,830,128	177,973	4,912,194	(2,656,748)	17,263,547	10,997,205
1930	Transportation	10 & 38	8-12	13,219,310	-	924,000	(553,478)	13,589,831	7,424,086	-	950,897	(553,478)	7,821,505	5,768,326
1935	Stores Department	8	8	345,540	-	15,000	(125,569)	234,972	265,052	-	12,247	(125,569)	151,731	83,241
1940	Tools, Shop, Garage Equipment	8	8	989,586	-	155,000	(123,791)	1,020,795	485,999	-	125,485	(123,791)	487,693	533,101
1945	Meter Department	8	8	726,606	-	150,000	(11,016)	865,590	151,456	-	98,824	(11,016)	239,264	626,327
1950	Power Operated (Major) Equipment	38	8	1,032,283	-	175,000	(100,304)	1,106,979	656,884	-	125,654	(95,080)	687,458	419,521
1955	Communication Equipment	8	8-35	4,834,685	-	747,500	-	5,582,185	1,627,712	-	316,047	-	1,943,759	3,638,425
1960	Miscellaneous	8	8	4,039	-	-	-	4,039	547	-	505	-	1,052	2,987
1980	System Supervisory Equip (Scada)	47	10-20	3,716,233	-	300,600	(10,015)	4,006,818	1,177,101	-	237,203	(10,015)	1,404,289	2,602,529
1995	Contributed Capital	47	40	(39,262,043)	-	-	-	(39,262,043)	(11,315,453)	-	(899,701)	-	(12,215,154)	(27,046,889)
2440	Deferred Revenue	47	40	(7,746,243)	-	(2,101,000)	-	(9,847,243)	(267,100)	-	(219,919)	-	(487,019)	(9,360,224)
	Total before Work In Progress			451,710,106	438,897	28,092,000	(10,921,994)	469,319,009	193,199,445	182,089	17,984,944	(10,916,770)	200,449,709	268,869,300
2055	Work in progress			14,143,422	-	2,382,000	-	16,525,422	-	-	-	-	-	16,525,422
	Total After Work In Progress			**465,853,528**	**438,897**	**30,474,000**	**(10,921,994)**	**485,844,431**	**193,199,445**	**182,089**	**17,984,944**	**(10,916,770)**	**200,449,709**	**285,394,722**
2075	Renewable Generation	43.2	20	2,263,985	-	-	-	2,263,985	541,056	-	113,203	-	654,259	1,609,726
	Total London Hydro Inc			**468,117,513**	**438,897**	**30,474,000**	**(10,921,994)**	**488,108,416**	**193,740,501**	**182,089**	**18,098,147**	**(10,916,770)**	**201,103,968**	**287,004,448**

	Provision	Net Book Value
Work in progress	-	(16,525,422)
LH renewable generation	(113,203)	(1,609,726)
Fully allocated vehicle depreciation	(1,076,551)	-
Deferred Revenue	219,919	-
	17,128,312	268,869,300

Appendix 2-2:
Capitalization Policy

CAPITAL ASSETS ACCOUNTING POLICIES AND PROCEDURES

(Property, Plant and Equipment and Intangible Assets)

OVERVIEW

London Hydro applies International Financial Accounting Standards (IFRS), as identified in IFRS 1 First Time Adoption of IFRS and in IAS 16 Property, Plant and Equipment (PP&E), for the following general capitalization principles and procedures.

Background

On February 13, 2008, the Canadian Accounting Standards Board ("AcSB") officially confirmed the requirement for publicly accountable enterprises to adopt IFRS for financial reporting purposes in 2011. However, transition was deferred due to issues surrounding rate-regulated accounting for regulatory assets and liabilities.

London Hydro's eventual and actual transition date to IFRS is January 1, 2015 with 2014 amounts being restated for comparative purposes.

Up to and including the date of transition to IFRS, Canadian Generally Accepted Accounting Principles (CGAAP), and in particular CICA Handbook (Sections 3061 to 3064), and the guidelines as specified in the Ontario Energy Board (OEB) Accounting Procedures Handbook (APH) (Article 410) were the basis for general capitalization principles and procedures.

To ease in the transition from CGAAP to IFRS and to help with Cost of Service filings, London Hydro implemented the following required IFRS changes acceptable under the CGAAP accounting standard effective January 1, 2012, as follows:

- Capital assets were segregated into more intricate components and new life spans where applied;

- Materials Management overhead burdens were reduced to consider direct labour only. (All other expenditures cannot be tied to a specific item so are considered general and administrative in nature under MIFRS); and
- Labour overhead burdens were reduced slightly to exclude the capitalization of costs associated with training employees.

GENERAL CAPITALIZATION POLICY

1.0 PURPOSE

This document describes the accounting policies and processes set for the appropriate classification of London Hydro's expenditures and provides guidelines to assist in determining whether expenditures are capitalized and recorded to the balance sheet (capital assets) or expensed to operations in the period incurred (expensed).

The accounting policies and processes document is to permit accurate recognition of expenditures as either capital assets or operating expenses which is necessary for meeting the financial reporting requirements for IFRS and of the OEB, to provide accurate financial reporting to management and our shareholder, and to prepare meaningful budgets.

It should also be noted that capitalized expenditures attempt to provide for an equitable allocation of cost among existing and future customers as the assets are used.

2.0 ACCOUNTING POLICY

2.1 Recognition Principle

An *item* of Property, Plant and Equipment should be recognized as a capital asset, if and only if, it is probable that *future economic benefits* associated with the asset will flow to the Company, and the cost of the item can be measured reliably. (IAS 1 67.74 a and b)

Intangible assets are also considered capital assets under this criteria and are identified as identifiable non-monetary assets that lack physical substance. (IAS 38.8)

Other Criteria for recognition as a capital asset include:

Expenditures incurred to purchase or to build tangible or intangible assets that will provide *benefits lasting beyond one year* to the Company will be capitalized.

Expenditures incurred to improve (betterment) an existing asset will be capitalized if it is probable that future economic benefits will flow to the Company. Future economic benefits are demonstrated by the expenditure extending the asset's useful life/lifespan or increasing the asset's potential productivity/capacity or potentially lowering operating costs.

London Hydro's capital assets typically include electric plant, transmission, generation and distribution facilities, meters, vehicles, office furniture, computer hardware and other equipment.

Intangible assets general represent land rights, capital contributions paid to Hydro One and computer software.

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.

In the event of uncertainty surrounding the determination of a cost to be capital or operating or the application of materiality limits, if any exist, the Finance Department or the CFO should be consulted.

2.2 Measurement

Whether capital assets are purchased or constructed by the Company, they are stated at cost and include expenditures that are directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended.

The cost of self-constructed assets includes direct materials, initial delivery and assembly, labour, employee benefits, professional fees and any other costs directly attributable to bringing the asset to a working condition for its intended use. Other costs could include expenditures *directly attributable* to the asset from engineering, overheads, contracted services, and interest or borrowing costs.

Overheads are identified as being costs that support capital and operating activities, specifically within Supply Chain Management, Fleet Operations and Labour costing. Similarly, expenditures included in Overheads must be reviewed to determine whether they are “directly attributable” to bringing the asset to the location and working condition for its intended use (IAS 16.16 b). Interest or borrowing costs should be capitalized on qualifying projects where construction activity extends over one year.

Costs that are not included in the cost of an item of PP&E include training costs, administration and other general overhead costs, feasibility studies conducted prior to project approval.

2.3 Amortization / Depreciation

Depreciation is recognized in profit or loss on a straight-line basis over the estimated useful life of each part or component of an item of PP&E that is significant in relation to the total cost of the item. PP&E are considered tangible assets. Land and perpetual land rights are not depreciated. Finite lived intangible assets are amortized over their estimated useful life (IAS 38).

Construction-in-progress assets are not amortized until the item of PP&E is **“available for use”** (in its location and condition necessary for it to be capable of operating in the manner intended by management) (IAS 16.55).

Depreciation methods, useful lives and residual values are reviewed annually. Changes in useful life and residual values resulting from this review will be accounted for on a prospective basis as a change in accounting estimate in accordance with IAS 8.

Depreciation of an asset ceases when the asset is derecognized. (IAS 16.55). Depreciation does not cease when the asset is idle or retired from active use except when the asset is classified as held for sale.

2.4 Derecognition (Retirements and Disposals)

An item of PP&E or Intangibles will be removed from the capital assets on the balance sheet when it is taken out of service, or abandoned where no future benefits are expected or when sold. The resulting loss equal to its net book value less disposal costs will be recognized in profit and loss. In the case of a sale of an item of PP&E or Intangibles, gains and losses are determined by comparing the proceeds from the disposal with the net book value of the item disposed with the gain or loss recognized in profit or loss. (IAS 16.68)

Derecognition will follow materiality limits to avoid undue administrative burden where costs may outweigh the benefits. For assets which cannot be individually identified, *this materiality limit has been set by London Hydro to $10,000* in that an item will not be removed from PP&E where its net book value is equal to or less than this limit. This threshold takes into consideration, and assists in offsetting for, those assets in service that have exceeded their life expectancy.

This above-noted materiality limit does not apply where an individual asset record is maintained. For example, in the case of a vehicle.

2.5 Impairments

At the end of each annual reporting period, the Company must assess whether there is any indication that an asset may be impaired, and if so, determine and measure the impairment loss (IAS 36.9).

An item of PP&E or intangible asset is considered impaired if objective evidence indicates that one or more events have had a negative effect on the estimated future cash flows of the item. IAS 36.12 (f) states that a plan to dispose of an asset before the previously expected date is an indicator of impairment that triggers the calculation of the asset's recoverable amount for the purpose of determining whether the asset is impaired. Further indications of possible impairment are reflected below.

Indications of Impairment [IAS 36.12]

External sources:

- market value declines
- negative changes in technology, markets, economy, or laws
- increases in market interest rates

Internal sources:

- obsolescence or physical damage
- asset is part of a restructuring or held for disposal
- worse economic performance than expected

The above list is not intended to be exhaustive. [IAS 36.13]

If there is an indication that an impairment loss on assets exists, the recoverable amount is estimated. The impairment loss is the amount by which the asset's carrying amount or net book value exceeds its recoverable amount. The impairment loss is recognized in profit or loss.

3.0 DEFINITIONS

3.1 Tangible Assets

Property, Plant and Equipment as set out in IAS 16.6 indicates that they are a tangible item that:

- are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes; and
- are expected to be used during more than one period.

3.2 Intangible Assets

An intangible asset is an identifiable non-monetary asset without physical substance. An asset is a resource that is controlled by the entity as a result of past events (for example, purchased or self-creation) and from which future economic benefits (inflows of cash or other assets) are expected. [IAS 38.8] Thus, the three critical attributes of an intangible asset are:

- identifiable
- control (power to obtain benefits from the asset) resulting from a past event
- future economic benefits (such as revenues or reduced future costs)

Identifiable: an intangible asset is identifiable when it: (IAS 38.12) is separable (capable of being separated and sold, transferred, licensed, rented, or exchanged, either individually or together with a related contract) or arises from contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights and obligations.

3.3 Betterment

A betterment is defined as the cost incurred to enhance the service potential of a capital asset. It can include the increasing of the capacity of the asset, lowering associated operating costs, improving the quality of output or extending the asset's useful life. Expenditures for betterments are capitalized if the capital asset will provide future economic benefit to the Company (see 4.1 for materiality limits as to betterments).

3.4 Repair

A repair is a cost which is incurred in the maintenance of the existing service potential of a capital asset. These costs are normally wear and tear in the normal use of the capital asset and do not enhance the service life of the asset. Repair costs are expensed in the period in which they occur.

3.5 Administrative and other general overhead

IAS 16.19 (d) explicitly prohibits capitalization of administration and other general overhead costs ("G&A"). IAS 16 does not define administration and other general overhead costs nor is it defined elsewhere in IFRS literature and therefore requires the application of judgment to identify such costs. In considering whether a cost is in the nature of G&A, the nature of the cost itself is not determinative. Rather, it is the specific facts and circumstances surrounding the cost at an entity <u>and</u> the entity's ability to demonstrate that the cost is directly attributable to an item of PP&E.

G&A costs typically benefit the organization as a whole or areas of the organization more broadly rather than contributing directly to bringing a physical asset to the location and condition necessary for it to be capable of operating in the manner intended by management. The more the nature of a particular costs strays from being directly attributable to an item of PP&E, then the more likely it is that the cost will be determined to be in the nature of G&A.

3.6 Recoverable amount

The recoverable amount of an asset is the higher of its fair value less cost to sell and its value in use.

Fair value, less costs to sell, is the amount obtainable from the sale of an asset in an arm's length transaction between knowledgeable, willing parties, less the costs of disposal. Value in use is the present value of the future cash flows expected to be derived from an asset.

3.7 Qualifying assets

A qualifying asset is an asset that necessarily takes a substantial period of time to get ready for its intended use or sale. A substantial period of time is defined as greater than one year.

4.0 CAPITALIZATION GUIDELINES

4.1 Materiality Limits

All expenditures for capital assets, including betterments, are subject to materiality limits.

While an expenditure might meet the definition to qualify as a capital asset, a materiality limit has been established to minimize the cost disadvantages where administration costs of capitalizing an asset may outweigh the intended benefits.

In view of the foregoing, expenditures that *are less than $2,000* should be charged to an operating account (expensed). This limit applies to an individual asset, the total costs of a constructed asset, as well as betterments.

In cases where items are routinely purchased as a set, and have an aggregate purchase price of $2,000 or more, the items will be capitalized and depreciated. For example: the purchase of a table and 4 chairs from the same vendor where the table and chairs are to be utilized as a set and the value of which is over $2,000 in total.

Bulk purchases of similar items that have an *aggregate value of $5,000* or more are to be recorded as a fixed asset regardless of individual price of item. For example: the purchase of 10 hand tools at $500 each, where the total purchase is $5,000 or more.

With respect to office furniture and computer hardware purchases, these materiality limits are reduced to $500 and $2,000. Specifically, expenditures that are less than $500 should be expensed and bulk purchase of $2,000 or more are to be capitalized. All acquisitions of used office furniture should be charged to expense.

4.2 Componentization of Assets

For each part of an item of PP&E with a cost that is significant in relation to the total cost of the item, the item shall be depreciated separately (IAS 16.43).

An entity allocates the amount initially recognized in respect of an item of property, plant and equipment to its significant parts and depreciates each such part (IAS 16.44).

A significant part of an item of PP&E may have a useful life and a depreciation method that are the same as the useful life and the depreciation method of another part of the same item. Such parts may be grouped in determining the depreciation charge (IAS 16.45).

4.3 Interest or Borrowing Costs

Borrowing costs that are directly attributable to the construction or acquisition of qualifying assets are capitalized as part of the cost of the asset. The OEB usually identifies borrowing costs that are capitalized as being Allowance for Funds Used in Construction (AFUDC). Only those assets with construction periods of *over 1 year* are to be considered for having their interest or borrowing costs capitalized.

For the purposes of determining whether an asset is a qualifying asset, those periods of time where there is a lack of construction activity, for whatever reason, should reflect a reduction of construction duration. Therefore, the period of time reflecting a lack of construction should be eliminated from the construction duration when determining whether the asset has a construction period of greater than one year.

Further requirements include that the qualifying asset has a reasonable expectation of completion and recovery. Interest or borrowing costs are to be charged to an operating account once substantially all of the activities necessary to prepare the qualifying asset for its intended use are complete (IAS 23.22).

The capitalization of borrowing costs should be suspended when there are extended periods where active development of a qualifying asset are suspended.

Borrowing costs are based on the Company's cost of borrowing. Borrowing costs that are directly attributable to the acquisition or construction of a qualifying asset are those borrowing costs that would have been avoided if the expenditure on the qualifying asset had not been made. When the company borrows funds specifically for the purpose of obtaining a particular qualifying asset, the borrowing costs that directly relate to that qualifying asset can be readily identified. Borrowing costs related to general borrowings, where general borrowings are used to obtain a qualifying asset, should be determined. A capitalization rate should be calculated as the weighted average of the borrowing costs applicable to the borrowings outstanding during the period (IAS 23.14). The amount of borrowing costs that are capitalized during the period should not exceed the amount of borrowing costs incurred during that period. London Hydro calculates borrowing costs to be capitalized using the lower of the Ontario Energy Board's published Constuction Work-In-Progress (CWIP) interest rates and actual borrowing costs incurred.

4.4 Replacement Parts

The cost of replacing part of an item of PP&E is recognized in the carrying amount of the item if it is probable that the future incremental economic benefits embodied within the part will flow to the Company and its costs can be measured reliability (IAS 16.7, 16.13). The carrying amount of the replaced part is derecognized (IAS 16.13).

4.5 Decommissioning or Dismantling (Constructive and Asset Retirement Obligations or ARO)

Where there is a legal or constructive obligation to remove and dispose of PP&E at the end of their useful life, a provision is recorded to cover such future removal and disposal costs. (IAS 37, Provisions, Contingent Liabilities and Contingent Assets) The obligation costs are recognized at best estimate to settle the present obligation (IAS 37.36).

It is felt that the Company's distribution network essentially operates in perpetuity, and accordingly the date upon which it will be taken out of service is generally not determinable. Therefore, the present value of that obligation should be immaterial if it exists at all.

Decommissioning or dismantling obligations may arise from contractual agreements (such as leases) or legislation governing the disposal requirements for an asset. When such obligations arise as a result of a past event and it is probable that an outflow of resources will be required to settle the obligation, a liability should be recorded. The initial estimate of such a liability is included in the cost of the asset (IAS 16.16 (c)).

4.6 Capital Spares

Spare parts and stand-by equipment are considered PP&E when the Company expects to use them during more than one period (year). If the spare parts and servicing equipment can be used only in connection with an item of PP&E, they are considered PP&E (IAS 16.8).

Therefore, spare transformers and meters and other such items of PP&E that are applicable to this guidance, are accounted for as an item of PP&E as they are i) not intended for resale, ii) have a longer period of future benefit as compared to inventory items, iii) form an integral part of the original distribution plant by enhancing reliability of the original distribution plant, and iv) provide future benefits because they are expected to be placed in service.

Spare parts commence to be amortized when the spare part is available for use (rather than put to use) (IAS 16.55).

4.7 Contributed Capital (Contributions in Aid of Construction)

Certain assets may be acquired or constructed with financial assistance in the form of contribution from customers or developers.

Capital contributions received are treated as a liability on the balance sheet (IFRIC 18).

Amortization of the deferred customer contributions is required and done so over the average life span of the related assets.

Additions to contributed capital throughout the year need to be amortized as incurred.

Amounts that are amortized are to be recorded as a charge to the revenue deferral account and a credit to revenue account. For the purposes of reporting to the OEB, contributed capital is considered to be recorded as a capital account (as a credit to the asset contra account).

The Company has yet to have a customer or developer with a new expansion project select an “alternative bid” option as determined under 3.2.3 of the OEB Distribution System Code. An alternative bid option is one in which the customer provides on their own the purchase or building of the expansion facilities. Upon acceptance of these facilities by the Company as meeting specific requirements, the facility ownership is then to be transferred from the customer to the Company. The transfer price for the expansion project is based on the Company’s initial offer that was made to the customer.

4.8 Major Inspections/Overhauls of Item of PP&E

If regular "major" inspections are instituted on an item or items of PP&E, regardless if the parts of the item are replaced, this cost is recognized in the carrying amount of the item of PP&E. (IAS 16.13). If the PP&E item is derecognized the remaining carrying amount of the cost of the previous major inspection is also derecognized.

The cost of the major inspection or overhaul included in the amount initially recognized for an item of PP&E should be allocated to the major inspection or overhaul component and amortized separately over the useful life of this component so that it is fully depreciated before the next major inspection occurs.

The Company does not normally realize regular major inspections on its PP&E, and therefore does not anticipate having a separate component for major inspection costs.

4.9 London Hydro Contributions to PP&E not Owned by London Hydro

Contributions to PP&E made by London Hydro, where ownership is not realized by London Hydro, should be classified as an Intangible Asset, based on the following requirements:

The contribution is a resource that is controlled by the entity as a result of asset purchase or self-creation and from which future economic benefits (inflows of cash or other assets) are expected. [IAS 38.8]

Thus, the three critical attributes of an intangible asset are:

- identifiability
- control (power to obtain benefits from the asset)
- future economic benefits (such as revenues or reduced future costs)

An example of such an intangible asset would be London Hydro contributions to a Hydro One Transformer Station. Although London Hydro provided expenditures to the PP&E item, London Hydro does not retain ownership of the item. However, London Hydro does obtain future economic benefit and has been provided by Hydro One assurance that London Hydro has the right to use the item of PP&E or that the item of PP&E's future economic benefits will continue to accrue to London Hydro.

4.10 Computer Software Expenditures

Computer software expenditures are to be classified as an intangible asset if it is probable that the expected future economic benefits attributable to it will flow to the entity (IAS 38.21). Only major application software projects with total "acquisition and enhancement expenditures" in excess of the established materiality limit, per 4.1 Materiality Limit, and with an expected future life ***exceeding two years***, are capitalized. All other software expenditures are charged to operations as incurred.

IAS 38, Intangible Assets, guidance for the recording and recognition of computer software expenditure:

- Purchased: capitalize
- Operating system for hardware: include in hardware cost **
- Internally developed (whether for use or sale): charge to expense until technological feasibility, probable future benefits, intent and ability to use or sell the software, resources to complete the software, and ability to measure cost
- Amortization: over useful life based on pattern of benefits (straight-line is the default)

Further criteria for computer software expenditures to be recorded as an item of an intangible asset is identified in item 3.2 Intangible Assets. Further interpretations can be found under "*Further Guidance, Intangible Assets"*, towards end of this Capital Asset Accounting Policy and Procedures document.

Software acquisition and enhancement expenditures include:

- Software purchase costs (including internal and external customization charges)
- Development costs for internally developed software. Permitted development costs must be identified with the following:
    - i. being technological feasibility,
    - ii. intending to complete the software,
    - iii. having the ability to use the intangible asset,
    - iv. having probable future benefits,
    - v. having available resources to complete the software, and
    - vi. having the ability to measure cost.

Examples of permitted development costs for internal development software projects can include testing, data purchase and loading costs, commissioning and documentation.

Software-related expenditures for existing data clean up or repair prior to loading are not capitalized as they represent a repair of existing data (exclusion to this is where data is required to be formatted before loading to a new computer system). Business process reengineering costs that are directly related to certain computer systems are charged to operation as incurred, as these costs are not an integral component for software. Training costs associated with any computer software projects are charged to operation as incurred (IAS 38.69).

Subsequent expenditure on computer software after its purchase or completion should be recognized as an expense when it is incurred, unless it is probable that this expenditure will enable the asset to generate future economic benefits in excess of its originally assessed standard of performance and the expenditure can be measured and attributed to the asset reliably. [Referenced to IAS 38.60]

** Software required for hardware to function (integral part of the related hardware) is considered hardware. For example, an operating system is to be charged to tangible fixed assets under computer hardware. Software that is not an integral part of computer hardware will be considered software and capitalized as an intangible asset. Both examples assume expenditures meet materiality limits and life span requirements.

5.0 POLICY COMPLIANCE

As with any policy, there are to be no exemptions to the requirements of this policy in the execution of day-to-day business. Staff must report incidents of non-compliance relating to this policy in a timely manner to their Manager or Supervisor. Non-compliance issues of a serious nature will be immediately reported to the CFO.

FURTHER GUIDANCE

Measurement Recognition

The Company shall measure an item of PP&E at initial recognition at its cost (IAS 16.15).

The cost of an item of PP&E comprises of:

a) purchase price, including legal and brokerage fees, import duties and non-refundable purchase taxes, after deducting trade discounts and rebates.
b) Any costs directly attributable to bring the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. These can be costs of site preparation, initial delivery and handling, installation and assembly, and testing of functionality.
c) The initial estimate of the costs of dismantling and removing the item and restoring the site on which it is located, the obligation for which the Company incurs either when the item is acquired or as a consequence of having used the item during a particular period for purposes other than to produce inventories during that period. (IAS 16.16 a., b. and c.) (reference Item 4.5 for further information)

Examples of directly attributable costs are costs of employee benefits (as defined IAS 19 Employee Benefits), directly arising from the construction or acquisition of the item of PP&E; costs of site preparation; initial delivery and handling costs; installation and assembly costs; cost of testing whether the asset is functioning properly and professional fees.

As per IAS 16.19, the following costs are examples of costs not to be included as PP&E, and therefore shall be expensed. They are: Costs of opening a new facility, introduction of a new product or service, conducting business in a new location or with a new class of customer, administration and other general overhead costs. Other costs that should be recorded as expense include training, non-specific pre-construction project costs (where it is uncertain whether the costs will result in an addition to PP&E), and abnormal waste.

Useful Life Determinates

The Company shall consider all the following factors in determining the useful life of an asset (IAS 17.12):

a) The expected usage of the asset. Usage is assessed by reference to the asset's expected capacity or physical output
b) Expected physical wear and tear, which depends on operational factors such as loads to be used on asset, the repairs and maintenance program, and the care and maintenance of the asset while it is idle
c) Technical or commercial obsolescence arising from changes or improvements in production, or change in the market demand or service input of the asset
d) Legal or similar limits on the use of the asset

Intangible Assets

Classification of Intangible Assets Based on Useful Life

Intangible assets are classified as: [IAS 38.88]

- **Indefinite life:** no foreseeable limit to the period over which the asset is expected to generate net cash inflows for the entity
- **Finite life:** a limited period of benefit to the entity

Measurement Subsequent to Acquisition: Intangible Assets with Finite Lives

The cost less residual value of an intangible asset with a finite useful life should be amortized on a systematic basis over that life: [IAS 38.97]

- The amortization method should reflect the pattern in which the benefits are expected to be consumed.
- If the pattern cannot be determined reliably, amortize by the straight line method.
- The amortization charge is recognized in profit or loss unless another IFRS requires that it be included in the cost of another asset.
- The amortization period and method should be reviewed when required.
- The asset should also be assessed for impairment in accordance with IAS 36. [IAS 38.111]

Measurement Subsequent to Acquisition: Intangible Assets with Indefinite Lives

An intangible asset with an indefinite useful life should not be amortized. [IAS 38.107]

Its useful life should be reviewed each reporting period to determine whether events and circumstances continue to support an indefinite useful life assessment for that asset. If they do not, the change in the useful life assessment from indefinite to finite should be accounted for as a change in an accounting estimate. [IAS 38.109]

The asset should also be assessed for impairment in accordance with IAS 36 on an annual basis. [IAS 38.108]

Subsequent Expenditure

Subsequent expenditure on an intangible asset after its purchase or completion should be recognized as an expense when it is incurred, unless it is probable that this expenditure will enable the asset to generate future economic benefits in excess of its originally assessed standard of performance and the expenditure can be measured and attributed to the asset reliably. [IAS 38.60]

Land and Land Rights

Capitalized land includes direct purchase costs including appraisals, fees, commissions, surveys, title search and registration. Costs for first clearing and grading and installation of the plant are ultimately capitalized as part of the cost of PP&E constructed on the land, rather than as an integral cost of the land.

Capitalized land rights include costs of acquiring rights, interests and privileges in land owned by others. Land rights are considered under IFRS as an intangible asset and so guidance can be identified in intangible sections of this policy.

Appendix 2-3:
Lead Lag Study

Working Capital Requirements of London Hydro's Electricity Distribution Business

Prepared for:

London Hydro

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Table of Contents

Section I: Executive Summary

Summary

This report provides the results of a lead-lag study used to calculate the working capital requirements of London Hydro's ("the Company") distribution business.

Performing a lead-lag study requires two key undertakings:

1. Developing an understanding of how the regulated distribution business operates in terms of products and services sold to customers/purchased from vendors, and the policies and procedures that govern such transactions; and,
2. Modeling such operations using data from a relevant period of time and a representative data set. It is important to ascertain and factor into the study whether (or not) there are known changes to existing business policies and procedures going forward. Where such changes are known and material, they should be factored into the study.

Results from the lead-lag study using data for calendar year 2014 identify the following working capital amount in Table 1, below.

Table 1: Summary of Working Capital Requirements

Year		2014
Percentage of OM&A		8.67%
Working Capital Requirement Incl. HST	$	35,010,605

Table 2, below summarizes the detailed working capital requirements for the test year, considering known and measurable changes calculated in the study.

Table 2: London Hydro Distribution Working Capital Requirements (Test Year)

Description	Revenue Lag Days	Expense Lead Days	Net Lag Days	Working Capital Factor	Expenses	Working Capital Requirements
Cost of Power	60.28	33.07	27.21	7.46%	$ 365,958,637	$ 27,285,731
Aggregate OM&A	60.28	10.83	49.46	13.55%	$ 37,832,710	$ 5,126,314
Debt Retirement Charge	60.28	33.96	26.32	7.21%	$ 14,810,815	$ 1,068,011
Payment in Lieu of Taxes	60.28	24.79	35.49	9.72%	$ 1,900,000	$ 184,741
Interest Expense	60.28	36.44	23.84	6.53%	$ 3,009,460	$ 196,575
Total					$ 423,511,621	$ 33,861,373
HST						$ 1,149,232
Total - Including HST						**$ 35,010,605**
Working Capital as a Percent of OM&A incl. Cost of Power						**8.67%**

Organization of the Report

Section 1 of the report discusses the lag times associated with London Hydro's collections of revenues. The section includes a description of the sources of revenues and how an overall revenue lag is derived.

Section 2 presents the lead times associated with London Hydro's expenses. The section includes a description of the types of expenses incurred by London Hydro's distribution operations and how expenses are treated for the purposes of deriving an overall expenses lead time.

Section 3 presents an overall summary of the results from the study.

Appendix A provides a discussion of the methodology used to determine the working capital allowance for London Hydro.

Appendix B provides detailed data tables to support the findings of the report.

1. Revenue Lags

A distribution utility providing service to its customers generally derives its revenue from bills paid for service by its customers. A revenue lag represents the number of days from the date service is rendered by London Hydro until the date payments are received from customers and funds are available to London Hydro.

Interviews with London Hydro personnel indicate that its distribution business receives funds from the following funding streams:

1. Retail Customers; and,
2. Other Sources (revenues from miscellaneous service charges).

Prior to January 1, 2016 London Hydro took into account the Ontario Clean Energy Benefit (OCEB) when billing customers and was reimbursed for OCEB through the settlement processes with the Independent Electricity System Operator (IESO). The OCEB ceased December 31, 2015. OCEB was removed from retail revenues in this study to reflect this known and measurable change.

Prior to January 1, 2016 London Hydro charged both residential and non-residential customers for the Debt Retirement Charge (DRC) and remitted the DRC collected from customers to the Ontario Electricity Financial Corporation (OEFC). O.Reg 156/15 exempts residential customers from paying DRC on electricity consumed after December 31, 2015. DRC was removed from residential customers' retail revenues in this study to reflect this known and measurable change.

The lag times associated with the funding streams (adjusted for known and measurable changes) were weighted and combined to calculate an overall revenue lag time as shown below. Detailed data tables are provided in Appendix B.

Table 3: Summary of Revenue Lag

Description	Revenues	Lag Days	Weighting	Weighted Lag
Retail Revenue	$ 436,504,494	60.81	97.97%	59.58
Other Revenue	$ 9,041,199	34.80	2.03%	0.71
Total	**$ 445,545,693**		**100.00%**	**60.28**

1.1 Retail Revenue Lag

Retail Revenue lag consists of the following components:

1. Service Lag;
2. Billing Lag;
3. Collections Lag; and,
4. Payment Processing Lag.

The lag times for each of the above components, when added together, results in the Retail Revenue Lag for the purpose of calculating the working capital requirements for London Hydro's distribution business. The components are intended to represent a continuous process from the end date of the customer's previous billing cycle to the date in which the payment is available to London Hydro. Figure 1 illustrates the start and end point for each component of London Hydro's retail revenue lag.

Figure 1: Retail Revenue Lag

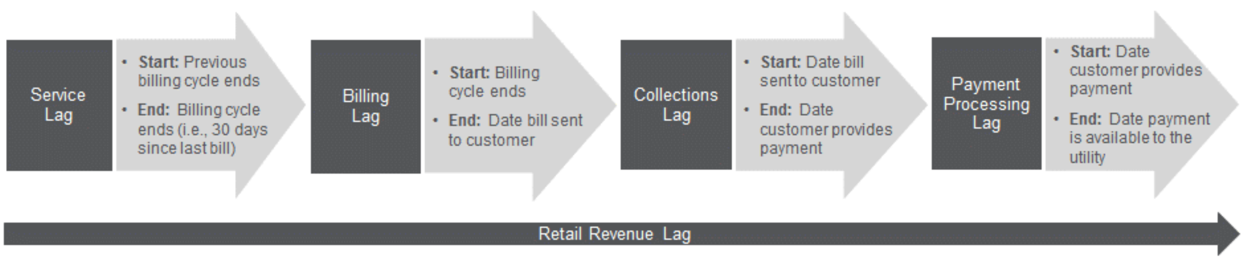

Table 4, below summarizes the total Retail Revenue Lag.

Table 4: Summary of Retail Revenue Lag

Description	Lag Days
Service Lag	15.21
Billing Lag	18.00
Collections Lag	26.35
Payment Lag	1.25
Total	**60.81**

The estimation of each component of the Retail Revenue Lag is described below.

1.1.1 Service Lag

The Service Lag is the time from London Hydro's provision of electricity to a customer, to the time the customer's service period ends, which is typically defined as when the meter is read. All of London Hydro's customers have monthly billing cycles. Using the information provided, the Service Lag was estimated to be 15.21 days (365 days/12 months/2).

1.1.2 Billing Lag

The Billing Lag is the time period from when the customer's service period ends, which is typically defined as when the meter is read to the time that the bill is sent to the customer. Interviews with London Hydro staff and data provided indicated that London Hydro customers have an average billing lag of 18.00 days.

1.1.3 Collections Lag

The Collections Lag is the time period from when the bill is posted to accounts receivable, until the time when the customer provides a payment to London Hydro. The Collections Lag is measured by analyzing the receivables aging data provided by London Hydro. London Hydro's Collection lag was calculated to be 26.35 days for London Hydro's distribution operations[1].

1.1.4 Payment Processing Lag

The Payment Processing lag is the time period from when the customer provides a payment to London Hydro until such time as the funds associated with that payment are available to the company. The Payment Processing Lag is measured by analyzing the payment methods used by London Hydro customers. Some examples of the payment methods used include credit card, electronic and pre-authorized payment and post-dated cheque payments. London Hydro provided the processing time associated with each method of payment and the amount processed under each method of payment. Using the data provided by London Hydro a customer-weighted average payment processing lag of 1.25 days was determined for London Hydro's distribution operations.

[1] An adjustment was made to London Hydro's collections lag. London Hydro's current write-off policy is 18 months after the bill due date. Using an 18 month write-off policy would have resulted in a collection lag of 36.58 days. This result skews the results of the study to a significantly higher working capital percentage than other utilities in Ontario. For the purposes of this study, the write-off policy has been revised to 365 days after bill due date.

2. Expense Leads

Expense Leads are defined as the time period between when a service is provided to London Hydro and when payment is remitted for that service. Typically services are provided in advance of payment which reduces the capital requirement of the company. Therefore, in conjunction with the calculation of the revenue lag, expense lead times were calculated for the following items:

1. Cost of Power;
2. OM&A Expenses;
3. Debt Retirement Charge (DRC);
4. Payments in Lieu of Taxes; and,
5. Interest Expenses.

2.1 Cost of Power

For the purpose of the distribution lead- lag study, cost of power expenses were considered to consist of payments made by London Hydro to its vendors in the following categories:

1. Independent Electricity System Operator (IESO) Cost of Power Expenses;
2. Hydro One Cost of Power Expenses;
3. Embedded Generation; and,
4. Payments to Retailers.

Expense lead times were calculated individually for each of the items listed above and then dollar- weighted to derive a composite expense lead time of 33.07 days for cost of power expenses.

Table 5: Summary of Cost of Power Expenses

Description	Amounts	Expense Lead Time	Weighting	Weighted Lead Time
IESO - COP	$ 354,570,390	32.81	96.89%	31.79
HONI COP Charges	$ 281,186	34.21	0.08%	0.03
Embedded Generation	$ 7,317,662	36.28	2.00%	0.73
Retailer Payments	$ 3,789,398	50.91	1.04%	0.53
Total	**$ 365,958,637**		**100.00%**	**33.07**

2.1.1 IESO Cost of Power Expenses

London Hydro purchases its power supply requirements on a monthly basis from the IESO and pays for such supplies on a schedule defined by the IESO's billing and settlement procedures. Using the actual cost of power payments made by London Hydro during calendar year 2014, a dollar-weighted IESO Cost of Power expense lead time of 32.81 days was calculated. Table 6 below summarizes the components of the Cost of Power expense lead calculation.

Table 6: Summary of IESO Cost of Power Expenses

Delivery Period	Payment Date	Amounts	Service Lead Time	Payment Lead Time	Total Lead Time	Weighting Factor %	Weighted Lead Time
Jan-14	02/19/14	$ 35,240,355	15.50	19.00	34.50	9.94%	**3.43**
Feb-14	03/18/14	$ 32,461,220	14.00	18.00	32.00	9.16%	**2.93**
Mar-14	04/16/14	$ 29,995,816	15.50	16.00	31.50	8.46%	**2.66**
Apr-14	05/16/14	$ 19,248,861	15.00	16.00	31.00	5.43%	**1.68**
May-14	06/17/14	$ 23,770,323	15.50	17.00	32.50	6.70%	**2.18**
Jun-14	07/17/14	$ 31,336,939	15.00	17.00	32.00	8.84%	**2.83**
Jul-14	08/19/14	$ 31,476,600	15.50	19.00	34.50	8.88%	**3.06**
Aug-14	09/17/14	$ 31,046,919	15.50	17.00	32.50	8.76%	**2.85**
Sep-14	10/17/14	$ 28,918,162	15.00	17.00	32.00	8.16%	**2.61**
Oct-14	11/19/14	$ 28,297,014	15.50	19.00	34.50	7.98%	**2.75**
Nov-14	12/16/14	$ 28,431,603	15.00	16.00	31.00	8.02%	**2.49**
Dec-14	01/19/15	$ 34,346,579	15.50	19.00	34.50	9.69%	**3.34**
Total		**$ 354,570,390**				**100.00%**	**32.81**

2.1.2 Hydro One Cost of Power Expenses

London Hydro incurs and provides payment to Hydro One for Cost of Power expenses on a monthly basis. Based upon cost of power payments made by London Hydro during calendar year 2014 related to cost of power expenses during calendar year 2014, a dollar-weighted Hydro One Cost of Power expense lead time of 34.21 days was calculated. Table 7, below summarizes the components of the Hydro One Cost of Power expense lead calculation.

Table 7: Summary of Hydro One Cost of Power Expenses

Delivery Period	Payment Date	Amounts		Service Lead Time	Payment Lead Time	Total Lead Time	Weighting Factor %	Weighted Lead Time
Jan-14	03/06/14	$	34,883	15.50	34.00	49.50	12.41%	6.14
Feb-14	03/06/14	$	29,979	14.00	6.00	20.00	10.66%	2.13
Mar-14	04/10/14	$	42,342	15.50	10.00	25.50	15.06%	3.84
Apr-14	05/15/14	$	15,117	15.00	15.00	30.00	5.38%	1.61
May-14	06/05/14	$	18,069	15.50	5.00	20.50	6.43%	1.32
Jun-14	07/10/14	$	19,412	15.00	10.00	25.00	6.90%	1.73
Jul-14	08/07/14	$	21,510	15.50	7.00	22.50	7.65%	1.72
Aug-14	09/11/14	$	21,998	15.50	11.00	26.50	7.82%	2.07
Sep-14	10/16/14	$	22,423	15.00	16.00	31.00	7.97%	2.47
Oct-14	11/20/14	$	19,846	15.50	20.00	35.50	7.06%	2.51
Nov-14	02/05/15	$	19,797	15.00	67.00	82.00	7.04%	5.77
Dec-14	02/05/15	$	15,810	15.50	36.00	51.50	5.62%	2.90
Total		**$**	**281,186**				**100.00%**	**34.21**

2.1.3 Payments to Embedded Generation Customers

London Hydro purchases power supply from Feed-in-Tariff (FIT), micro Feed-in-Tariff (MFIT), and cogeneration customers on a monthly basis according to each customer's billing cycle. London Hydro provided transaction level data including, invoice dates, payment dates, and payment amounts. Using the data provided by London Hydro staff, a dollar-weighted expense lead time of 36.28 days was calculated.

2.1.4 Payments to Retailers

London Hydro remits payments to retailers for applicable revenues collected from customers on retailer billing. Note that the net payment can be positive or negative. Retailers are invoiced after the retailer customer is billed. Using invoice and payment information for each retailer transaction from calendar year 2014 and retail revenue lag components determined from the revenue analysis, a dollar-weighted expense net lead time of 50.91 days was calculated.

2.2 OM&A Expenses

For the purpose of the distribution lead-lag study, OM&A expenses were considered to consist of payments made by London Hydro to its employees, vendors and government in the following categories:

1. Payroll and Benefits;
2. Property Taxes; and,
3. Other Miscellaneous OM&A.

Expense lead times were calculated individually for each of the items listed above and then dollar- weighted to derive a composite expense lead time of 10.83 days for OM&A expenses.

Table 8: Summary of OM&A Expenses

Description	Amounts	Expense Lead Time	Weighting	Weighted Lead Time
Payroll and Benefits	$ 23,142,117	13.75	61.17%	8.41
Property Tax	$ 601,892	(9.62)	1.59%	(0.15)
Other OM&A	$ 14,088,700	6.90	37.24%	2.57
Total	**$ 37,832,710**		**100.00%**	**10.83**

2.2.1 Payroll & Benefits

The following items were considered to be expenses related to the Payroll & Benefits of London Hydro:

1. Payroll;
2. Withholdings including the Canada Pension Plan, Employment Insurance, and Income Tax withholdings;
3. Pension contributions;
4. Group Health, Group Life, and long-term disability;
5. Payments made for Employer Health Tax (EHT);
6. Payments made for the Workplace Safety and Insurance Board (WSIB); and,
7. Other benefits payments.

When all Payroll, Withholdings and Benefits were dollar-weighted using actual payment data, the weighted average expense lead time associated with Payroll & Benefits was determined to be 13.75 days as shown in Table 9, below[2]. Additional detail can be found in Appendix B.

Table 9: Summary of Payroll & Benefits Expenses

Description	Amounts	Expense Lead Time	Weighting	Weighted Lead Time
Payroll	$ 11,521,596	7.82	49.79%	3.89
Withholdings	$ 5,468,932	9.40	23.63%	2.22
Pensions	$ 3,554,722	45.03	15.36%	6.92
Group Health Insurance	$ 791,857	9.30	3.42%	0.32
Group Life Insurance	$ 141,724	(8.06)	0.61%	(0.05)
Long-Term Disability	$ 319,981	(3.55)	1.38%	(0.05)
EHT	$ 364,017	7.90	1.57%	0.12
WSIB	$ 168,768	44.40	0.73%	0.32
Other Benefits	$ 810,519	1.36	3.50%	0.05
Total	**$ 23,142,117**		**100.00%**	**13.75**

[2] It should be noted that the dollar amounts in the table below represent the labor and benefit costs related to expenses. Labor and benefit costs that were capitalized were not included the dollar amounts below.

2.2.2 Property Taxes

London Hydro remits property taxes to the City of London and payment in lieu (PIL) of property taxes to the Ontario Electricity Financing Corporation. Using payment dates during calendar year 2014 and amounts associated with London Hydro's distribution business, a dollar-weighted expense lead (-lag) time of negative 9.62 days was determined. Table 10, below summarizes the property tax expense lead calculation.

Table 10: Summary of Property Tax Expenses

Description	Amounts		Expense Lead Time	Weighting	Weighted Lead Time
Property Tax	$	539,843	(10.71)	89.69%	(9.61)
PIL Property Tax	$	62,049	(0.12)	10.31%	(0.01)
Total	**$**	**601,892**		**100.00%**	**(9.62)**

2.2.3 Other Miscellaneous OM&A

London Hydro provided transaction level data for calendar year 2014 from their accounts payable system under the Miscellaneous OM&A category, a dollar-weighted expense lead time of 6.90 days was derived. Table 11, below summarizes the components of miscellaneous OM&A expense lead calculation.

Table 11: Summary of Miscellaneous OM&A Expenses

Description	Amounts		Expense Lead Time	Weighting	Weighted Lead Time
Insurance	$	100,436	(150.07)	0.71%	(1.07)
Hardware and Software Prepayments	$	1,106,829	(179.36)	7.86%	(14.09)
Other Prepayments	$	847,142	(113.87)	6.01%	(6.85)
Other	$	11,934,292	32.98	84.71%	27.93
Rent	$	100,000	136.50	0.71%	0.97
Total	**$**	**14,088,700**		**100.00%**	**6.90**

2.3 Debt Retirement Charge (DRC)

London Hydro makes payments for the debt retirement charge on a monthly basis to the Ontario Electricity Financial Corporation. O.Reg 156/15 exempts residential customers from paying DRC on electricity consumed after December 31, 2015. This has been modeled as a known and measurable change and only DRC to non-residential customers is included in the model. Using payment amounts that were made during calendar year 2014, a dollar-weighted expense lead time of 33.96 days was determined for DRC. Table 12, below summarizes the components of the DRC expense lead calculation.

Table 12: Summary of DRC Expenses

Delivery Period	Payment Date	Amounts	Service Lead Time	Payment Lead Time	Total Lead Time	Weighting Factor %	Weighted Lead Time
Dec-13	1/20/2014	$ 1,177,816	15.50	20.00	35.50	7.95%	2.82
Jan-14	2/18/2014	$ 1,244,580	15.50	18.00	33.50	8.40%	2.82
Feb-14	3/18/2014	$ 1,240,933	14.00	18.00	32.00	8.38%	2.68
Mar-14	4/21/2014	$ 1,269,387	15.50	21.00	36.50	8.57%	3.13
Apr-14	5/20/2014	$ 1,213,350	15.00	20.00	35.00	8.19%	2.87
May-14	6/18/2014	$ 1,138,320	15.50	18.00	33.50	7.69%	2.57
Jun-14	7/18/2014	$ 1,238,469	15.00	18.00	33.00	8.36%	2.76
Jul-14	8/18/2014	$ 1,182,927	15.50	18.00	33.50	7.99%	2.68
Aug-14	9/18/2014	$ 1,429,798	15.50	18.00	33.50	9.65%	3.23
Sep-14	10/20/2014	$ 1,297,847	15.00	20.00	35.00	8.76%	3.07
Oct-14	11/18/2014	$ 1,230,922	15.50	18.00	33.50	8.31%	2.78
Nov-14	12/18/2014	$ 1,146,466	15.00	18.00	33.00	7.74%	2.55
Total		**$ 14,810,815**				**100.00%**	**33.96**

2.4 Payment in Lieu of Taxes (PILs)

London Hydro makes payments in lieu of taxes in monthly installments to the relevant taxing authorities. Using payment amounts that were made during calendar year 2014, a dollar-weighted expense lead time of 24.79 days was determined for PILs. Table 13, below summarizes the components of the PILs expense lead calculation.

Table 13: Summary of PILs Expenses

Delivery Period	Payment Date	Amounts	Service Lead Time	Payment Lead Time	Total Lead Time	Weighting Factor %	Weighted Lead Time
Jan-14	1/23/2014	$ 130,000	182.50	(342.00)	(159.50)	6.84%	(10.91)
Feb-14	2/20/2014	$ 130,000	182.50	(314.00)	(131.50)	6.84%	(9.00)
Mar-14	3/20/2014	$ 130,000	182.50	(286.00)	(103.50)	6.84%	(7.08)
Apr-14	4/17/2014	$ 130,000	182.50	(258.00)	(75.50)	6.84%	(5.17)
May-14	5/22/2014	$ 130,000	182.50	(223.00)	(40.50)	6.84%	(2.77)
Jun-14	6/19/2014	$ 150,000	182.50	(195.00)	(12.50)	7.89%	(0.99)
Jul-14	7/24/2014	$ 150,000	182.50	(160.00)	22.50	7.89%	1.78
Aug-14	8/21/2014	$ 150,000	182.50	(132.00)	50.50	7.89%	3.99
Sep-14	9/25/2014	$ 200,000	182.50	(97.00)	85.50	10.53%	9.00
Oct-14	11/5/2014	$ 200,000	182.50	(56.00)	126.50	10.53%	13.32
Nov-14	11/21/2014	$ 200,000	182.50	(40.00)	142.50	10.53%	15.00
Dec-14	12/16/2014	$ 200,000	182.50	(15.00)	167.50	10.53%	17.63
Total		**$ 1,900,000**				**100.00%**	**24.79**

2.5 Interest on Short-Term and/or Long-Term Debt

London Hydro provided information regarding payments made four debt instruments in calendar year 2014 specifying known and measurable changes in unsecured loans. Taking into account the long term and short term debt instruments and known and measurable changes, a dollar-weighted expense lead time of 36.44 days was determined for calendar year 2014.

Table 14: Summary of Interest Expenses

Description	Amounts	Expense Lead Time	Weighting	Weighted Lead Time
Operating Line	$ 60,413	14.97	2.01%	0.30
Smart Meter, Unsecured Loan	$ 401,512	(15.90)	13.34%	(2.12)
Unsecured Loan	$ 2,443,808	45.63	81.20%	37.05
Revolving Loan Payments	$ 103,726	35.23	3.45%	1.21
Total	**$ 3,009,460**		**100.00%**	**36.44**

3. Harmonized Sales Tax (HST)

The expense lead times associated with the following items that attract HST were considered in London Hydro's distribution lead-lag study.

1. Revenues;
2. Cost of Power; and,
3. OM&A[3].

A summary of the expense lead times and working capital amounts associated with each of the above items is provided in Table 15. Note that the statutory approach described in Appendix A was used to determine the expense lead times associated with London Hydro's remittances and disbursements of HST (i.e., remittances are generally on the last day of the month following the date of the applicable return).

Table 15: Summary of HST Working Capital Factors

Description	HST Lead Time	Working Capital Factor	Working Capital Requirement
Revenue	(29.61)	-8.11%	**$ (4,698,270)**
Cost of Power	43.16	11.82%	**$ 5,625,616**
Misc. OM&A Expenses	44.54	12.20%	**$ 221,886**

[3] Costs within OM&A that attract HST include Other OM&A (hardware and software prepayments, other prepayments, and other).

4. Conclusions

Using the revenue lags and expense leads developed in the previous sections and London Hydro's calendar year 2014 distribution revenues and expenses (adjusted for known and measurable changes) the overall working capital requirements were calculated. Table 16 summarizes the working capital requirements for 2014 calculated in the study.

Table 16: London Hydro Distribution Working Capital Requirements (2014)

Description	Revenue Lag Days	Expense Lead Days	Net Lag Days	Working Capital Factor	Expenses	Working Capital Requirements
Cost of Power	60.28	33.07	27.21	7.46%	$ 365,958,637	$ 27,285,731
Aggregate OM&A	60.28	10.83	49.46	13.55%	$ 37,832,710	$ 5,126,314
Debt Retirement Charge	60.28	33.96	26.32	7.21%	$ 14,810,815	$ 1,068,011
Payment in Lieu of Taxes	60.28	24.79	35.49	9.72%	$ 1,900,000	$ 184,741
Interest Expense	60.28	36.44	23.84	6.53%	$ 3,009,460	$ 196,575
Total					$ 423,511,621	$ 33,861,373
HST						$ 1,149,232
Total - Including HST						**$ 35,010,605**
Working Capital as a Percent of OM&A incl. Cost of Power						**8.67%**

Appendix A. Working Capital Methodology

Working capital is the amount of funds that are required to finance the day- to- day operations of a regulated utility and which are included as part of a rate base for ratemaking purposes. A lead-lag study is the most accurate basis for determination of working capital and was used by Navigant for this purpose.

A lead-lag study analyzes the time between the date customers receive service and the date that customers' payments are available to London Hydro (or "lag") together with the time between which London Hydro receives goods and services from its vendors and pays for them at a later date (or "lead")[4]. "Leads" and "Lags" are both measured in days and are dollar- weighted where appropriate.[5] The dollar- weighted net lag (lag minus lead) days is then divided by 365 (or 366 for leap years) and then multiplied by the annual test year expenses to determine the amount of working capital required. The resulting amount of working capital is then included in London Hydro's rate base for the purpose of deriving revenue requirements.

A.1 Key Concepts

Two key concepts need to be defined as they appear throughout the report:

Mid-Point Method

When a service is provided to (or by) London Hydro over a period of time, the service is deemed to have been provided (or received) evenly over the midpoint of the period, unless specific information regarding the provision (or receipt) of that service indicates otherwise. If both the service end date ("Y") and the service start date ("X") are known, the mid-point of a service period can be calculated using the formula:

$$\text{Mid-Point} = \frac{([Y-X]+1)}{2}$$

When specific start and end dates are unknown, but it is known that a service is evenly distributed over the mid-point of a period, an alternative formula that is generally used is shown below. The formula uses the number of days in a year (A) and the number of periods in a year (B):

$$\text{Mid-Point} = \frac{A/B}{2}$$

Statutory Approach

In conjunction with the mid-point method, it is important to note that not all areas of the study may utilize dates on which actual payments were made to (or by) London Hydro. In some instances, particularly for the HST, the due dates for payments are established by statute or

4 A positive lag (or lead) indicates that payments are received (or paid for) after the provision of a good or service.

5 The notion of dollar-weighting is pursued further in the sub-section titled "Key Concepts".

by regulation with significant penalties for late payments. In these instances, the due date established by statute has been used in lieu of when payments were actually made.

Expense Lead Components

As used in the study, Expense Leads are defined to consist of two components:

1. Service Lead component (services are assumed to be provided to London Hydro evenly around the mid-point of the service period), and
2. Payment Lead component (the time period from the end of the service period to the time payment was made and when funds have left London Hydro's possession).

Dollar Weighting

Both leads and lags should be dollar-weighted where appropriate and where data is available to accurately reflect the flow of dollars. For example, suppose that a particular transaction has a lead time of 100 days and has a dollar value of $100. Further, suppose that another transaction has a lead time of 30 days with a dollar value of $1 Million. A simple un-weighted average of the two transactions would give us a lead time of 65 days ([100+30]/2). However, when these two transactions are dollar weighted, the resulting lead time would be closer to 30 days which is more representative of how the dollars actually flow.

A.2 Methodology

Performing a lead-lag study requires two key undertakings:

1. Developing an understanding of how the regulated distribution business operates in terms of products and services sold to customers/purchased from vendors, and the policies and procedures that govern such transactions; and,
2. Modeling such operations using data from a relevant period of time and a representative data set. It is important to ascertain and factor into the study whether (or not) there are known changes to existing business policies and procedures going forward. Where such changes are known and material, they should be factored into the study.

To develop an understanding of London Hydro's operations, interviews with London Hydro staff were conducted. Key questions that were addressed during the course of the interviews included:

1. What is being sold (or purchased)? If a service is being provided to (or by) London Hydro, over what time period was this service provided;
2. Who are the buyers (or sellers);
3. What are the terms for payment? Are the terms for payment driven by industry norms or by company policy? Is there flexibility in the terms for payment;
4. Are any changes to the terms for payment expected? Are these terms driven by industry or internally? What is the basis for any such changes;
5. Are there any new rules or regulations governing transactions relating to distribution operations that are expected to materialize over the time frame considered in this report; and,
6. How are payments made (or received)?Payment types have different payment lead times (i.e., internet payments have shorter deposit times than cheque deposit times)

Appendix B. Detailed Data Tables

B.1 Other Revenues

Description	Amounts	Revenue Lag Time	Weighting	Weighted Lead Time
Interest	$ 174,813	60.81	1.93%	1.18
Late Payment Charges	$ 1,739,022	42.81	19.23%	8.23
Collection Charges	$ 691,645	22.17	7.65%	1.70
Occupancy Charges	$ 594,327	42.81	6.57%	2.81
Customer billing service fees	$ 592,065	42.81	6.55%	2.80
Pole Rentals	$ 357,678	50.38	3.96%	1.99
Other Miscellaneous Rev	$ 987,999	40.96	10.93%	4.48
Water Cost Recoveries	$ 3,903,650	26.88	43.18%	11.60
Total	**$ 9,041,199**		**100.00%**	**34.80**

B.2 Payroll, Withholdings and EHT

Description	Amounts	Expense Lead Time	Weighting	Weighted Lead Time
Payroll	$ 11,521,596	7.82	66.39%	5.19
Withholdings	$ 5,468,932	9.41	31.51%	2.97
EHT	$ 364,017	7.90	2.10%	0.17
Total	**$ 17,354,545**		**100.00%**	**22.48**

B.3 Pensions

Delivery Period	Payment Date	Amounts	Service Lead Time	Payment Lead Time	Total Lead Time	Weighting Factor %	Weighted Lead Time
Jan-14	02/28/14	$ 268,180	15.50	28.00	43.50	7.54%	3.28
Feb-14	03/31/14	$ 265,809	14.00	31.00	45.00	7.48%	3.36
Mar-14	04/30/14	$ 264,730	15.50	30.00	45.50	7.45%	3.39
Apr-14	05/30/14	$ 276,903	15.00	30.00	45.00	7.79%	3.51
May-14	06/30/14	$ 337,439	15.50	30.00	45.50	9.49%	4.32
Jun-14	07/31/14	$ 268,342	15.00	31.00	46.00	7.55%	3.47
Jul-14	08/29/14	$ 331,847	15.50	29.00	44.50	9.34%	4.15
Aug-14	09/30/14	$ 263,199	15.50	30.00	45.50	7.40%	3.37
Sep-14	10/31/14	$ 262,743	15.00	31.00	46.00	7.39%	3.40
Oct-14	11/28/14	$ 326,358	15.50	28.00	43.50	9.18%	3.99
Nov-14	12/30/14	$ 260,198	15.00	30.00	45.00	7.32%	3.29
Dec-14	01/30/15	$ 428,974	15.50	30.00	45.50	12.07%	5.49
Total		**$ 3,554,722**				**100.00%**	**45.03**

B.4 Group Health Insurance

Delivery Period	Payment Date	Amounts		Service Lead Time	Payment Lead Time	Total Lead Time	Weighting Factor %	Weighted Lead Time
Jan-14	12/19/13	$	66,160	15.50	(43.00)	(27.50)	8.35%	(2.30)
Feb-14	02/27/14	$	65,294	14.00	(1.00)	13.00	8.25%	1.07
Mar-14	03/27/14	$	64,800	15.50	(4.00)	11.50	8.18%	0.94
Apr-14	05/01/14	$	66,840	15.00	1.00	16.00	8.44%	1.35
May-14	05/29/14	$	68,159	15.50	(2.00)	13.50	8.61%	1.16
Jun-14	06/26/14	$	65,746	15.00	(4.00)	11.00	8.30%	0.91
Jul-14	07/31/14	$	66,657	15.50	-	15.50	8.42%	1.30
Aug-14	08/28/14	$	66,385	15.50	(3.00)	12.50	8.38%	1.05
Sep-14	10/02/14	$	65,496	15.00	2.00	17.00	8.27%	1.41
Oct-14	10/30/14	$	65,674	15.50	(1.00)	14.50	8.29%	1.20
Nov-14	11/27/14	$	65,612	15.00	(3.00)	12.00	8.29%	0.99
Dec-14	12/18/14	$	65,036	15.50	(13.00)	2.50	8.21%	0.21
Total		**$**	**791,857**				**100.00%**	**9.30**

B.5 Group Life Insurance

Delivery Period	Payment Date	Amounts		Service Lead Time	Payment Lead Time	Total Lead Time	Weighting Factor %	Weighted Lead Time
Jan-14	01/13/14	$	11,395	15.50	(18.00)	(2.50)	8.04%	(0.20)
Feb-14	02/07/14	$	11,980	14.00	(21.00)	(7.00)	8.45%	(0.59)
Mar-14	03/07/14	$	11,503	15.50	(24.00)	(8.50)	8.12%	(0.69)
Apr-14	04/04/14	$	11,995	15.00	(26.00)	(11.00)	8.46%	(0.93)
May-14	05/07/14	$	11,959	15.50	(24.00)	(8.50)	8.44%	(0.72)
Jun-14	06/09/14	$	11,656	15.00	(21.00)	(6.00)	8.22%	(0.49)
Jul-14	07/08/14	$	11,795	15.50	(23.00)	(7.50)	8.32%	(0.62)
Aug-14	08/06/14	$	11,803	15.50	(25.00)	(9.50)	8.33%	(0.79)
Sep-14	09/05/14	$	11,766	15.00	(25.00)	(10.00)	8.30%	(0.83)
Oct-14	10/08/14	$	11,775	15.50	(23.00)	(7.50)	8.31%	(0.62)
Nov-14	11/11/14	$	12,080	15.00	(19.00)	(4.00)	8.52%	(0.34)
Dec-14	12/01/14	$	12,017	15.50	(30.00)	(14.50)	8.48%	(1.23)
Total		**$**	**141,724**				**100.00%**	**(8.06)**

B.6 Long-term Disability

Delivery Period	Payment Date	Amounts		Service Lead Time	Payment Lead Time	Total Lead Time	Weighting Factor %	Weighted Lead Time
Jan-14	01/16/14	$	25,726	15.50	(15.00)	0.50	8.04%	0.04
Feb-14	02/13/14	$	26,927	14.00	(15.00)	(1.00)	8.42%	(0.08)
Mar-14	03/13/14	$	26,008	15.50	(18.00)	(2.50)	8.13%	(0.20)
Apr-14	04/10/14	$	27,026	15.00	(20.00)	(5.00)	8.45%	(0.42)
May-14	05/15/14	$	26,935	15.50	(16.00)	(0.50)	8.42%	(0.04)
Jun-14	06/12/14	$	26,550	15.00	(18.00)	(3.00)	8.30%	(0.25)
Jul-14	07/10/14	$	26,849	15.50	(21.00)	(5.50)	8.39%	(0.46)
Aug-14	08/07/14	$	26,777	15.50	(24.00)	(8.50)	8.37%	(0.71)
Sep-14	09/11/14	$	26,701	15.00	(19.00)	(4.00)	8.34%	(0.33)
Oct-14	10/09/14	$	26,512	15.50	(22.00)	(6.50)	8.29%	(0.54)
Nov-14	11/13/14	$	27,017	15.00	(17.00)	(2.00)	8.44%	(0.17)
Dec-14	12/11/14	$	26,955	15.50	(20.00)	(4.50)	8.42%	(0.38)
Total		**$**	**319,981**				**100.00%**	**(3.55)**

B.7 WSIB

Delivery Period	Payment Date	Amounts		Service Lead Time	Payment Lead Time	Total Lead Time	Weighting Factor %	Weighted Lead Time
Jan-14	02/28/14	$	14,034	15.50	28.00	43.50	8.32%	3.62
Feb-14	03/28/14	$	13,957	14.00	28.00	42.00	8.27%	3.47
Mar-14	04/30/14	$	13,983	15.50	30.00	45.50	8.29%	3.77
Apr-14	05/30/14	$	14,247	15.00	30.00	45.00	8.44%	3.80
May-14	06/27/14	$	18,427	15.50	27.00	42.50	10.92%	4.64
Jun-14	07/31/14	$	14,970	15.00	31.00	46.00	8.87%	4.08
Jul-14	08/29/14	$	18,196	15.50	29.00	44.50	10.78%	4.80
Aug-14	09/30/14	$	14,482	15.50	30.00	45.50	8.58%	3.90
Sep-14	10/31/14	$	13,278	15.00	31.00	46.00	7.87%	3.62
Oct-14	11/28/14	$	14,365	15.50	28.00	43.50	8.51%	3.70
Nov-14	12/30/14	$	9,389	15.00	30.00	45.00	5.56%	2.50
Dec-14	01/29/15	$	9,441	15.50	29.00	44.50	5.59%	2.49
Total		**$**	**168,768**				**100.00%**	**44.40**

B.8 Other Benefits

Description	Amounts		Expense Lead Time	Weighting	Weighted Lead Time
Retiree (GS)	$	170,020	(17.49)	20.98%	(3.67)
Retiree (DFS)	$	189,612	(3.48)	23.39%	(0.81)
Retiree Benefits	$	287,295	12.80	35.45%	4.54
OHIP	$	129,560	6.47	15.98%	1.03
Maternity Top Up	$	34,033	6.51	4.20%	0.27
Total	**$**	**810,519**		**100.00%**	**1.36**

Appendix C. Expert Information

Ralph Zarumba, Director in the Energy Practice at Navigant Consulting, specializes in Regulatory Matters. Mr. Zarumba oversees that part of Navigant's Energy Practices specializing in retail regulatory matters. Mr. Zarumba has appeared as an expert in several dozen regulatory proceedings in Canada and the United States.

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Navigant has previously undertaken or supported numerous lead-lag studies across North America and for several of Ontario's electricity local distribution companies (LDCs) including Hydro One, Toronto Hydro, Horizon Utilities, London Hydro, London Hydro and others. Navigant lead-lag reports have been submitted by many of these other clients as evidence to support their rate submissions, and our approach and findings have been accepted, in large part, by the OEB and interveners. Some examples of recent lead-lag studies conducted by Navigant where Mr. Zarumba was the projected manager which have been filed with the OEB by Ontario utilities are outlined below.

Table 17: Recent Navigant Lead-Lag Studies (Ontario)

Utility	Reference
Toronto Hydro-Electric System Limited	EB-2014-0116 Exhibit 2A, Tab 3, Schedule 2
Hydro One Networks Inc. (distribution)	EB-2013-0141 Exhibit D1, Tab 1, Schedule 3
Hydro One Networks Inc. (transmission)	EB-2012-0031 Exhibit D1, Tab 1, Schedule 3, Attachment 1
Horizon Utilities	EB-2014-0002 Exhibit 2, Tab 4, Schedule 1
North Bay Hydro	EB-2014-0099, Correspondence
Entegrus Powerlines Inc.	EB-2015-0061, Exhibit 2, Attachment 2-B
Kingston Hydro	EB-2015-0083
Hydro Ottawa	EB-2015-0004

NAVIGANT

Ralph Zarumba

Director

Ralph.zarumba@navigant.com

30 S. Wacker Drive, Chicago, IL 60606

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Professional Summary

Ralph Zarumba is a Director in the Energy Practice with 30 years of experience specializing in regulatory issues and economic analysis associated with energy utilities in North America, Europe and Asia. Mr. Zarumba has appeared as an expert witness in a number of regulatory and legal proceedings addressing electric generation, transmission and distribution issues, unregulated operations of utility holding companies, asset valuation and regulatory treatment of Smart Grid investments.

He has also assisted clients in other matters including Depreciation Studies, Transfer Pricing Mechanisms and evaluation of the results of competitive bidding for electric generation services. These testimonies have been presented before the Nova Scotia Utility and Review Board, the Federal Energy Regulatory Commission ("FERC"), the Massachusetts Department of Public Utilities, the Rhode Island Public Utilities Commission, the Illinois Commerce Commission, the Wisconsin Public Service Commission, the Ontario Energy Board, the New York Public Service Commission, the New Mexico Public Regulation Commission, the Kansas Corporation Commission as well as a number of other venues.

Mr. Zarumba has provided a number of papers and presentations on various regulatory and market analysis issues.

Recent Whitepapers

» White Paper Prepared for the Ontario Energy Board on Approaches to Rate Mitigation for Transmitters and Distributors

  http://www.ontarioenergyboard.ca/OEB/_Documents/EB-2010-0378/EB-2010-0378_Navigant_Report.pdf

» White Paper Prepared for the Ontario Energy Board Cost addressing Distributor Efficiency

  http://www.ontarioenergyboard.ca/OEB/_Documents/EB-2012-0397/Navigant_Report_Elect-Dist-Efficiency_20130225.pdf

» White Paper Prepared for the Ontario Energy Board Cost addressing Cost Assessment Models for Regulators

  http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/319593/view/Cost%20Assessment%20Model%20Report_Jan%2013%202011_20120116pdf.PDF

Ralph Zarumba

Director

- Economic Issues Related to Tariff Development (with Thomas Welch)

  http://www.erranet.org/index.php?name=OE-eLibrary&file=download&id=6052&keret=N&showheader=N

Recent Publications

- Public Utilities Fortnightly "Pricing Social Benefits - Calculating and allocating costs for non-traditional utility services" Ralph Zarumba, Benjamin Grunfeld and Koby Bailey, August 2013

- American Gas "Modernization: The Quest for 21st Century Utilities" Ralph Zarumba and Peter Haapaniemi, November 2012

- Public Utilities Fortnightly "Pre-Funding to Mitigate Rate Shock" Sherman Elliot and Ralph Zarumba, September 2012

Professional Experience

Cost of Service

- Provided testimony in the proceedings reviewing the 2014 Nova Scotia Power Cost-of-Service study (NSPI-P-892-/M05473).

- Prepared and sponsored before the FERC a cost-of-service filing supporting a Reliability Must-Run filing on the Cayuga Operating Company.

- Managed a project team which completed a Remaining Life Study for the Western Minnesota Municipal Power Agency.

- For a confidential client reviewed the cost-of-service application for a natural gas distributor in Central Canada.

NAVIGANT

Ralph Zarumba

Director

Regulatory and Pricing

- Assisted the Ontario Energy in formulating a regulatory process and pricing design for Revenue Decoupling.
- Prepared a white paper on rate mitigation mechanisms for the Ontario Energy Board.
- Prepared a white paper for the Ontario Energy Board on apportion of regulatory commission costs to various stakeholders.
- Prepared a number of working capital studies for various distributors and transmitters in the Province of Ontario.
- Prepare a functional cost separation study for a regulated electric utility in Ontario.
- For a confidential client prepared a benchmarking analysis of the costs of regulatory proceedings associated with the introduction of new electric generation.
- Prepared an analysis of the pricing of voluntary renewable energy products for a Midwestern public power association.
- Led a team that prepared a cost of service, rate design, legal evaluation and financial analysis for the Puerto Rico Electric Power Authority.
- Performed a Pricing Strategy for the South Carolina Public Service Company (Santee Cooper).
- Prepared a financial plan, electric rate design and phase-in plan for a new electric generation plan for Fayetteville (North Carolina) Public Works Commission.
- Assisted Commonwealth Edison Company in their Electric Rate Request (Illinois Commerce Commission Docket No. 10-467).
- Prepared proposals for Retail Conjunctive Billing Pricing filed in Illinois and Wisconsin which were filed before the Illinois Commerce Commission and the Wisconsin Public Service Commission.
- Developed the Wisconsin Electric Power Company's first Curtailable Electric Tariff available to commercial customers.
- Negotiated complex service contracts with thermal energy customers which led to a major expansion of the Wisconsin Electric Steam System.

Ralph Zarumba

Director

- Assisted Indianapolis Power & Light in preparing a cost recovery plan for Energy Efficiency and Demand Side Management Expenditures.
- Trained regulatory staffs in the Republic of Macedonia, Bosnia and Herzegovina, Croatia and Albania.
- Prepared proposals for ancillary services pricing based upon market-based mechanisms for San Diego Gas and Electric Company.
- Completed the development of wholesale and retail rate designs for a southeastern G&T, an analysis of stranded cost exposure for a northeastern utility, and prepared a strategic plan for a large municipal utility.
- Developed a proposal for electric generation transfer pricing that would be used as a transition mechanism between the existing vertically integrated utility and a deregulated environment.
- Filed testimony in Wisconsin proposing that state's first Demand Response Program.

Demand Response

- Assisted the Building Owners and Managers of Chicago (BOMA/Chicago) develop a program where they can bid demand response based ancillary services into the PJM market.
- Prepared a presentation for the Public Utilities Commission of Ohio on Commercial and Industrial Dynamic Pricing and Demand Response in an unregulated regulatory environment.

Electric Transmission

- Assisted the Long Island Power Authority to purchase distribution, transmission and regulatory assets and prepared its non-jurisdictional open-access transmission tariff.
- Prepared the pricing portion of a FERC open access tariff (Docket No. ER96-96-43.000) for San Diego Gas and Electric Company; testified on revenue requirements and pricing including opportunity costs.

Generation Market Analysis

- For a major public power generation owner prepared a strategy of internal coal versus natural gas generation dispatch protocols including the treatment of liquidated damages.

Ralph Zarumba

Director

- Co-authored a report for Nalcor on the feasibility and economics of the proposed development of the Lower Churchill Hydroelectric project.
- Prepared a number of electric market price forecasts for many regions of the United States and Central America.
- Supported the electric pricing and infrastructure analysis for a Least-Cost Resource Plan for San Diego County.
- Prepared an analysis of the saturation of coal-fired electric generation technology in the Western Electric Coordinating Council.
- Developed a long-run electric expansion plan for the Railbelt System in Alaska.
- Managed a team that prepared a long-term capacity and energy forecast for a medium-sized municipal utility.
- For Manitowoc Public Utilities prepared a resource plan evaluating various generation expansion options.

Merger, Acquisition and Divesture

- On behalf of the Minnesota Public Service Commission. Mr. Zarumba co-authored an analysis of the merger savings associated with the proposed Primergy Merger (the proposed combination of Northern States Power and Wisconsin Energy). The analysis included a detailed review of cost savings that would emanate from the merger and regulatory commitments made by the companies to regulatory authorities in Minnesota.
- The Ontario Energy Board desired to identify factors that potentially impede the combination of regulated distributors in that province. Mr. Zarumba co-authored a study which identified those factors and discussed policies in other jurisdictions.
- For the Manitowoc Public Utilities prepared an analysis that evaluated the divesture of its transmission assets to the American Transmission Company.

Ralph Zarumba

Director

International

- Currently assisting the Israel Public Utility Authority is electric tariff reviews for the Israel Electric Company and the Jerusalem District Electric Company.
- Mr. Zarumba assisted the electric regulator in the Republic of Macedonia with various regulatory issues including pricing design, revenue requirements and privatization issues. Included in the assistance was the development of market designs for the electricity sector.
- Completed a tariff implementation plan proposal for the privatization of the distribution companies of the Bulgarian Electric Utility.
- Led a team to implement regulatory procedures and methodology for the electric power industry in Bosnia and Herzegovina.
- Conducted a study of the electric power market in El Salvador including a quantification of the level of generation market power using the Lerner Index.

Work History

Director, Navigant Consulting

Director, Science Applications International Corporation

President, Zarumba Consulting

Management Consultant, Sargent & Lundy Consulting Group

President, Analytical Support Network, Inc.

Manager, Pricing Practice, Synergic Resources Corporation

Senior Analyst – San Diego Gas & Electric Company

Senior Analyst – Wisconsin Electric Power Company

Analyst 4 – Eastern Utilities Associates

Analyst – Illinois Power Company

Education

MA, Economics	DePaul University, Chicago, IL
BS, Economics	Illinois State University, Normal, IL

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Appendix 2-4:
New Policy Options for the Funding of Capital

Ontario Energy Board

Capital Module

Applicable to ACM and ICM

Note: Depending on the selections made below, certain worksheets in this workbook will be hidden.

Version 3.01

Utility Name	London Hydro Inc.
Service Territory (if filing more than one model)	
Assigned EB Number	EB-2016-0091
Name of Contact and Title	Martin Benum, Director of Regulatory Affairs
Phone Number	519-661-5800 x5750
Email Address	benumm@londonhydro.com
Is this Capital Module being filed in a CoS or Price-Cap IR Application?	**COS**
Rate Year	**2017**
London Hydro Inc. is applying for:	**ACM Approval**
Last COS OEB Application Number	**EB-2012-0146**
The most recent complete year for which actual billing and load data exists	**2015**
Current IPI	**2.10%**
Strech Factor Assigned to Middle Cohort	**III**
Stretch Factor Value	**0.30%**
Price Cap Index	**1.80%**

Based on the inputs above, the growth factor utilized in the Materiality Threshold Calculation will be determined by:

2017 Test Year Distribution Revenues
2015 Actual Distribution Revenues

Notes

Pale green cells represent input cells.

Pale blue cells represent drop-down lists. The applicant should select the appropriate item from the drop-down list.

White cells contain fixed values, automatically generated values or formulae.

Ontario Energy Board

Capital Module

Applicable to ACM and ICM

London Hydro Inc.

Select the appropriate rate classes as they appear on your most recent Board-Approved Tariff of Rates and Charges, excluding the MicroFit Class.

How many classes are on your most recent Board-Approved Tariff of Rates and Charges? **9**

Select Your Rate Classes from the **Blue Cells** below. Please ensure that a rate class is assigned to **each shaded cell.**

	Rate Class Classification
1	RESIDENTIAL
2	GENERAL SERVICE LESS THAN 50 KW
3	GENERAL SERVICE 50 TO 4,999 KW
4	GENERAL SERVICE 50 TO 4,999 KW (COGENERATION)
5	STANDBY POWER
6	LARGE USE
7	STREET LIGHTING
8	SENTINEL LIGHTING
9	UNMETERED SCATTERED LOAD

Ontario Energy Board

Capital Module
Applicable to ACM and ICM

London Hydro Inc.

Input the billing determinants and base distribution rates associated with London Hydro Inc.'s 2017 Test Year Distribution Revenues. Sheets 4 & 5 calculate the NUMERATOR portion of the growth factor calculation.

		2017 Test Year Distribution Revenues			2017 Test Year Distribution Revenues		
Rate Class	**Units**	**Billed Customers or Connections**	**Billed kWh**	**Billed kW (if applicable)**	**Monthly Service Charge**	**Distribution Volumetric Rate kWh**	**Distribution Volumetric Rate kW**
RESIDENTIAL	$/kWh	142,509	1,068,671,798		20.11	0.0082	0.0000
GENERAL SERVICE LESS THAN 50 KW	$/kWh	12,999	371,911,863		32.88	0.0109	0.0000
GENERAL SERVICE 50 TO 4,999 KW	$/kW	1,611	1,486,650,047	3,778,018	162.33	0.0000	2.7963
GENERAL SERVICE 50 TO 4,999 KW (COGENERATION)	$/kW	4	34,191,555	65,844	2650.00	0.0000	4.6482
STANDBY POWER	$/kW			154,800	0.00	0.0000	3.2101
LARGE USE	$/kW	1	82,923,505	159,628	21350.00	0.0000	2.3178
STREET LIGHTING	$/kW	35,912	19,502,488	54,607	1.71	0.0000	8.8279
SENTINEL LIGHTING	$/kW	599	706,221	1,907	3.77	0.0000	12.4297
UNMETERED SCATTERED LOAD	$/kWh	1,537	5,464,035		2.25	0.0195	0.0000

Ontario Energy Board

Capital Module
Applicable to ACM and ICM
London Hydro Inc.

Calculation of 2017 Revenue Requirement. No input required.

2017 Test Year Distribution Revenues

Rate Class	Billed Customers or Connections	Billed kWh	Billed kW (if applicable)	Monthly Service Charge	Distribution Volumetric Rate kWh	Distribution Volumetric Rate kW	Service Charge Revenue	Distribution Volumetric Rate Revenue kWh	Distribution Volumetric Rate Revenue kW	Revenue Requirement from Rates	Service Charge % Revenue	Distribution Volumetric Rate % Revenue kWh	Distribution Volumetric Rate % Revenue kW	Total % Revenue
	A	B	C	D	E	F	G = A * D *12	H = B * E	I = C * F	J = G + H + I	K = G / J	L = H / J	M = I / J	N = J / R
RESIDENTIAL	142,509	1,068,671,798		20.11	0.0082	0.0000	34,390,272	8,763,109	0	43,153,381	79.7%	20.3%	0.0%	62.5%
GENERAL SERVICE LESS THAN 50 KW	12,999	371,911,863		32.88	0.0109	0.0000	5,128,885	4,053,839	0	9,182,725	55.9%	44.1%	0.0%	13.3%
GENERAL SERVICE 50 TO 4,999 KW	1,611	1,486,650,047	3,778,018	162.33	0.0000	2.7963	3,138,164	0	10,564,473	13,702,637	22.9%	0.0%	77.1%	19.9%
GENERAL SERVICE 50 TO 4,999 KW (COGENERATION)	4	34,191,555	65,844	2,650.00	0.0000	4.6482	127,200	0	306,056	433,256	29.4%	0.0%	70.6%	0.6%
STANDBY POWER			154,800	0.00	0.0000	3.2101	0	0	496,923	496,923	0.0%	0.0%	100.0%	0.7%
LARGE USE	1	82,923,505	159,628	21,350.00	0.0000	2.3178	256,200	0	369,986	626,186	40.9%	0.0%	59.1%	0.9%
STREET LIGHTING	35,912	19,502,488	54,607	1.71	0.0000	8.8279	736,914	0	482,065	1,218,979	60.5%	0.0%	39.5%	1.8%
SENTINEL LIGHTING	599	706,221	1,907	3.77	0.0000	12.4297	27,099	0	23,703	50,802	53.3%	0.0%	46.7%	0.1%
UNMETERED SCATTERED LOAD	1,537	5,464,035		2.25	0.0195	0.0000	41,499	106,549	0	148,048	28.0%	72.0%	0.0%	0.2%
Total	**195,172**	**3,070,021,512**	**4,214,804**				**43,846,233**	**12,923,497**	**12,243,207**	**69,012,936**				**100.0%**

Ontario Energy Board

Capital Module
Applicable to ACM and ICM

Applicants Rate Base

2017 Test Year Distribution Revenues

Average Net Fixed Assets					
Gross Fixed Assets - Re-based Opening	$ 451,867,413	A			
Add: CWIP Re-based Opening		B			
Re-based Capital Additions	$ 28,092,000	C			
Re-based Capital Disposals		D			
Re-based Capital Retirements	-$ 10,483,097	E			
Deduct: CWIP Re-based Closing	-$ 157,307	F			
Gross Fixed Assets - Re-based Closing	$ 469,319,009	G			
Average Gross Fixed Assets			$	460,593,211	H = (A + G) / 2
Accumulated Depreciation - Re-based Opening	$ 193,199,445	I			
Re-based Depreciation Expense	$ 17,984,944	J			
Re-based Disposals		K			
Re-based Retirements	-$ 10,734,680	L			
Accumulated Depreciation - Re-based Closing	$ 200,449,709	M			
Average Accumulated Depreciation			$	196,824,577	N = (I + M) / 2
Average Net Fixed Assets			**$**	**263,768,634**	O = H - N
Working Capital Allowance					
Working Capital Allowance Base	$ 438,036,563	P			
Working Capital Allowance Rate	8.7%	Q			
Working Capital Allowance			**$**	**37,977,770**	R = P * Q
Rate Base			**$**	**301,746,404**	S = O + R
Return on Rate Base					
Deemed ShortTerm Debt %	4.00%	T	$	12,069,856	W = S * T
Deemed Long Term Debt %	56.00%	U	$	168,977,986	X = S * U
Deemed Equity %	40.00%	V	$	120,698,562	Y = S * V
Short Term Interest	1.65%	Z	$	199,153	AC = W * Z
Long Term Interest	2.71%	AA	$	4,582,246	AD = X * AA
Return on Equity	9.19%	AB	$	11,092,198	AE = Y * AB
Return on Rate Base			**$**	**15,873,596**	AF = AC + AD + AE
Distribution Expenses					
OM&A Expenses	$ 38,797,000	AG			
Amortization	$ 17,128,312	AH			
Ontario Capital Tax		AI			
Grossed Up PILs	$ 1,377,498	AJ			
Low Voltage		AK			
Transformer Allowance	$ 791,884	AL			
		AM			
		AN			
		AO			
			$	**58,094,694**	AP = SUM (AG : AO)
Revenue Offsets					
Specific Service Charges	-$ 1,689,119	AQ			
Late Payment Charges	-$ 1,967,000	AR			
Other Distribution Income	-$ 550,900	AS			
Other Income and Deductions	-$ 757,145	AT	**-$**	**4,964,164**	AU = SUM (AQ : AT)
Revenue Requirement from Distribution Rates			**$**	**69,004,126**	AV = AF + AP + AU
Rate Classes Revenue					
Rate Classes Revenue - Total (Sheet 5)			$	69,012,936	AW
Difference			-$	8,810	AZ = AV - AW
Difference (Percentage - should be less than 1%)				-0.01%	BA = AZ / AW

Ontario Energy Board

Capital Module
Applicable to ACM and ICM
London Hydro Inc.

Input the billing determinants associated with London Hydro Inc.'s 2015 Actual Distribution Revenues. This sheet calculates the DENOMINATOR portion of the growth factor calculation.
Pseudo Revenue Requirement Calculation.

Rate Class	2015 Actual Distribution Revenues			2015 Base Rates										
	Billed Customers or Connections	Billed kWh	Billed kW	Monthly Service Charge	Distribution Volumetric Rate kWh	Distribution Volumetric Rate kW	Service Charge Revenue	Distribution Volumetric Rate Revenue kWh	Distribution Volumetric Rate Revenue kW	Total Revenue By Rate Class	Service Charge % Revenue	Distribution Volumetric Rate % Revenue kWh	Distribution Volumetric Rate % Revenue kW	Total % Revenue
	A	B	C	D	E	F	G = A * D *12	H = B * E	I = C * F	J = G + H + I	K = G / J_{total}	L = H / J_{total}	M = I / J_{total}	N = J / J_{total}
RESIDENTIAL	139,861	1,084,665,542		20.11	0.0082	0.0000	33,751,257	8,894,257	0	42,645,514	48.6%	12.8%	0.0%	61.5%
GENERAL SERVICE LESS THAN 50 KW	12,485	399,647,917		32.88	0.0109	0.0000	4,926,082	4,356,162	0	9,282,244	7.1%	6.3%	0.0%	13.4%
GENERAL SERVICE 50 TO 4,999 KW	1,594	1,465,515,148	3,725,595	162.33	0.0000	2.7963	3,105,048	0	10,417,882	13,522,930	4.5%	0.0%	15.0%	19.5%
GENERAL SERVICE 50 TO 4,999 KW (COGENERATION)	4	38,831,481	75,192	2,650.00	0.0000	4.6482	127,200	0	349,506	476,706	0.2%	0.0%	0.5%	0.7%
STANDBY POWER			154,800	0.00	0.0000	3.2101	0	0	496,923	496,923	0.0%	0.0%	0.7%	0.7%
LARGE USE	3	137,445,055	284,637	21,350.00	0.0000	2.3178	768,600	0	659,732	1,428,332	1.1%	0.0%	1.0%	2.1%
STREET LIGHTING	35,359	24,640,359	69,126	1.71	0.0000	8.8279	725,567	0	610,237	1,335,804	1.0%	0.0%	0.9%	1.9%
SENTINEL LIGHTING	627	738,970	2,010	3.77	0.0000	12.4297	28,365	0	24,984	53,349	0.0%	0.0%	0.0%	0.1%
UNMETERED SCATTERED LOAD	1,522	5,522,828		2.25	0.0195	0.0000	41,094	107,695	0	148,789	0.1%	0.2%	0.0%	0.2%
Total	**191,455**	**3,157,007,301**	**4,311,360**				**43,473,213**	**13,358,115**	**12,559,265**	**69,390,592**				**100.0%**

Ontario Energy Board

Capital Module

Applicable to ACM and ICM

London Hydro Inc.

Current Revenue from Rates

This sheet is used to determine the applicant's most current allocation of revenues (after the most recent revenue to cost ratio adjustment, if applicable) to appropriately allocate the incremental revenue requirement to the classes.

Rate Class	Proposed Base Rates in Current CoS Application			2017 Test Year Distribution Revenues											
	Monthly Service Charge	Distribution Volumetric Rate kWh	Distribution Volumetric Rate kW	Re-based Billed Customers or Connections	Re-based Billed kWh	Re-based Billed kW	Current Base Service Charge Revenue	Current Base Distribution Volumetric Rate kWh Revenue	Current Base Distribution Volumetric Rate kW Revenue	Total Current Base Revenue	Service Charge % Total Revenue	Distribution Volumetric Rate % Total Revenue	Distribution Volumetric Rate % Total Revenue	Total % Revenue
	A	B	C	D	E	F	G = A * D *12	H = B * E	I = C * F	J = G + H + I	$L = G / J_{total}$	$M = H / J_{total}$	$N = I / J_{total}$	$O = J / J_{total}$
RESIDENTIAL	13.12	0.0155	0.0000	142,509	1,068,671,798		22,436,617	16,564,413	0	39,001,030	35.88%	26.49%	0.00%	62.4%
GENERAL SERVICE LESS THAN 50 KW	30.70	0.0099	0.0000	12,999	371,911,863		4,788,832	3,681,927	0	8,470,759	7.66%	5.89%	0.00%	13.5%
GENERAL SERVICE 50 TO 4,999 KW	150.00	0.0000	2.5038	1,611	1,486,650,047	3,778,018	2,899,800	0	9,459,403	12,359,203	4.64%	0.00%	15.13%	19.8%
GENERAL SERVICE 50 TO 4,999 KW (COGENERATION)	2403.08	0.0000	4.1978	4	34,191,555	65,844	115,348	0	276,400	391,748	0.18%	0.00%	0.44%	0.6%
STANDBY POWER	0.00	0.0000	2.9026			154,800	0	0	449,322	449,322	0.00%	0.00%	0.72%	0.7%
LARGE USE	19314.83	0.0000	2.0949	1	82,923,505	159,628	231,778	0	334,405	566,183	0.37%	0.00%	0.53%	0.9%
STREET LIGHTING	1.57	0.0000	8.1064	35,912	19,502,488	54,607	676,582	0	442,666	1,119,248	1.08%	0.00%	0.71%	1.8%
SENTINEL LIGHTING	3.31	0.0000	10.9336	599	706,221	1,907	23,792	0	20,850	44,643	0.04%	0.00%	0.03%	0.1%
UNMETERED SCATTERED LOAD	1.98	0.0171	0.0000	1,537	5,464,035		36,519	93,435	0	129,954	0.06%	0.15%	0.00%	0.2%
Total							**31,209,268**	**20,339,775**	**10,983,046**	**62,532,089**				**100.0%**

Ontario Energy Board

Capital Module
Applicable to ACM and ICM

London Hydro Inc.

No Input Required.

Preliminary Threshold Calculation

$$Threshold\ Value\ (\%) = 1 + \left[\left(\frac{RB}{d}\right) \times (g + PCI \times (1+g))\right] \times ((1+g) \times (1+PCI))^{n-1} + 10\%$$

Year		**2016**	
Year in which Applicant is applying		**COS**	n
Price Cap Index		**1.80%**	PCI
Growth Factor Calculation			
2017 Test Year Distribution Revenues		**$69,012,936**	
2015 Actual Distribution Revenues		**$69,390,592**	
Growth Factor		**-0.27%**	g (Note 1)
Dead Band		**10%**	
Average Net Fixed Assets			
Gross Fixed Assets Opening	$	451,867,413	
Add: CWIP Opening	$	-	
Capital Additions	$	28,092,000	
Capital Disposals	$	-	
Capital Retirements	-$	10,483,097	
Deduct: CWIP Closing	-$	157,307	
Gross Fixed Assets - Closing	$	469,319,009	
Average Gross Fixed Assets	$	460,593,211	
Accumulated Depreciation - Opening	$	193,199,445	
Depreciation Expense	$	17,984,944	
Disposals	$	-	
Retirements	-$	10,734,680	
Accumulated Depreciation - Closing	$	200,449,709	
Average Accumulated Depreciation	$	196,824,577	
Average Net Fixed Assets	$	263,768,634	
Working Capital Allowance			
Working Capital Allowance Base	$	438,036,563	
Working Capital Allowance Rate		9%	
Working Capital Allowance	$	37,977,770	
Rate Base	**$**	**301,746,404**	RB
Depreciation	**$**	**17,984,944**	d
Threshold Value (varies by Price Cap IR Year subsequent to CoS rebasing)			
Price Cap IR Year 2018		**136%**	
Price Cap IR Year 2019		**136%**	
Price Cap IR Year 2020		**136%**	
Price Cap IR Year 2021		**137%**	
Threshold CAPEX			$Threshold\ Value \times d$
Price Cap IR Year 2018	**$**	**24,378,972**	
Price Cap IR Year 2019	**$**	**24,448,961**	
Price Cap IR Year 2020	**$**	**24,520,016**	
Price Cap IR Year 2021	**$**	**24,592,153**	

Note 1: The growth factor g is annualized, depending on the number of years between the numerator and denominator for the calculation. Typically, for ACM review in a cost of service and in the fourth year of Price Cap IR, the ratio is divided by 2 to annualize it. No division is normally required for the first three years under Price Cap IR.

Ontario Energy Board

Capital Module
Applicable to ACM and ICM
London Hydro Inc.

Identify ALL Proposed ACM projects and related CAPEX costs in the relevant years

	Cost of Service Test Year 2017	Price Cap IR Year 1 2018	Year 2 2019	Year 3 2020	Year 4 2021
Distribution System Plan CAPEX	$ 32,575,000	$ 35,417,000	$ 32,659,000	$ 33,611,000	$ 33,507,000
Materiality Threshold		$ 24,378,972	$ 24,448,961	$ 24,520,016	$ 24,592,153
Maximum Eligible Incremental Capital (Forecasted CAPEX less Threshold)		$ 11,038,028	$ 8,210,039	$ 9,090,984	$ 8,914,847
Maximum Eligible Incremental Capital (Forecasted Capex less Threshold)		$ 11,038,028	$ 8,210,039	$ 9,090,984	$ 8,914,847

Proposed Capital Projects Eligible for ACM treatment

Project Descriptions:	Cost of Service Test Year 2017	Price Cap IR Year 1 2018	Year 2 2019	Year 3 2020	Year 4 2021	Total
Nelson TS Capital Contribution		$ 6,850,000			$ 1,450,000	$ 8,300,000
JD Edwards		$ 2,000,000				$ 2,000,000
HONI CCRA True-up's Talbot and Buchanan		$ 1,000,000				$ 1,000,000
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
Maximum Allowed Incremental Capital		$ 9,850,000	$ -	$ -	$ 1,450,000	

Appendix 2-5:
Service Quality and Reliability Performance

File Number:	EB-2016-0091
Exhibit:	2
Tab:	3
Schedule:	1
Page:	
Date:	8/26/2016

Appendix 2-G
Service Reliability and Quality Indicators
2011 - 2015

Service Reliability

Index	Including outages caused by loss of supply					Excluding outages caused by loss of supply					Excluding Major Event Days				
	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
SAIDI	1.860	0.900	1.020	1.110	1.060	1.670	0.890	0.990	0.980	1.040	1.860	0.900	0.853	1.110	0.950
SAIFI	2.360	1.420	1.380	1.620	1.370	2.140	1.300	1.240	1.210	1.220	2.360	1.420	1.227	1.620	1.220

5 Year Historical Average

	Including outages caused by loss of supply	Excluding outages caused by loss of supply	Excluding Major Event Days
SAIDI	1.190	1.114	1.135
SAIFI	1.630	1.422	1.569

SAIDI = System Average Interruption Duration Index
SAIFI = System Average Interruption Frequency Index

Service Quality

Indicator	OEB Minimum Standard	2011	2012	2013	2014	2015
Low Voltage Connections	90.0%	97.6%	96.8%	99.9%	100.0%	97.6%
High Voltage Connections	90.0%	100.0%	100.0%	100.0%	n/a	100.0%
Telephone Accessibility	65.0%	67.3%	68.3%	67.1%	65.9%	68.0%
Appointments Met	90.0%	99.5%	99.9%	99.9%	99.3%	100.0%
Written Response to Enquires	80.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Emergency Urban Response	80.0%	100.0%	99.2%	98.1%	99.1%	100.0%
Emergency Rural Response	80.0%	n/a	n/a	n/a	n/a	n/a
Telephone Call Abandon Rate	10.0%	2.1%	2.1%	2.4%	3.2%	2.6%
Appointment Scheduling	90.0%	93.4%	97.5%	96.7%	95.3%	98.6%
Rescheduling a Missed Appointment	100.0%	100.0%	100.0%	100.0%	100.0%	n/a
Reconnection Performance Standard	85.0%	96.2%	98.3%	98.6%	99.1%	99.1%

Appendix 2-6:
Distribution System Plan