EB-2024-0063

Generic Proceeding on
Cost of Capital and Other Matters

TFG/Minogi Compendium for Dr. Sean Cleary, CFA

October 2, 2024

Tab 1

DR. SEAN CLEARY, CFA

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Areas of Interest

Research: Empirical studies in sustainable finance, corporate finance and investments.
Teaching: Sustainable Finance, Investments, Business Finance and Corporate Finance. I have also taught numerous courses and delivered seminars in many preparatory programs designed to prepare students to write exams for all three levels of the CFA program and the CSC for over 10 years.

Education

University of Toronto	Ph.D., Finance, 1993 - January, 1998
Saint Mary's University	M.B.A., Finance, 1987-1989
Saint Francis Xavier University	B.Ed., Secondary, 1983-84
Acadia University	B.A., Economics, 1979-1983

Career Experience

Queen's University	Professor of Finance Founding Chair, Institute of Sustainable Finance (July 2018-December 2023); Director of Master of Finance (July 2008 – June 2014; January 2017- December 2022)
Saint Mary's University	Associate Dean and Pengrowth Nova Scotia Professor in Petroleum Financial Management: (July 2007 – June 2008) Professor: (September 2006 – June 2007) Associate Professor: Finance (September 2000 - June 2001, July 2002 – August 2006) Assistant Professor: Finance (July 1998 - August 2000) Lecturer: Finance and Statistics, (1990-1993, Full Time)
York University	Assistant Professor: Finance (July 2001 – June 2002)
The University of Lethbridge	Assistant Professor: Finance (1997- 1998, Full Time)
The University of Toronto	Lecturer: Business Finance (Undergraduate and MBA) (1994-1997, Part Time)
Ryerson University	Lecturer: Investment Finance (1994-1997, Full Time)
WSC Investment Services	Instructor for CSC and CFA Seminars and Prepare Course Materials and Deliver Seminars for various professional organizations; (1996-present, Part Time)
Royal Bank of Canada	Commercial Lender; (1989-1990, Full Time)

Expert Witness Experience:

February-October 2023 – Industrial Gas Users Association (IGUA) of Ontario
Preparing evidence regarding an appropriate equity ratio for Enbridge Gas.

July 2022-October 2023 – Utilities Consumer Advocate (UCA) of Alberta
Prepared evidence regarding an appropriate ROE and capital structure for regulated Alberta utilities.

September 2019-April 2020 – Utilities Consumer Advocate (UCA) of Alberta
Prepared evidence regarding an appropriate ROE and capital structure for regulated Alberta utilities.

July-November 2018 – Newfoundland Consumer Advocate
Prepared evidence regarding an appropriate capital structure for Newfoundland Power.

September 2017-June 2018 – Utilities Consumer Advocate (UCA) of Alberta
Prepared and testified regarding an appropriate ROE and capital structure for regulated Alberta utilities.

April 2017-September 2018 – Utilities Consumer Advocate (UCA) of Alberta
Preparing evidence and testifying regarding appropriate risk margins for commodity risk for regulated Alberta utilities.

July-October 2016 – Manitoba Public Insurance
Prepared a report and testified regarding interest rate forecasts.

September 2015-July 2016 – Utilities Consumer Advocate (UCA) of Alberta
Prepared and testified regarding an appropriate ROE and capital structure for regulated Alberta utilities.

December 2015-June 2016 – Newfoundland Consumer Advocate
Prepared and testified regarding an appropriate capital structure for Newfoundland Power.

April-November 2014 – Utilities Consumer Advocate (UCA) of Alberta
Prepared and testified regarding appropriate risk margins for commodity risk for regulated Alberta utilities.

December 2013-August 2014 – Utilities Consumer Advocate (UCA) of Alberta
Prepared and testified regarding an appropriate ROE and capital structure for regulated Alberta utilities.

Publications:

Academic Journals:

"The Cost of Delaying to Invest: A Canadian Perspective," 2022. Finance Research Letters, 50, 103242. Co-authored with Neal Willcott, Smith School of Business, Queen's University.

"Post-Crisis M&As and the Impact of Financial Constraints" 2020. Journal of Financial Research, Vol 43 No. 2, 407-454. Co-authored with Ashrafee Hossain, Memorial University. Recipient of "Outstanding Article Award" for 2020.

"Institutional Investors, Monitoring and Corporate Finance Policies," 2017. International Journal of Managerial Finance, Vol. 13, Issue No. 2, 186-212. Co-authored with Jun Wang, The University of Western Ontario. Outstanding Paper Award.

"The Cash Effect and Market Reaction over Three Decades," 2016. Journal of Accounting and Finance, December 2016, 93-115. Co-authored with Fatma Sonmez, Queen's University.

"An Efficient and Functional Model for Predicting Bank Distress: In and Out of Sample Evidence," 2016. Co-authored with Greg Hebb, Dalhousie University. Journal of Banking and Finance, Vol. 64, March 2016, 101–111.

"Managerial Practices and Corporate Social Responsibility," 2015. Co-authored with Najah Attig, Saint Mary's University. Journal of Business Ethics, Vol. 131 (No. 1), 121-136.

"Organization Capital and Investment Cash Flow Sensitivity: The Effect of Management Quality Practices," 2014. Co-authored with Najah Attig, Saint Mary's University. Lead Article - Financial Management, Vol. 43 (No. 3), 473-504.

"Corporate Legitimacy and Investment-Cash Flow Sensitivity," 2014. Co-authored with Najah Attig, Saint Mary's University, Sadok El Ghoul, University of Alberta, and Omrane Guedhami, South Carolina University. Journal of Business Ethics, Vol. 121 (No. 2), 297-314.

"Debt Rating Initiations: Natural Evolution or Opportunistic Behavior?" 2013. Co-authored with Laurence Booth, University of Toronto, and Lynnette Purda, Queen's University. Journal of Modern Accounting and Auditing, Vol. 9 (No. 12), 1574-1595.

"Institutional Investment Horizons and the Cost of Equity Capital," 2013, Co-authored with Najah Attig, Saint Mary's University, Sadok El Ghoul, University of Alberta, and Omrane Guedhami, South Carolina University. Financial Management, Vol. 42 (No.2), 2013, 441-477. Selected as one of 8 papers (since 2005) that was included in a Special Virtual edition on "Monitoring Management," 2018.

"Institutional Investment Horizon and Investment-Cash Flow Sensitivity." Co-authored with Najah Attig, Saint Mary's University, Sadok El Ghoul, University of Alberta, and Omrane Guedhami, South Carolina University. Journal of Banking & Finance, Vol. 36, (No. 4), 2012, 1164-1180.

"Capital Market Developments in the Post-October 1987 Period: A Canadian Perspective." Co-authored with Laurence Booth from the University of Toronto. Review of Accounting and Finance,

Vol. 8 (No.2), 2009, 155-175.

"Cash Flow Volatility, Financial Slack and Investment Decisions," 2008, China Finance Review, Number 1, Vol 2, 63-86. Co-authored with Laurence Booth from the University of Toronto.

"The Investment Nature of Income Trusts and Their Role in Diversified Portfolios," Canadian Journal of Administrative Sciences. Co-authored with Greg MacKinnon from Saint Mary's University, (Vol 24(4)), 2007, 314-325.

"The U-Shaped Investment Curve: Theory and Evidence." Co-authored with Paul Povel, University of Minnesota, and Michael Raith, University of Southern California, Lead article, Journal of Financial and Quantitative Analysis, Vol. 42 (No. 1), March 2007, 1-39.

"Financial Constraints and Investment: An Alternative Empirical Framework." Co-authored with Bert D'Espallier, Hasselt University, Anales de Estudios Economicos y Empresariales, Vol. 17, 2007, 9-41.

"Dividend Smoothing and Debt Ratings." Co-authored with Laurence Booth and Varouj Aivazian, both from the University of Toronto. Lead article, Journal of Financial and Quantitative Analysis, Vol. 41(No. 2), June 2006, 439-452.

"International Corporate Investment and the Relationships between Financial Constraint Measures," Journal of Banking and Finance, Volume 30 (5), 2006, 1559-1580.

"Are U.S. Variables Good Predictors of Foreign Equity Risk Premiums?" 2006. Co-authored with John Schmitz, President, Sci-Vest Capital Management Inc., The Cyprus Journal of Sciences.

"Income Trusts: Past Performance and Future Prospects." Co-authored with Greg MacKinnon of Saint Mary's University. Canadian Investment Review, Winter 2005, 53-54.

"Dividend Policy and the Role of Contracting Environments" FSR Forum, December 2005, 13-20. Co-authored with Laurence Booth and Varouj Aivazian, both from the University of Toronto.

"Corporate Investment and Financial Slack: International Evidence," The International Journal of Managerial Finance, 2005, 140-163.

"Industry Affects Do Not Explain Momentum in Canadian Stock Returns," Investment Management and Financial Innovations, 2005(2), 49-60. Co-authored with John Schmitz, President, Sci-Vest Capital Management Inc., and David Doucette, Saint Mary's University.

"Do Emerging Market Firms Follow Different Dividend Policies from U.S. Firms?" The Journal of Financial Research, Fall 2003, 371-387. Co-authored with Laurence Booth and Varouj Aivazian, both from the University of Toronto.

"Dividend Policy and the Organization of Capital Markets." Journal of Multinational Financial Management, Spring 2003, 101-121. Co-authored with Laurence Booth and Varouj Aivazian, both from the University of Toronto.

"The Risk-Adjusted Performance of Closed-End Funds and the Impact of Discounts." Journal of Today, December 2002, 119-133. Co-authored with Greg Hebb of Dalhousie University and Greg MacKinnon from Saint Mary's University.

"Transactions Costs for TSE-Listed Stocks," Canadian Investment Review, Spring 2002, 20-26. Co-authored with John Schmitz, President, Sci-Vest Capital Management Inc., and Kevin Kerr, TD Securities, Toronto.

"What Has Worked on Bay Street," Canadian Investment Review, Winter 2001, 25-34. Co-authored with John Schmitz, President, Sci-Vest Capital Management Inc.

"The Sensitivity of Canadian Corporate Investment to Liquidity," Canadian Journal of Administrative Sciences, September 2000, 217-232.

"Diversification with Canadian Stocks: How Much is Enough?" Canadian Investment Review, Fall 1999, 21-25. Co-authored with David Copp, Mount Allison University.

"The Relationship Between Firm Investment and Financial Status," Journal of Finance, April 1999, 673-692. Received at least one vote from the editorial board for the top Corporate Finance Paper Award during the year of publication.

"Momentum in Canadian Stock Returns," Canadian Journal of Administrative Sciences, September 1998, 279-291. Co-authored with Michael Inglis, University of Toronto. One of five nominations for "best 1998 CJAS paper."

Books and Book Chapters:

Introduction to Corporate Finance, first five editions, John Wiley & Sons Canada Limited. The first three editions were co-authored with Laurence Booth from the University of Toronto (2007, 2010, 2013), and the fourth and fifth editions (2016, 2020) co-authored with Laurence Booth and Ian Rakita from Concordia University. This is an Introductory Canadian Finance text that was written from "scratch."

Corporate Finance, First US Edition. Co-authored with Laurence Booth from the University of Toronto and Pamela (Petersen) Drake) from Virginia Commonwealth University. John Wiley & Sons. In progress – publication date 2013.

Investments: Analysis and Management, First, Second and Third Canadian Editions, co-authored with Charles P. Jones of North Carolina State University, John Wiley & Sons Canada Limited (1999, 2004, 2008). I was solely responsible for the development of all three Canadian editions, the first being based on an adaptation of the sixth U.S. edition, authored by Professor Jones.

The Canadian Securities Exam Fast Track Study Guide, First, Second, Third and Fourth Editions (2001, 2006, 2009, 2013) – sole author. Published by John Wiley & Sons Canada Limited.

Finance in a Canadian Setting, Sixth Edition, co-authored with Peter Lusztig and Bernard Schwab, both of the University of British Columbia, John Wiley & Sons Canada Limited, March, 2001. I was solely responsible for the development of this edition of the text, based on an adaptation of the fifth edition, authored by Professors Lusztig, Schwab and Randall Morck of University of Alberta.

Market Efficiency, a chapter in the CFA Institute Investment Series book entitled Investments: Principles of Portfolio and Equity Analysis (Wiley, 2011), which is currently used as CFA Level 1 material within the Candidate Body of Knowledge.

"Introduction to Financial Markets," (on-line course). Developed all seven modules for the Bourse de Montreal, 2002.

"Derivatives for the Retail Investor," (on-line course). Developed two modules (Forwards and Future, and Options) for the Bourse de Montreal, 2002.

"Derivatives for the Institutional Investor," (on-line course). Developed two modules (Options and Derivatives for Equity and Index Products) for the Bourse de Montreal, 2002.

"Investment Strategies and Asset Allocation," Chapter 5, Investment Management Techniques, The Canadian Securities Institute, 1999.

"Equity Securities," Chapter 12, Investment Management Techniques, The Canadian Securities Institute, 1999.

Cases:

"Time Value of Money: The Buy versus Rent Decision," with Stephen Foerster. Ivey Publishing, August 2014. Ivey Classic case – recognized as one of the most widely used Ivey cases of all time.

Conference Proceedings:

I have published numerous articles in conference proceedings, as summarized below:
European Financial Management Association annual conference, 2008, 2006, 2005, 2002.
Hawaii International Conference on Business, 2002.
Multinational Finance Society annual conference, 2001.
Atlantic Schools of Business annual conferences, 2000, 1998.
ASAC annual conferences, 2006, 2001, 2000.

Conference Best Paper Awards:

"The Information Content of Institutional Investment Horizon: Evidence from Firms' Implied Cost of Equity," 2012, Working Paper, Co-authored with Najah Attig, Saint Mary's University, Sadok El Ghoul, University of Alberta, and Omrane Guedhami, South Carolina University. Chosen Best Paper in Banking and Finance – 2012 European Business Research Conference.

"Income Trusts: Why All the Fuss and What About the Future?" 2006. Co-authored with Greg MacKinnon from Saint Mary's University. Chosen as the best paper in the Finance division for the 2006 ASAC Conference in Banff, Alberta.

"The U-Shaped Investment Curve: Theory and Evidence" 2004. Co-authored with Paul Povel, University of Minnesota, and Michael Raith, Rochester University. Presented at the 2004 NFA Conference and received award as the "Best Paper in Managerial Finance."

"The Sensitivity of Canadian Corporate Investment to Liquidity." Published in conference proceedings for the 1999 ASAC Conference in Saint John, New Brunswick.
Chosen as the best paper in the Finance division for this conference.

Conference Presentations:

Keynote Speaker (Finance Area) – ASAC 2012 Annual Conference.
I have presented papers at numerous conferences, as summarized below:
World Finance Conference, 2015, 2014, 2013, 2011, 2010.
Paris Financial Management Conference, 2014.
Northern Finance Association annual conferences, 2022, 2013, 2011, 2010, 2008, 2005, 2004, 2002, 2000, 1996.
Multinational Finance Society annual conferences, 2010, 2001, 1999.
European Financial Management Association annual conference, 2008, 2006, 2005, 2002.
Hawaii International Conference on Business, 2002.
Eastern Finance Association annual conferences, 2003, 2000.
Atlantic Schools of Business annual conferences, 2000, 1998, 1996.
ASAC annual conferences, 2006, 2000, 1999.
Financial Management Association annual conferences, 2013, 2011, 2010, 2008, 2005, 2004, 2001, 1999, 1996.
Southern Finance Association annual conference, 2022, 2016, 2008.

Finance Workshops (invited presentations):

Atlantic Canada CFA Society, 2006.
Melbourne Centre for Financial Studies, 2006.
Melbourne CFA Society, 2006.
Monash University (Caulfield), 2006.
University of Melbourne, 2006.
University of New South Wales, 2006.
University of Sydney, 2006.
University of Manitoba CGA Finance Conference 2005
Wilfred Laurier University, 2002.
University of Western Ontario, 2001.
York University, 2001, 2010.
Dalhousie University, 2001, 2013.
Queen's University, 2000.
Saint Mary's University, 2002, 2001, 2000, 1999.
Schulich School of Business, 2010.
Concordia University, 2013.
The University of Waterloo, 2015.

Research Grants

Co-investigator for an Insight Development Grant in the amount of $55,626 from the Social Sciences and Humanities Research Council of Canada (SSHRC) for the 2016 to 2018 period (Principal investigator – Jun Wang of the University of Western Ontario).

Co-investigator for a Standard Research Grant in the amount of $129,980 from the Social Sciences and Humanities Research Council of Canada (SSHRC) for the 2013 to 2017 period (Principal investigator - Najah Attig of Saint Mary's University).

Awarded four Research Grants of $90,000 each over three years from the Smith School of Business at Queen's University (2008-11; 2011-14; 2014-17; 2018-2020).

Principal investigator for a Standard Research Grant in the amount of $60,500 from the Social Sciences and Humanities Research Council of Canada (SSHRC) for the 2008 to 2011 period.

Co-investigator for a Standard Research Grant in the amount of $111,000 from the Social Sciences and Humanities Research Council of Canada (SSHRC) for the 2006 to 2009 period (Principal investigator - Najah Attig of Saint Mary's University).

Principal investigator for a Standard Research Grant in the amount of $70,118 from the Social Sciences and Humanities Research Council of Canada (SSHRC) for the 2003 to 2006 period.

Awarded a Research Grant of $25,000 per year for three years from the Schulich School of Business at York University (July 2001).

Principal investigator for a Standard Research Grant in the amount of $61,530 from the Social Sciences and Humanities Research Council of Canada (SSHRC) for the 1999 to 2002 period.

Awarded Research Grant for $1,500 from Saint Mary's University (2003-2004).

Awarded Research Grant for 2,500 from Saint Mary's University (2002-2003).

Awarded Research Grant for $2,500 from Saint Mary's University (2000-2001).

Awarded Research Grant for $3,030 from Saint Mary's University (1999-2000).

Awarded Research Grant for $2,000 from Saint Mary's University (1998-99).

Research Grant in the amount of $20,000 from the Intellectual Infrastructure Partnership Program (IIPP) at the University of Lethbridge (1997-98).

Research Grant from the University of Lethbridge Research Fund for $4,500 (1997-98).

Work-in Progress

"The Leverage-Profitability Puzzle Revisited," 2018, Working Paper. Co-authored with Alan Douglas, and Tu Nguyen, both from the University of Waterloo.

"Does Dual Holdings by Institutional Investors Make a Big Difference?" 2018, Working Paper. Co-authored with Jun Wang, the University of Western Ontario, and Keke Song, University of Melbourne.

"Leverage, Financial Flexibility, and Dividend Smoothing: An Empirical Investigation," 2018, Working Paper. Co-authored with Alan Douglas, the University of Waterloo.

Professional Activities

Member - CFA Society Toronto Advisory Council (January 2018-present)
Editorial Board – *Managerial Finance* (July 2017-present)
Associate Editor (Finance area) for the *Canadian Journal of Administrative Sciences* (2017-2020); Editor (Finance area) (2014-2016).
Associate Editor for the *European Journal of Finance* (2008-present).
Editorial Advisory Board – Investor Lit (2013-present)

Senior Advisor – Toronto CFA Professional Development Committee (2014-2021); Chair (2013-14); Vice-Chair (2012-13)
Chair – Awards Committee – CFA Toronto Board of Directors (2008-2011)
President - Board of Directors for the Atlantic Canada CFA Society (2007-2008). Served on the board from 2001 to 2008.
Editorial Board – *Canadian Investment Review* (2008-2011).
Served as a reviewer for the *Review of Financial Studies*, the *Journal of Financial and Quantitative Analysis*, *Journal of Business, Financial Management, Journal of Money, Credit and Banking,* the *Journal of Banking and Finance,* the *European Journal of Finance*, the *Journal of Corporate Finance*, the *Journal of Applied Economics*, the *Multinational Finance Journal, Financial Review, Journal of International Financial Management,* the *International Review of Economics and Finance,* the *Canadian Journal of Administrative Sciences,* the *Review of Financial Economics, the Journal of Risk Finance,* and for the *Journal of Management and Governance*.
Reviewer for several SSHRC grant applications.
External reviewer/examiner for several tenure and renewal applications received for professors at other universities, as well as for Ph.D. dissertations.
Conference chair for 2001 Northern Finance Association Annual Meeting, held in Halifax.
Conference organizing committee and Reviewer for several conferences.
Completed the Chartered Financial Analyst (CFA) program, and awarded the CFA designation.
Completed the Professional Financial Planning Course offered by the Canadian Securities Institute, as well as the Canadian Securities Course (CSC).
Completed the Investment Funds Institute of Canada's Mutual Fund Course.
Prepared course materials for several "on-line" finance courses.
Instructor for Canadian Securities Course Seminars.
Prepared Course Materials for the Canadian Securities Institute.
Delivered Seminars for the Canadian Securities Institute on the Canadian Securities Course (CSC), Fixed Income Securities and Portfolio Management Techniques.

Student Supervision

External Examiner for several PhD students.
Supervisor, Queen's PhD Finance Students, Neal Willcott 2019-present, and Dhruv Baswal 2022-present.
Supervisor, Queen's MSc Finance Students, Michael Scott 2023-present, Ziyuan Liu 2023-present, Aashray Kaudinya 2023, Dhruv Baswal 2022, Ehsan Dehghanizadeh 2019, Wayne Charles 2010.
Served as co-director for the Investment Management of Portfolios in Atlantic Canada Training Program (IMPACT) at Saint Mary's University. This innovative program has students manage a portfolio of over $150,000 of "real" money (2005-2008).
Served as faculty advisor to several MBA students preparing their Management Research Project (MRP) in finance (FIN 669) to satisfy their MBA requirements:
Robert March, "Using Canadian and US Macroeconomic Variables to Predict Canadian Equity Risk Premiums" (1999).
Simon Sagar, "Do Canadian Investors Overreact?" (2000). Simon also presented his paper at the 1999 Atlantic Schools of Business (ASB) conference in Halifax.
Kevin Kerr, "Bid-Ask Spreads and Commissions on the TSE" (2000).
Scott LeBlanc, "An Investigation of Derivative Use: A Case Study of Cambior Inc." (2000).
David Doucette, "Industry Momentum in Canadian Stock Returns" (2001).
Balakrishna Murty, "The Effect of Board Composition on Firm Value: Some Canadian Evidence" (2003).
Bashir Jallow, "US Economic Factors and International Equity Risk Premia Predictability" (2005).
Kathy Isnor, "The Effect of Corporate Governance Policies on the Corporate Bond Rating" (2005).

References

Dr. Laurence Booth
Professor of Finance
University of Toronto
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Email: Booth@Rotman.utoronto.ca

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CEO of Melancthon Capital
Chancellor, Saint Mary's University
Toronto, Ontario
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Tab 2

By **Clint Davis**
President and CEO
Nunasi Corporation

By **Sara Alvarado**
Former Executive Director
Institute for Sustainable Finance

This series explores the foundations of sustainable finance, one of the most important emerging fields of our time. Sustainable finance aligns financial systems and services to

← Primer Series page

French version

Indigenous Economic Reconciliation

What is Economic Reconciliation? How does it apply to Indigenous communities and all Canadians across our land? And importantly, what can we do about it?

The purpose of this Primer is three-fold:

1. To continue that conversation with the goal of educating different stakeholders about these issues, from the perspective of inclusivity and sustainability.
2. Present a high-level picture of how historical developments take us to where we are today.
3. Lastly, but very importantly, focus on **how we can move from discussion to action:** What can Canadians do to help with these reconciliation efforts? We believe Economic Reconciliation would be one of the answers and a very impactful one; however, it requires all stakeholders to recognize its importance and the need to collaborate in these efforts.

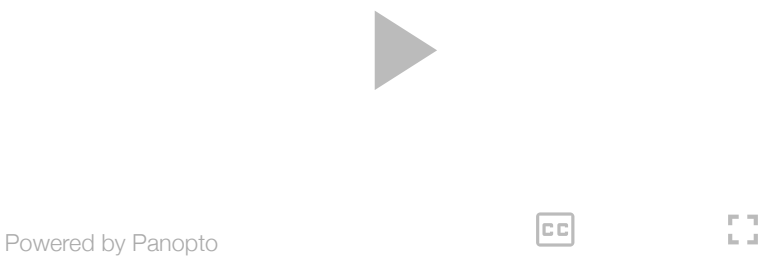
ISF Primer Video Series

promote long-term environmental sustainability and economic prosperity.

Primer series

On the path to Indigenous Economic Reconciliation, with Clint Davis

Renewable energy development “has to involve … the engagement of Indigenous communities.” ISF Executive Director Sara Alvarado interviews Clint Davis, President and CEO of Nunasi Corp., about how Canada is progressing on Indigenous economic reconciliation, what we need to do better, and what it means for Canada and Indigenous peoples as we transition to a Net Zero economy.



Taking a Seat at the Table

The recognition of Indigenous[1] reconciliation began in earnest with the release of the summary Truth and Reconciliation Commission report and the 94 Calls to Action on June 2, 2015, almost seven years ago. Since this historic day, there has been widespread activity throughout the country where Canadians have contributed in their own way toward achieving reconciliation. September 30, 2021 marked the first National Day for Truth and Reconciliation, a recognized federal holiday. This day honours the lost children and Survivors of residential schools, their families and communities, and is a vital component of the reconciliation process.

Indigenous reconciliation will lead to an appreciation and

understanding of the Indigenous reality, historically and today. It is a commitment to make space for the Indigenous way of life where values, practices and sovereignty are respected. It is the inclusion of Indigenous people, communities and business in all aspects of economic activity, or simply **"Economic Reconciliation".** Indigenous communities continue to face multiple barriers to fully participating in the economy, despite successes in court that recognise rights and title to their lands. Lack of access to capital and the hurdles to generating own-source revenue are two well-known barriers.

Industry is starting to realize that focusing on economic reconciliation and the inclusion of Indigenous people, communities, and values in project development leads to better project outcomes. Moody's has commented on the increasing participation of Indigenous communities in infrastructure projects, and their more active role, including investing in equity: "Many Indigenous communities view economic development as a path to self-sufficiency for their populations, and growing business acumen will likely bring greater involvement in larger projects."[2] The report also mentioned potential overruns and delays if Indigenous communities are not engaged early and often.

Why is Economic Reconciliation Necessary?

Prior to and at the time of contact, Indigenous communities had their own systems of governance, reflecting their values and societal norms. Communities developed their own economic systems and at times were involved in trade with other Indigenous communities. Indigenous communities were politically and economically independent. This changed dramatically once Canada became a country.

According to a 2019 report by the National Indigenous Economic Development Board[3] , "Indigenous populations face deeply rooted systemic barriers embedded in the Canadian economic landscape, notably the Indian Act and its restrictive land regime, inadequate implementation of the treaties, and systematic exclusion of Indigenous peoples from economic systems. This has resulted in

Indigenous overrepresentation in low paying jobs, higher unemployment rates, and lower educational attainment than their non-Indigenous counterparts." Some of the more insidious restrictions that were placed on First Nations people under the Indian Act included First Nations people or communities being prohibited from hiring a lawyer until 1951. The Canadian government had a policy until 1940 that required all First Nation people living on reserve to get written permission from an Indian Agent when they needed to leave their community. If they were caught without a pass, they were either incarcerated or returned to the reserve.

Resilience and vision enabled communities to bring their claims of Indigenous rights to the courts, where they experienced unprecedented success. The recognition of Indigenous rights and title at the highest court is the catalyst for the inclusion of Indigenous people during the early stages of development. Such inclusion often results in preferential training and employment, procurement and a financial contribution from the project proponent. In addition, more communities are settling outstanding claims and grievances with the federal government resulting in comprehensive agreements that have a financial component. Other land claim agreements, like those in northern Indigenous communities, have self-governance provisions which lay out the rules for engagement of Indigenous communities and business for any development activity in their region.

These activities, along with the growing number of Indigenous people completing high school and going on to college or university, has led to the rise of the Indigenous market. In 2011, TD Economics did a report on the size of the Indigenous Market, which calculated the buying power of Indigenous people, business and communities and determined that it was $24-billion and was expected to grow to $32-billion over the next five years.

Similarly to how the World Bank, the Inter-American Development Bank and other International Financial Institutions (IFIs) have development programs in place to help improve access to clean water, education, health and communications in less-developed

communities around the world, we need to apply a development lens in some cases, given poor access by Indigenous communities in Canada to this very basic infrastructure. Better access to communications and Internet, for example, will enable access to education, better health, and ultimately, a closer economic level to that of the rest of Canada. This takes time and a coordinated approach.

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Economic Reconciliation and Environmental, Social and Governance (ESG) Considerations

When Indigenous communities partner with the private sector, projects can benefit from multiple ESG considerations. The value placed on the **Environment** and balancing economic returns with the impact of a project to the land, air and water (externalities) is a key consideration for Indigenous communities as they contemplate partnerships. As partners in project development, Indigenous communities will place great importance on the **Social** impacts that a project will have on their community. How many members of their community will receive training, get jobs and have their small

business supported through procurement and investment opportunities? Is the private sector partner committed to upholding and respecting the communities' values? And has the private sector partner taken the time and made the effort to understand the unique historical circumstances and culture of the Indigenous community partner?

Strong **Governance** will matter for Indigenous communities to collaborate on project development. Indigenous partners will often seek a seat at the table and a voice on the board. They will seek confirmation that their partners have undertaken cultural awareness/competency training. They will seek diversity at the board level and in the executive and management of the partner. They will want to know what the relationship will look like as the project winds down operations.

As Canada strives to reach net-zero targets by 2050, it will need to consider how to obtain the social licence from Indigenous communities whose lands may be impacted by project development. This will require policy makers to create space and support for economic reconciliation through programming and services. It will require coordination across Canada, by the federal government, to develop a myriad of tools to support Indigenous communities' access to capital for them to be meaningful partners in this time of transition, to achieve "a just transition." Private sector will need to be open to real and meaningful partnerships based on trust, respect and reciprocity. Education of Indigenous culture and history will result in better understanding and will help improve these relationships. Project development will be smoother and the transition to Net Zero will be more seamless when collaboration, recognition and relationship building become a foundation for project development.

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[1] For reference, the term Indigenous is used throughout the document and refers to First Nation, Métis and Inuit peoples, each with their own distinct history, culture and language.

[2] Source: Announcement: Moody's: Indigenous involvement in large Canadian infrastructure projects set to increase, 2017.

[4] Source: NIEDB, 2019 Indigenous Economic Progress Report.

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Key contacts at Smith

Follow us on social

Tab 3

Taxonomy Roadmap Report

Mobilizing Finance for Sustainable Growth by Defining Green and Transition Investments

Sustainable Finance Action Council
September 2022

Our core knowledge partners:

CANADIAN CLIMATE INSTITUTE | L'INSTITUT CLIMATIQUE DU CANADA

Institute for Sustainable Finance

Contents

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ISBN 978-0-660-47217-1

Executive summary

Canada needs to scale up climate investment rapidly to achieve a net-zero economy by 2050. By some estimates, Canada's climate investment gap is as high as $115 billion annually. In recent years, many countries facing similar investment gaps have been developing taxonomies as part of broader policy frameworks, to help mobilize and accelerate the deployment of capital in support of achieving climate objectives.

Taxonomies can provide a standardized approach for benchmarking economic activities that are consistent with domestic and global climate goals. They set screening criteria that allow users, such as investors, companies and financial intermediaries, to evaluate the climate credentials of economic activities (e.g., in connection with investment and business decisions). Globally, taxonomies to date have largely focused on setting criteria for green activities; however, there are growing efforts to broaden the scope to transition activities. Taxonomies are frequently used to set standards for classifying climate-related financial instruments (e.g., green bonds), but, increasingly, they serve other use cases where the benchmarking feature is viewed as beneficial, including in the areas of climate risk management, net-zero transition planning and climate disclosure.

Given the urgency and complexity of transitioning to a net-zero economy, taxonomies can provide greater certainty about whether economic activities are aligned with credible, science-based transition pathways. They can liberate and accelerate the deployment of climate capital, mitigate greenwashing risks and promote the integrity of net-zero transitions. Against this, questions have emerged about whether taxonomies are overly prescriptive and burdensome, whether they can adequately accommodate market and technological innovations and how to reconcile urgency with what is often a multi-year effort to develop credible, science-based taxonomies.

In May 2021, the Sustainable Finance Action Council (SFAC) was mandated to provide advice and recommendations to Canada's Deputy Prime Minister and Minister of Finance and the Minister of Environment and Climate Change on defining green and transition investment (taxonomy). The SFAC confirmed and prioritized taxonomy as an early area of focus. The SFAC subsequently convened a Taxonomy Technical Experts Group (TTEG) to harness the leadership and expertise needed to deliver on this mandate item. Following substantial research and engagement, the TTEG prepared this report—the Taxonomy Roadmap Report—which was endorsed by the SFAC in September 2022.

The Taxonomy Roadmap Report contains 10 recommendations addressing the merits, design and implementation of a green and transition finance taxonomy for Canada. The recommendations are listed at the end of the Executive Summary and are followed by a summary of the taxonomy's value proposition.

Part 1: Opportunities and Risks of Taxonomy

The TTEG recommends the development of a green and transition finance taxonomy, given that the potential opportunities for Canada far outweigh the risks.

A Canadian taxonomy can:

- promote the integrity of Canada's net-zero transition by mobilizing capital in alignment with Canada's transition pathways and climate objectives;
- further develop Canada's sustainable finance market, and help mitigate greenwashing risks;
- serve multiple use cases across public and private sectors where there would be value in having a standardized tool to benchmark climate and transition activities; and
- ensure that Canada can engage and contribute to the global taxonomy dialogue, particularly as it relates to Canada's economic interest in promoting a smooth transition for high-emitting sectors and workers in these sectors.

A Canadian taxonomy can promote the integrity of Canada's net-zero transition by mobilizing capital in alignment with Canada's transition pathways and climate objectives.

The risks include whether the taxonomy can adequately accommodate market and technological innovations; the amount of resources and time needed to develop a credible taxonomy against the uncertainties about its future take-up and use; and the potential competitiveness implications that may arise with the United States, which does not appear to be developing a national taxonomy. Although these risks are not insignificant, they can largely be mitigated and managed through effective taxonomy design, implementation and leadership.

Part 2: Taxonomy Design

The taxonomy's design ultimately has significant implications for the taxonomy's overall effectiveness, credibility, usability and interoperability. As such, the TTEG considered how the Canadian green and transition finance taxonomy should be designed to maximize opportunities and minimize risks. The taxonomy framework architecture was developed in partnership with the Canadian Climate Institute.

Key Elements for Success

The table below summarizes the key elements that need to be in place, as a foundational matter, to position the Canadian taxonomy for success.

Governance and Leadership
✓ Joint federal government-financial sector leadership, with strong provincial and Indigenous participation, to maximize credibility and usability
✓ Governance that is transparent and results-oriented and that safeguards scientific integrity
✓ Well-resourced, with stable and predictable funding for the long term

Objectives, Usability and Credibility
✓ Prioritize climate mitigation but position the initiative to move quickly into other critical areas, such as climate adaptation and resilience
✓ Develop a versatile taxonomy that can support classifying climate-related financial instruments (e.g., bonds, loans)—as well as other private and public sector use cases
✓ Require issuing companies to commit to issuing net-zero plans, targets and climate disclosure, to ensure the taxonomy is supporting credible transitions
✓ Foster rigorous, scientific-based screening criteria that are reviewed regularly to reflect innovation and climate science
✓ Promote interoperability with major science-based taxonomies globally to foster market confidence and reduce market fragmentation

Governance

The recommended governance model draws from the governance frameworks frequently observed among financial sector standard-setting bodies and taxonomies globally—while being tailored to meet the distinct needs and circumstances of this Canadian initiative. The governance model is meant to be transparent and results-oriented and to safeguard the scientific integrity of the taxonomy and its technical criteria. In addition, the intended outcome is for the governance model and all other aspects of the Taxonomy initiative to comply with the *United Nations Declaration on the Rights of Indigenous Peoples Act*.

The governance model consists of the following elements:

- ***Taxonomy Council (oversight and approvals):*** led by the federal government and the financial sector, with strong provincial and Indigenous participation, the Council would be responsible for the governance, strategic direction and performance of the Taxonomy initiative. It would approve all taxonomy proposals for publication.
- ***Taxonomy Custodian (taxonomy developer):*** housed within an independent organization, the Custodian would carry out the technical work to develop taxonomy proposals for Council approval. The Council may direct revisions to taxonomy proposals (subject to rules of procedure) as long as these revisions do not undermine the scientific integrity of the taxonomy and its technical criteria. The Custodian would conduct education and awareness-raising activities as well as respond to feedback and technical inquiries.
- ***Technical Working Groups (external expertise):*** convened by the Custodian, these working groups would support the development of technical criteria that are scientifically robust, credible and usable. Working groups may be permanent or time-limited and would comprise a combination of industry, academics and subject matter experts.
- ***Stakeholder Advisory Forum (engagement and stakeholder relations):*** the Custodian would establish a Stakeholder Advisory Forum comprising stakeholders affected by the Taxonomy initiative (e.g., environmental not-for-profit organizations, climate advocates, communities, industry, market-based groups). The Forum would provide an opportunity for the Custodian to update stakeholders on the Taxonomy initiative, invite feedback on consultation drafts and discuss implementation issues.

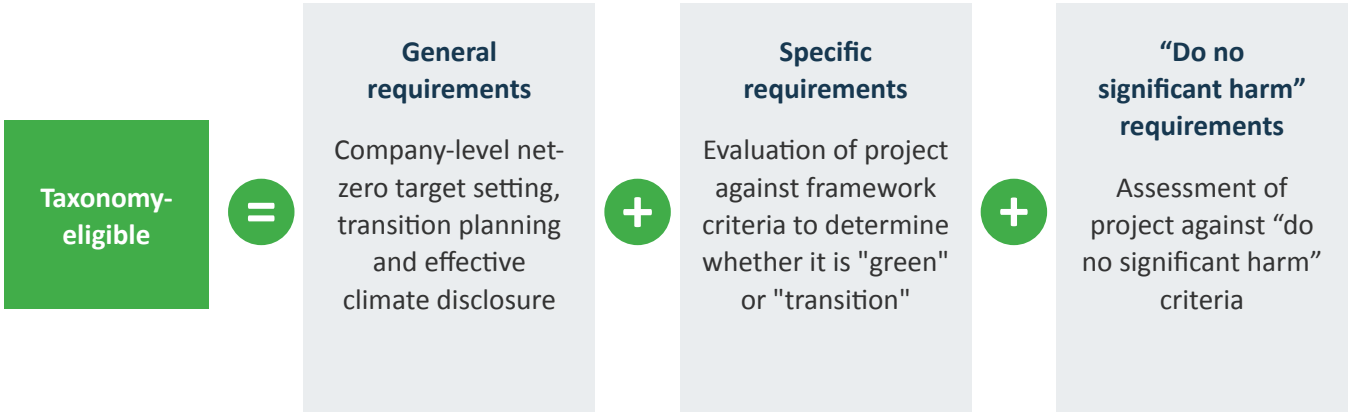
The governance model is meant to advance a voluntary taxonomy that is credible, usable and can serve multiple use cases. For greater certainty, neither the Council nor the Custodian would exercise an enforcement function in connection with the taxonomy's use.

Framework Architecture

The TTEG has developed a recommended framework architecture—in partnership with the Canadian Climate Institute—to guide the development of the Canadian green and transition finance taxonomy.

Under this framework, the taxonomy's objective is to foster the issuance of green and transition financial instruments that are consistent with Canada's goal of achieving net-zero emissions by 2050, and with the Paris-aligned commitment to keep global temperature rise to below 1.5 °C (based on pre-industrial levels) across all emissions categories (scopes 1, 2 and 3 emissions).[1]

Issuing companies must meet three categories of requirements to issue green and/or transition financial instruments under this taxonomy:



General requirements: Issuing companies must comply with requirements related to company-level net-zero emissions target setting, transition planning and climate disclosure, in keeping with emerging domestic regulatory requirements and international standards and best practices. These requirements are meant to ensure that projects financed under the taxonomy are supporting credible transitions.

Specific requirements: Issuing companies must use a categorization framework to determine whether the project meets the "green" or "transition" eligibility criteria under the taxonomy or is, by default, ineligible.[2]

1 It is recognized that there may be inconsistencies between federal emissions reduction targets and the global climate target of keeping emissions well below 1.5 °C (relative to pre-industrial levels). In its design and application, the taxonomy should err on the side of the most robust and scientifically-grounded emissions targets.

2 The expectation is that the categorization framework is the element of the taxonomy that would be developed to support other use cases where it would be beneficial to have a standardized tool to categorize green and transition projects. Despite its presentation here, its use should not be viewed as being limited to classifying climate-related financial instruments.

Eligible green projects for issuing green financial instruments:

- Projects with low or zero scope 1 and 2 emissions, low or zero downstream scope 3 emissions and that produce goods or services that are expected to see significant demand growth in the global low-carbon transition.[3] As a result, green projects also face relatively limited transition risks. Examples: green hydrogen production, afforestation projects, zero-emissions vehicle manufacturing (with low-emissions supply chains), electricity transmission infrastructure.

Eligible transition projects for issuing transition financial instruments:

- Projects that decarbonize sectors that historically have high scope 1 and 2 emissions (e.g., iron and steel, chemicals, aluminum and cement production). These are projects that—through making significant emissions reductions—improve the carbon competitiveness of activities exposed to higher carbon costs in the global low-carbon transition. These are projects that do not generate material downstream scope 3 emissions and operate in markets that are expected to remain stable or grow in the transition (due to a lack of economically and technically viable alternatives). Example: a steel production facility that installs an electric arc furnace, or constructing a new blue hydrogen facility with a high emissions capture rate.
- Projects that decarbonize sectors that historically have high downstream scope 3 emissions (e.g., oil and gas, or gas-fueled vehicles). These include projects that sell products that, due to high scope 3 emissions and the availability of viable alternatives, are expected to face decreasing global demand in transition. To remain transition-eligible, these projects must have well-defined lifespans that are approximately proportionate to the expected decline in global demand in representative 1.5 °C pathways. In the case of oil and gas projects, eligible projects must lead to significant emissions reductions from existing assets. Example: installing world-leading methane capture on existing natural gas production (with a short to moderate lifespan), or installing carbon capture, utilization and storage (CCUS) on an existing oilsands facility (with a short to moderate lifespan).

Ineligible projects:

- All projects related to solid fossil fuels. These are highly emissions-intensive activities that must be phased out immediately to align with representative 1.5 °C pathways (and even representative 2.0 °C pathways) and represent technological dead-ends, with economically and technically viable alternatives. Example: thermal coal mining, coal-fired power generation.
- Any projects that: create carbon lock-in and path dependency; are at a high risk of becoming stranded in net-zero pathways due to high scope 3 emissions and declining global demand; have scope 1 and 2 emissions that are inconsistent with net-zero pathways; and/or those that are unable to scale in transition. Example: exploration and development of new oil fields and industrial projects that fail to significantly reduce emissions.[4]

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3 Eligible green projects are defined as having low or zero scope 1 and 2 emissions, and low or zero downstream scope 3 emissions, whereas the piloted methodology for scoring green projects, introduced in this Report, uses low or zero lifecycle emissions to define eligible green projects, which includes both upstream and downstream scope 3 emissions. The use of lifecycle emissions is consistent with the thresholds used in the European Union's Sustainable Finance Taxonomy. It accounts for emissions across the entire supply chain (or lifecycle) of the good or service.

4 While the Taxonomy Custodian ultimately needs to develop precise definitions, criteria and thresholds for the types of ineligible oil and gas projects, the proposed definition in this document is based on the best available climate science and scenario analysis and uses the International Energy Agency's treatment of oil and gas, described in its 2021 report *Net Zero by 2050: A Roadmap for the Global Energy Sector*, as a starting point. See Box 5 in this Report for more details.

The examples presented above on what may be eligible or ineligible under the taxonomy, and those in the main body of the Report, are provided for illustrative purposes only. The examples are meant to enhance the readability of the Report and are not meant to bind future work and decisions. The final determination on these matters will be made by the Taxonomy Council, based on the technical work of the Taxonomy Custodian, which is expected to include a thorough review of existing and emerging net-zero scenarios and other technical, science-based considerations. A particular focus will be to establish science-based criteria, anchored in emissions thresholds and metrics, that clearly delineate between projects that are transition versus those that are ineligible. This work should examine the recent decision by the European Union to include natural gas and nuclear power generation projects in its sustainable finance (green) taxonomy, circumscribed by strict emissions thresholds and technical screening criteria, including, for natural gas, requiring the replacement of a high-emitting fossil fuel-powered facility with a lower-emitting natural gas power generation facility (where no renewable alternatives are feasible).

"Do no significant harm" requirement: The issuing company must assess the project against "do no significant harm" (DNSH) criteria to ensure the project is not detrimental to other environmental, social and governance (ESG) objectives (e.g., constructing wind turbines in a wetland). If a project violates the DNSH criteria, it would be ineligible for taxonomy financing. For example, a project categorized as green, which causes significant (non-climate) environmental damage, would be ineligible. To avoid creating duplication and additional work for issuers, the intention is to align the DNSH requirements with existing Canadian law (e.g., environment, labour and Indigenous Rights). The DNSH terminology and concept was pioneered in the European Union Sustainable Finance (green) Taxonomy and now features prominently in taxonomies globally.

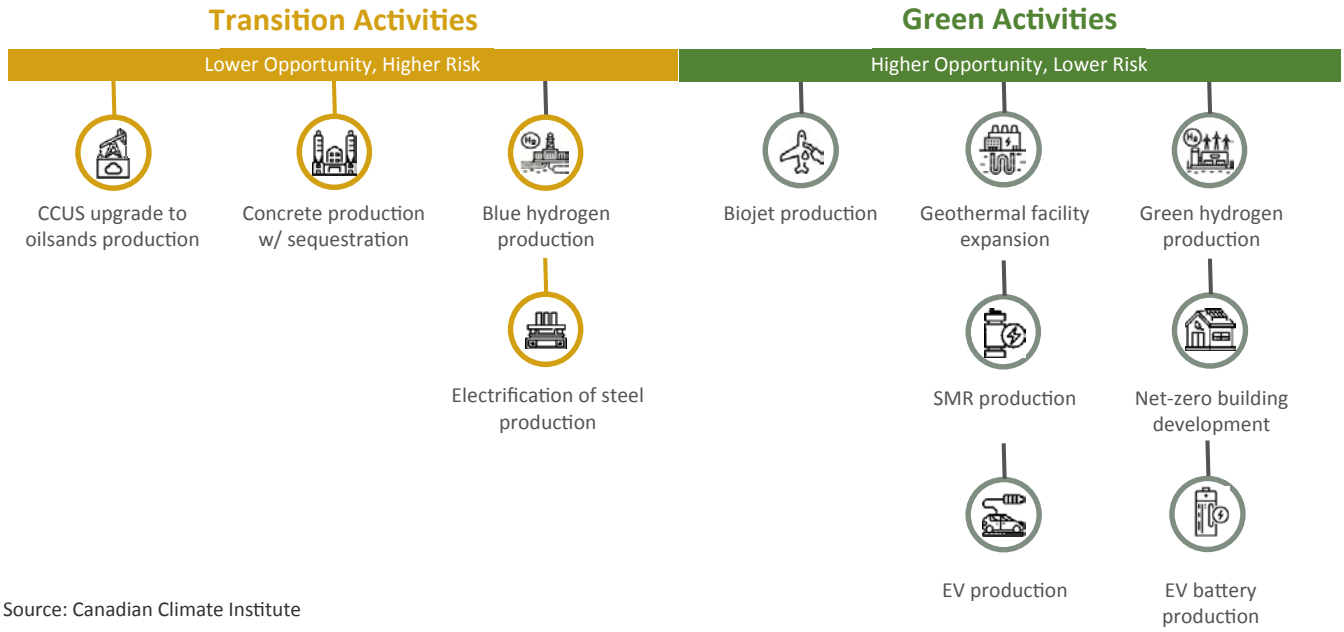
Evaluating Transition Opportunity and Risk

The projects that fall within the categories of green or transition under the taxonomy vary in terms of transition opportunity and risk, sometimes significantly. The framework introduced above only categorizes projects as either green or transition, and does not evaluate the relative merits of the projects within these categories. As a future priority, the Taxonomy initiative should consider developing a methodology and criteria so that eligible green and transition projects are differentiated, for the purposes of classifying issuances, according to their relative transition opportunity and risk.

This would enhance market information on the specific opportunity and risk profile of green and transition projects underlying these issuances, which would be particularly beneficial for investors. It would also promote the credibility of the taxonomy, particularly as it relates to transition, as it would differentiate projects within the transition category and demonstrate how eligibility may evolve over time in the face of regular reviews and more stringent criteria.

To provide a running start, this Report sets out a proposed methodology and criteria to classify green and transition financial instruments in a differentiated manner. Figure 1 below illustrates how this this could work in practice. It shows a range of hypothetical green and transition projects, evaluated based on their relative transition opportunity and risk. These examples are, however, for illustrative purposes only. The actual assessment of projects will require developing rigorous methodology and criteria, as well as identifying an appropriate delivery model for its use and administration.

Figure 1: Hypothetical Green and Transition Projects



Source: Canadian Climate Institute

Part 3: Implementation

There is an imperative to proceed expeditiously to develop and implement the Canadian green and transition finance taxonomy. Delays would present missed opportunities for Canada to mobilize green and transition capital in a meaningful way, as well as influence the global taxonomy dialogue. Proceeding expeditiously, however, cannot come at the expense of quality and credibility.

Given these considerations, the TTEG recommends that the taxonomy be developed and implemented in two discrete phases, as follows:

- **Phase 1** would see the SFAC publishing a short-form taxonomy covering priority sectors and activities by mid-2023, as well as laying the groundwork for the implementation of the taxonomy for the long term, including governance, funding and strategic planning.
- **Phase 2** would involve the full implementation of the Taxonomy initiative and publishing a substantially more complete and detailed taxonomy by end-2025 at the latest.

Phase 1 would be led by the SFAC and the TTEG. It would continue to rely on the existing governance arrangements, including engagement with the federal-provincial Official Sector Coordinating Group[5], while recognizing that balanced engagement will be needed with provincial governments, Indigenous rightsholders and leadership, industry and other stakeholders to support implementation towards Phase 2. This Report should be viewed as a foundational starting point for Phase 1, which will then be further developed and refined under SFAC leadership to arrive at a comprehensive taxonomy model for Phase 2 implementation.

5 Members of the Official Sector Coordinating Group are Finance Canada, Environment and Climate Change Canada, Bank of Canada, Office of the Superintendent of Financial Institutions, Autorité des marchés financiers (Québec), Ontario Securities Commission, Alberta Securities Commission, British Columbia Securities Commission, Financial Services Regulatory Authority of Ontario and the British Columbia Financial Services Authority.

Recommendations

1. We recommend that Canada develop a green and transition finance taxonomy.
2. We recommend that the Canadian green and transition finance taxonomy be led jointly by the federal government and the financial sector, with strong provincial and Indigenous participation, under a governance model that is transparent and results-oriented, safeguards the scientific integrity of the taxonomy and is resourced commensurate with the importance and scope of the initiative.
3. We recommend that the taxonomy be developed, in the first instance, to focus on supporting climate mitigation objectives and be constructed so that it may support multiple use cases. The taxonomy's criteria must be rigorous, objective and anchored in climate science to build and maintain international credibility. The criteria must be reviewed and updated regularly and support interoperability with other major science-based taxonomies.
4. We recommend the implementation of a three-tier governance model, with a Taxonomy Council (Tier one)—jointly governed by the federal government and financial sector, with strong provincial and Indigenous participation—responsible for the overall strategic direction, design and funding of the initiative; a Custodian (Tier two) that develops the taxonomy proposals and technical criteria; and, technical working groups and a Stakeholder Advisory Forum (Tier three) that provide expert input to the Custodian in support of the development and evolution of the taxonomy.
5. We recommend that the taxonomy's principal objective be to support the achievement of Canada's emissions reduction targets, consistent with keeping global temperature rise to below 1.5 °C (based on pre-industrial levels) across all emissions categories. Grounding the taxonomy with this ambitious climate objective can build and maintain international credibility and also help drive progress on other important economic, financial and social objectives.
6. We recommend that companies issuing green or transition financial instruments under the taxonomy be assessed against general requirements related to company-level net-zero target setting, transition planning and climate disclosure. These would be aligned with emerging domestic regulatory requirements and international standards and best practices.
7. We recommend that the green and transition finance taxonomy embody the categorization framework introduced in this Report, where projects are determined to be taxonomy-eligible only if material scope 1, 2 and 3 emissions, excluding carbon offsets, are aligned with representative pathways in a 1.5 °C scenario. Projects that lead to significant increases in emissions and make it difficult to reduce emissions in the future would be ineligible under the taxonomy.
8. We recommend that the eligibility requirements under the green and transition finance taxonomy include an assessment against "do no significant harm" criteria, which meet the unique needs of Canada and are informed by the European Union's Sustainable Finance Taxonomy, including, but not limited to, meeting minimum standards for respecting Indigenous rights and reconciliation as well as for supporting workers and communities in relation to just transition.

9. We recommend that the Taxonomy initiative consider, as a future priority, developing a methodology and criteria to differentiate the relative risk and opportunity of green and transition projects, to enhance investment decision-making and the taxonomy's sophistication and credibility.

10. We recommend that the green and transition finance taxonomy be developed in two discrete phases. Phase 1 would see the SFAC publishing a short-form taxonomy covering priority sectors and activities by mid-2023, as well as laying the groundwork for the implementation of the taxonomy for the long term, including governance, funding and strategic planning. Phase 2 would involve the full implementation of the Taxonomy initiative and publishing a substantially more complete and detailed taxonomy by end-2025 at the latest.

Value proposition

The development and implementation of a Canadian green and transition finance taxonomy would:

- provide definitions of classes of projects and activities that support credible efforts to limit emissions that are aligned with Canada's transition pathways to net zero;
- introduce standards and performance metrics that directly, clearly and credibly align with Canada's net-zero transition (for both mitigation and adaptation and resilience) to generate confidence and encourage capital flows in domestic and international financial markets;
- illustrate Canada's leadership in the transition of a resource-based economy, aligned with international expectations;
- consider the realities of various pathways to net zero (including detailed economic assessments of alternatives) and the global need for access to energy;
- promote Canada's leadership in net-zero technology and support efforts to improve the resilience and competitiveness of the Canadian economy in the global low-carbon transition and reinforce Canada's net-zero commitments;
- establish a single, standardized and market-informed taxonomy for Canada with common principles defining green and transition investment in a form that is easy to use and promotes confidence;
- assist investors with clearly disclosing their progress towards meeting their net-zero targets; and
- improve capital flows to green and transition projects.

Consistent with the findings of Canada's Expert Panel on Sustainable Finance, a Canadian taxonomy holds the potential to enable climate change opportunity and risk management to become business as usual in financial services and be embedded in everyday decisions, products and services—a key imperative to keeping global temperature rise to below 1.5 °C and improving Canada's resilience to the impacts from climate change.

Introduction

To build a net-zero economy by 2050, Canada will need to increase its climate investment to an estimated $125 billion to $140 billion annually, from its current levels of about $15 billion to $25 billion annually.[6] Scaling up climate investment to this magnitude will require significant actions by the public and private sectors—and having the right market infrastructure in place upfront.

Many countries have developed, or are in the process of developing, taxonomies—as a foundational tool, within a broader policy framework, to help mobilize and accelerate the deployment of capital to combat climate change. Given the urgency and complexity of the transition to net zero, taxonomies are viewed as a way to help liberate and expeditiously align capital and business activities in a manner consistent with national transition pathways and climate objectives.

Although approaches vary, taxonomies generally set criteria about which economic activities are climate-aligned. Taxonomies to date have largely focused on setting criteria for green activities; however, there are growing efforts to broaden the scope to transitional activities, given the importance of rapidly decarbonizing high-emitting sectors.[7] In this context, taxonomies have been most frequently used to set standards for classifying climate-related financial instruments (e.g., green bonds), to help mitigate greenwashing risks and direct capital to activities with substantive climate credentials. However, given that taxonomies serve to assess climate and transition performance against benchmark criteria, their use cases have been growing, including to inform prudential policy, climate risk management practices, net-zero transition planning and climate disclosure frameworks, among others.

Despite the rise of global taxonomy development, questions have emerged about whether taxonomies are overly prescriptive and burdensome, whether they can adequately accommodate market and technological innovations and how to reconcile urgency with what is often a multi-year effort to develop credible, science-based taxonomies.

6 Government of Canada, Budget 2022, page 60.

7 Singapore, South Africa and the Association of Southeast Asian Nations (ASEAN) are developing discrete transition categories for their taxonomies. Japan is focused on transition finance and has developed technical roadmaps to support transition finance in higher-emitting sectors. The European Union (EU) has recently decided to include some forms of natural gas and nuclear power generation in the EU Sustainable Finance Taxonomy, subject to strict screening criteria. The EU's Domestic Platform on Sustainable Finance has provided advice to the European Commission on how the concept of transition could be integrated into the EU Sustainable Finance Taxonomy.

In light of this context, and in keeping with the findings of Canada's Expert Panel on Sustainable Finance on taxonomy,[8] the Government of Canada mandated the Sustainable Finance Action Council (SFAC) in May 2021 to provide recommendations to Canada's Deputy Prime Minister and Minister of Finance and the Minister of Environment and Climate Change on defining green and transition investment (taxonomy). This item was included as part of a set of mandate items aimed at developing the foundational market infrastructure to scale up sustainable finance in Canada. The mandate has since been updated to develop and report on strategies for aligning private sector capital with the transition to net zero.[9]

The SFAC confirmed and prioritized taxonomy as an early area of focus,[10] and interpreted the mandate item to encompass two elements: to provide a recommendation on whether, based on the merits, a green and transition finance taxonomy would be an appropriate tool for the Canadian context; and, if in the affirmative, to provide recommendations on the optimal taxonomy design for Canada, including the key elements for success, the governance model and the framework architecture for the taxonomy.

Process

In summer 2021, the SFAC established the Taxonomy Technical Experts Group (TTEG) to harness the leadership and expertise to advance this mandate item. The TTEG comprises a subset of SFAC participating organizations and includes official sector representation and a number of external knowledge partners.

The TTEG subsequently engaged in extensive discussions about the theoretical and applied merits of a Canadian taxonomy as well as how such a taxonomy could be best designed, in light of domestic and international best practices and what would be appropriate for the Canadian context. These discussions were informed by a range of inputs and contributions, including:

- a green and transition taxonomy framework developed by the Canadian Climate Institute;
- a report titled, "Global Financial Taxonomies: Considerations for the Canadian Context," commissioned by the CSA Group and prepared by the Climate Bonds Initiative; [11]
- an in-depth review of domestic and international reports on transition finance and taxonomies, a comparative survey of taxonomy and standard-setting governance models and an overview of domestic and international sustainable finance trends and developments (see Annex 3) prepared by the Institute for Sustainable Finance;

8 Recommendation 9.1 of the Final Report of the Expert Panel on Sustainable Finance states the following: "Convene key stakeholders to develop Canadian green and transition-oriented fixed income taxonomies." The Final Report also notes that Canada should begin by adopting an international green taxonomy that aligns with its global investment and trade priorities. It should then work either independently, or with other countries with similar resource endowments, to develop supplemental coverage for industry transition activities that are essential to Canada but not captured under current criteria. Canada's taxonomies should be granular enough to avoid ambiguity, while flexible enough to evolve with policy, demand and innovation.

9 The SFAC's Terms of Reference (mandate) were updated in May 2022.

10 The SFAC Chair confirmed taxonomy as a priority for the SFAC and an early area of focus through discussions with participating organizations and the results of a pre-work questionnaire.

11 This report presents research on 21 international taxonomies and highlights the approaches and characteristics that may be useful in developing a Canadian taxonomy.

- education sessions and discussions with domestic and international experts on a range of topics related to taxonomy; and
- lessons learned from the private sector initiative to develop a transition finance taxonomy under the guidance of the CSA Group.[12]

This Taxonomy Roadmap Report ("Report") reflects the outcome of this work process. The TTEG finalized the Report following a series of feedback sessions conducted with taxonomy stakeholders in summer 2022. The SFAC Plenary considered and endorsed the Report in September 2022.

About This Report

The Report consists of three parts, each with analysis and discussion supporting recommendations for consideration and action. Part One introduces the concept of a green and transition finance taxonomy and evaluates its opportunities and risks for Canada. Part Two discusses how such a taxonomy should be designed for the Canadian context, with sections on key elements for success, governance and framework architecture. Part Three describes how to implement the taxonomy. A glossary of key terminology is provided at the end of the Report. The Report is accompanied by a research compendium that contains the research and supplementary documentation that were prepared in support of the TTEG's work.

Acknowledgement

The SFAC Chair, Kathy Bardswick, the TTEG Chair, Barbara Zvan, and the SFAC broadly would like to thank the TTEG members for their deep commitment to this exercise and the significant time and effort that they devoted to developing this comprehensive Report. We would like to thank our external knowledge partners for sharing their expertise and insights throughout this work process, and the important contributions that they made to support the development of this Report. These are the Institute for Sustainable Finance, the Canadian Climate Institute, the CSA Group and the Global Risk Institute. The Canadian Climate Institute led the analysis informing the taxonomy framework architecture developed in this Report. We are grateful to have benefited from the separate private sector initiative on transition finance taxonomy, which was conducted under the guidance of the CSA Group. Although concluded without the publication of a consensus document, this private sector initiative was an important foundational undertaking, which helped to inform and accelerate this work process. Finally, we would like to thank the domestic and international experts who were kind enough to provide their perspectives on taxonomy, as well as the climate, research, Indigenous, industry and regulatory stakeholders and rightsholders who participated in feedback sessions on this Report.

12 This included feedback sessions on the approach taken with targeted stakeholders (with environmental and emission mitigation expertise) not involved in the initiative.

Part One: Opportunities and Risks of Taxonomy

This section introduces the concept of a green and transition finance taxonomy. It then sets out the TTEG's assessment of the potential opportunities and risks associated with developing and implementing such a taxonomy in Canada. It concludes with a discussion of the findings and a recommendation.

A Primer on Green and Transition Finance Taxonomy

A green and transition finance taxonomy is a tool that is meant to help mobilize the allocation of capital to economic activities that are consistent with national transition pathways and climate mitigation objectives. It can be advanced by government, the private sector, or both, acting jointly.

This form of taxonomy establishes criteria, frequently organized by major economic sector, about which economic activities (assets, projects or revenue segments) are:

- **Green:** low- or zero-emitting activities (e.g., green hydrogen, solar and wind energy generation) or those that enable them (e.g., electricity transmission lines, hydrogen pipelines); and
- **Transition:** decarbonizing emission-intensive activities that are critical for sectoral transformation and consistent with a net-zero, 1.5 °C transition pathway (e.g., installing lower-emitting (electric) furnaces to produce steel).

Taxonomies also, by omission or exclusion, provide information about which activities present high risks to the climate transition by virtue of fostering the potential for stranded assets, perpetuating carbon lock-in and/or being unaligned with transition pathways to net zero.

Emissions categories in connection with green, transition or ineligible activities under the taxonomy can encompass direct scope 1 emissions (occur from owned or controlled sources (e.g., emissions generated onsite at a factory)), indirect scope 2 emissions (occur from the use of purchased energy (e.g., emissions associated with purchased electricity, used at a factory)) and value chain scope 3 emissions (occur in the value chain, including both upstream and downstream emissions (e.g., emissions associated with all the upstream inputs used at a factory, along with their consumption or disposal downstream)).

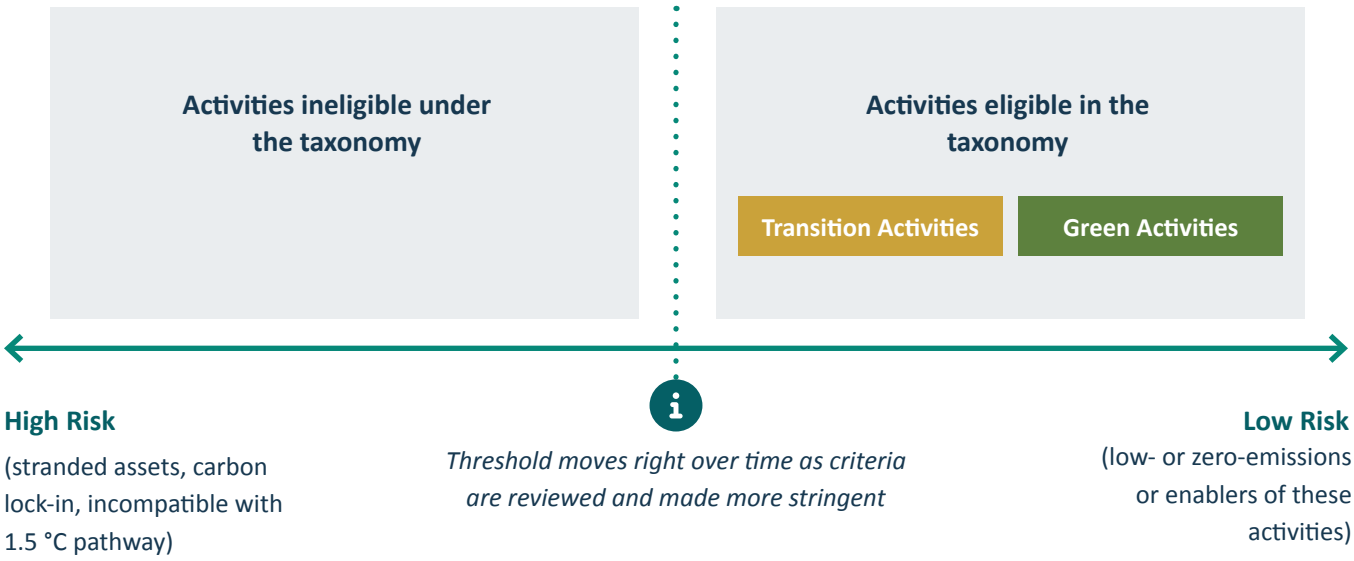
The criteria can be set by relying on high-level principles, lists of approved activities, technical screening criteria or a combination. The criteria can either be static or dynamic. Dynamic criteria are subject to a regular review process, where the criteria are made more stringent over time to reflect technological advancement and the need for increasing ambition as climate targets draw closer. Diagram 1 provides an overview of a green and transition finance taxonomy with dynamic criteria.

Taken together, the criteria are meant to support a theory of economy-wide change aimed at rapidly expanding green activities, decarbonizing higher-emitting sectors where possible and moving away from economic activities that are inconsistent with global climate objectives and carry significant transition risk.

The taxonomy can be used by investors, companies and financial intermediaries to assess the green and transition credentials of investment and business decisions, as well as to classify green and transition economic activities to support the issuance of corresponding financial instruments (a particular focus of this Report and the taxonomy architecture presented in Part Two).

It can also be used by government policymakers and regulators in multiple areas, including informing climate-related prudential frameworks (risk oversight and capital requirements), net-zero transition planning, sovereign green and transition bond issuance frameworks and climate disclosure requirements, among other use cases.

Diagram 1: Illustrative Example of a Green and Transition Finance Taxonomy Framework with Dynamic Criteria



Source: Canadian Climate Institute

The Opportunities of Taxonomy

Mobilizing green and transition capital

A Canadian taxonomy would help to mobilize and accelerate the deployment of capital in a manner that reflects Canada's transition pathways.

The challenge in Canada is not a shortage of transition capital per se, but the risk that capital is funding corporate transitions that are not well aligned with Canada's transition pathways. In the absence of a taxonomy to promote and facilitate alignment, it is unclear whether capital is being allocated in furtherance of achieving Canada's transition pathways or in an incremental, suboptimal manner. This uncertainty represents a material risk to the integrity of Canada's transition to net zero. A Canadian taxonomy would reduce this risk by setting robust criteria in keeping with transition pathways and government policy (see Table 1 for illustrative alignment examples).

Table 1: Opportunities to Align Taxonomy with Federal and Provincial Initiatives

(Initiatives are indicative and not exhaustive)

Federal initiatives	Description
Clean Fuel Regulations	The taxonomy could set criteria for the development and use of clean fuels in accordance with the Clean Fuel Regulations.
Carbon Capture, Utilization and Storage (CCUS) Tax Credit	The definition of eligible CCUS projects in the taxonomy could be aligned with the eligibility criteria set out in the CCUS tax credit.
Proposed Clean Electricity Standard (in support of a net-zero electricity sector)	The criteria prescribed in the taxonomy for emitting electricity generators could be set in accordance with the proposed Clean Electricity Standard that is presently under development.
Small Modular Reactors Action Plan	The taxonomy could define the development and deployment of small modular reactors as an eligible green activity.

Provincial initiatives	Description
Alberta Hydrogen Roadmap	The taxonomy could set emissions intensity thresholds and criteria for clean hydrogen in accordance with the considerations and vision set out in the Roadmap (e.g., low-carbon intensity production pathways that are cost effective and capable of large-scale production volumes).
CleanBC Industrial Incentive Program	The sector-specific emissions performance benchmarks set out in the CleanBC Industrial Incentive Program could be used to inform the emissions benchmarks and thresholds in the taxonomy.
Nuclear Green Bond Frameworks	The taxonomy's criteria related to power generation could be informed by the Ontario Power Generation and Bruce Power green bond frameworks, second party opinions and associated issuances.

Growing Canada's transition finance market for the long term

A Canadian taxonomy would foster investor confidence and support the growth of Canada's transition finance market. This is critical to ensuring Canadian companies have access to a reliable source of capital over time to support credible net-zero transition plans.

Canada's transition finance market is small and faces greenwashing risks. The transition bond segment of the transition finance market does not exist, having had only one transition bond come to market to date.[13] Meanwhile, the sustainability-linked bond segment has grown rapidly in recent years but is now facing criticisms of greenwashing.[14] The structure gives issuers control over how the proceeds are used as long as the forward-oriented sustainability targets are met. If these targets are not met, issuers will face a financial penalty, which is typically a 25 to 50 basis point increase on the bond's coupon payment.[15] Questions have been raised, in connection with some Canadian and global issuances, about the ambition of the targets and the adequacy of the penalty for noncompliance.

To govern the issuance of green and transition bonds and loans, and to inform measures and metrics for sustainability-linked products, a Canadian taxonomy would accelerate the growth of this market in Canada. Growing the transition finance market is critical to ensuring that Canadian companies, especially those in hard-to-abate sectors, have access to a reliable source of capital to fund credible transition plans over the long term. Although companies may be presently able to raise capital from traditional sources to fund transition plans that may not align with Canada's transition pathways, this may not always be the case, as stakeholders increase pressure for greater alignment and accountability, assisted by disclosure and accountability frameworks that will become more widespread and sophisticated. As pressure increases, and market expectations evolve, there is value in having an established transition finance market, anchored in a science-based taxonomy that can be used to support credible transition plans.

Enhancing private and public sector climate frameworks

A Canadian taxonomy would provide a strong foundation upon which to inform and enhance climate frameworks across the private and public sectors; it is a versatile tool with a multitude of use cases (see Table 2).

Within the private sector, a taxonomy can be used to set standards for classifying climate-related financial instruments (bonds and loans). It can be used to highlight investments gaps and transition risks and opportunities, assess the transition performance of portfolio companies, support scenario analyses, enhance financed emissions reporting and improve climate data.

13 In 2021, Seaspan, a British Columbia–based marine transportation company, raised $750 million from a blue transition bond to fund low-carbon container-ship construction and develop low-carbon fuels for marine vessels.

14 Annex 3 provides additional information on sustainability-linked bond issuances in Canada and globally, as part of a broader overview of key developments in the sustainable finance market over the last number of years.

15 See the S&P Global Ratings research note How Sustainability-Linked Debt Has Become a New Asset Class, published on April 28, 2021.

Table 2: A Multitude of Use Cases to Support Canada's Climate Objectives

- Climate and economic policy
- Net-zero transition plans
- Carbon accounting/financed emissions reporting
- Scenario analyses
- Risk management
- Climate stress testing
- Climate disclosure
- Data standardization
- Classifying green and transition financial instruments
- Procurement policy
- Bank and insurance capital requirements
- Green budgeting
- Climate-related tax policy
- Blended finance
- Trade policies (e.g., border carbon adjustments)

Source: NATIXIS, The New Geography of Taxonomies: A Global Standard-Setting Race, November 2021.

The taxonomy can also be used as a key input in developing credible transition plans in line with emerging best practices. Box 1 highlights how taxonomies can be used by financial institutions to develop transition plans in keeping with the best practice framework being advanced by the Glasgow Financial Alliance for Net Zero (GFANZ). As a practical example, PSP Investments' in-house taxonomy devotes a full dimension to transition planning. It includes a three-phase categorization system in relation to portfolio companies, namely "no transition", "early transition" and "mature transition" (or aligned with the Science Based Targets initiative (SBTi).[16]

Within government, a taxonomy can inform the issuance of sovereign green and transition financial instruments (e.g., transition bonds). It can be used by prudential supervisors to inform the development of prudential policy, including capital requirements and risk management. It may also be used by prudential supervisors to help standardize and improve the types of information and data filed by supervised entities in relation to green and transition financial exposures and related areas. Better information and data could support more robust climate risk analysis and, in turn, inform policy development. Finally, it can enrich climate disclosure requirements (e.g., reporting on taxonomy alignment); inform fiscal, tax, trade and export development policies; and enhance green- and transition-related procurement practices.

16 The SBTi defines and promotes best practice in emissions reductions and net-zero targets in line with climate science; provides technical assistance and expert resources to companies that set science-based targets in line with the latest climate science; and brings together a team of experts to provide companies with independent assessment and validation of targets.

Box 1: GFANZ's Proposed Recommendations and Guidance on Financial Institution Net-Zero Transition Plans

GFANZ proposes that financial institutions globally develop transitions plans that lead to reductions in emissions and support net-zero transition through financing or enabling:

1. the development and scaling of climate solutions to replace high-emitting technologies, activities or services;
2. companies that are already aligned to a 1.5 °C pathway;
3. the transition of real-economy firms according to transparent and robust net-zero transition plans in line with 1.5 °C-aligned sectoral pathways; and
4. the accelerated, managed phase out of high-emitting physical assets.

Taxonomies can enhance transition plans by establishing criteria to help align financing decisions and targets with these four priority areas. They can serve to establish what the GFANZ refers to as "guardrails" to safeguard against greenwashing, in particular in relation to elements 3. and 4. that deal with financing related to transition and managed phase outs. More broadly, they can contribute to other elements of GFANZ's transition plan framework, including governance, implementation strategy and metrics.

Source: GFANZ. *Recommendations and Guidance on Financial Institution Net-Zero Transition Plans*, Consultation Paper, June 2022.

Influencing the Global Taxonomy Dialogue

The global importance of taxonomy as a tool to mobilize and accelerate the deployment of capital towards climate objectives is significant and growing. Canada cannot influence and shape the global taxonomy dialogue without its own taxonomy.

There are 30 countries at different stages of taxonomy development (implemented, in development or being considered), including most of the Group of Seven (G7), the Group of Twenty (G20) and many developing economies (see Table 3). Among these, the EU Sustainable Finance Taxonomy is the most advanced and viewed as a global best practice. Taxonomy is a key framework item identified in the G20 Sustainable Finance Roadmap and a focus of the International Platform on Sustainable Finance, which has developed a common-ground taxonomy to promote taxonomy interoperability globally.[17]

17 See the G20 Sustainable Finance Roadmap and the International Platform on Sustainable Finance documentation on the common-ground taxonomy. The G20 Sustainable Finance Working Group has developed principles for taxonomy development, which are presented in Box 2 later in the report.

Central banks and prudential supervisors globally are increasingly interested in taxonomies. The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) recently released the results of a survey showing that well over half of the 25 central bank respondents (55 per cent) and 24 supervisor respondents (60 per cent) are planning to use or are considering using taxonomies.[18] In addition, the NGFS has issued two reports over the last year, in connection with its work program on bridging climate data gaps, indicating that taxonomies are an important building block for improving data reliability and comparability on a global basis.[19] The reports note the need to intensify the development of taxonomies globally, in a manner that promotes interoperability and standardization, with a view to creating a baseline global taxonomy over time.

Taxonomies are featuring prominently in the private sector. Some suggest there are as many as 200 taxonomies in use globally by financial institutions and other private sector entities (e.g., PSP Investments, BlackRock).[20]

The first phase of global taxonomy development has been on defining green activities; the second phase, which is underway, is to broaden taxonomies to define transition activities in the context of higher-emitting sectors. This second phase is more challenging, and of particular strategic interest to Canada, given the importance of resource and industrial sectors to Canada's economy.

A Canadian taxonomy would allow Canada to promote its interests in the global taxonomy dialogue and advance interoperability, as appropriate, with other major science-based taxonomies. In the absence of a Canadian taxonomy, there is risk that certain sectors and activities of importance to Canada are omitted, or that criteria are set that do not reflect the likely transition pathways of Canada.

"The EU Taxonomy is emerging as a green standard that serves as a 'common language' between companies and investors. As of August 24th [2022], a total of 365 companies representing $6.2 trillion in market cap have reported Taxonomy-eligibility, followed by 147 companies ($3.1 trillion market cap) reporting Taxonomy-alignment a year ahead of time. Recognition and appreciation of the influence of the Taxonomy have been growing among companies in annual reporting and on earnings calls. Companies recognize that they can benefit from easier access to capital or lower cost of capital given their high Taxonomy exposure. Meanwhile, some companies with low Taxonomy relevance have noted the potential for financial and reputational risk."

- Global Investment Bank

18 See the NGFS report titled, Enhancing Market Transparency in Green and Transition Finance, published in April 2022. The NGFS is a network of 116 central banks and prudential supervisors dedicated to exchanging experiences, sharing best practices and contributing to the development of environment and climate risk management in the financial sector and to mobilizing mainstream finance to support the transition towards a sustainable economy. The Office of the Superintendent of Financial Institutions and the Bank of Canada are members.

19 The NGFS established a data work program in July 2020 to identify climate-related data needs and gaps, and to propose policy recommendations. In connection with this work, the NGFS issued a progress report in May 2021 and a final report in July 2022.

20 E3G, Expanding Common Ground: Deepening International Cooperation on Taxonomies, February 2022.

Table 3: Global Taxonomy Development

Taxonomy in Place	Taxonomy in Draft Development	Taxonomy Under Consideration	Other Taxonomy Initiatives
• Bangladesh • Brazil[a] • China • Colombia • European Union (27 member states) • Georgia • Indonesia • Kazakhstan • Korea (Republic of) • Malaysia[b] • Mongolia • New Zealand[c] • Philippines • Russian Federation • South Africa • Sri Lanka	• Australia[d] • Chile • Dominican Republic • India • Japan[e] • Kyrgyzstan • Mexico • Panama • Singapore • Thailand • United Kingdom • Vietnam	• Canada • Egypt • Hong Kong	• Association of Southeast Asian Nations (ASEAN) Taxonomy • Climate Bonds Initiative Taxonomy • International Platform on Sustainable Finance Common Ground Taxonomy • International Organization for Standardization (ISO) Taxonomy • Working Group on Sustainable Finance Taxonomies in Latin America and the Caribbean[f]

a) Brazil's taxonomy was developed by the Brazilian Federation of Banks (FEBRABAN), which represents the Brazilian banking industry.

b) Malaysia's central bank, Bank Negara, has finalized and issued a principles-based taxonomy focused on climate change; Malaysia's Securities Commission is developing a Sustainable and Responsible Investment Taxonomy, which is under consultation.

c) New Zealand's taxonomy is focused on the agricultural sector (livestock and crops); it was developed by a Steering Group comprising banks and the Ministry for Primary Industries. It appears that New Zealand's public-private Centre for Sustainable Finance is committed to working with government partners to develop a comprehensive sustainable investment taxonomy by end-2023.

d) The Australian Sustainable Finance Institute is supporting an industry-led initiative to develop an Australian sustainable finance taxonomy, working closely with government and financial sector regulators.

e) Japan has published the "Basic Guidelines on Climate Transition Finance" that define transition finance and set out disclosure expectations for issuing transition-related financial instruments. The annex of this publication provides ten roadmaps for nine hard-to-abate sectors, which are meant to serve as a reference point for capital raising and investment in the transition context.

f) Launched in June 2022 by Costa Rica's Minister of Environment and Energy and Chair of the Forum of Ministers of Environment of Latin America and the Caribbean, the Working Group on Sustainable Finance Taxonomies in Latin America and the Caribbean (GTT- LAC) will work to develop a common framework of sustainable finance taxonomies for the region.

Source: internal research, with reference to the Climate Bonds Initiative publication Global Green Taxonomy Development, Alignment, and Implementation, 2022.

The Risks of Taxonomy

Resource Intensity

Developing, implementing and maintaining a credible taxonomy would be time-consuming and resource-intensive. The initiative would be a substantive, long-term commitment, which would effectively involve fostering the development of an entirely new segment of Canada's capital markets focused on transition finance. It would require a permanent governance structure, a large team of expert and technical staff and a stable funding model. It would involve going sector by sector to set criteria for green and transition economic activities. Taxonomy proposals would require targeted and public consultations, and published versions would need to be supported by detailed guidance as well as education and awareness-raising activities. There would need to be ongoing maintenance and review activities. Although advancing a taxonomy would be a significant undertaking, there is deep knowledge and expertise in Canada in taxonomy-relevant areas that could be leveraged to accelerate taxonomy development efforts in the first instance and to support the initiative over time.

Uncertain Support

The level of support for a green and transition finance taxonomy among companies remains unclear. In the absence of policy signals (e.g., supervisory guidance, regulation), it is unclear how much demand there would be for the taxonomy. There is risk that companies, especially those in higher-emitting sectors, may bypass the rigours of the taxonomy in favour of continuing to raise capital for transition purposes through the use of traditional financial instruments. In addition, some oil and gas companies are currently "cash rich" and may not have an immediate need for the taxonomy.

Pace of Innovation

The taxonomy is too prescriptive and rules-based and may not be able to keep pace with innovation. There is risk that the taxonomy's criteria may not be able to be reviewed and updated enough to keep pace with the rate of technological and market innovation. The taxonomy may prevent capital from being allocated to areas at the technological frontier of green and transition, especially in comparison to more principles-based approaches. There may also be challenges in designing a sufficiently comprehensive taxonomy to cover all the activities, projects and assets to which it should reasonably apply.

Alignment With the United States

The United States (U.S.) has no stated plans to develop a taxonomy, which raises policy questions and design challenges for Canada. In March 2021, the U.S. Climate Envoy expressed interest in the taxonomy concept but indicated that any approach would need to safeguard U.S. capital markets from excessive regulation.[21] Since that time, the U.S. has been publicly silent on taxonomy, appearing to be in favour of more market-centric, principles-based approaches to transition, with a focus on strong climate disclosure, including net-zero transition plans.

Although the U.S. does not appear to be proceeding with a national taxonomy at this time, U.S. investment managers that actively manage "green" or "sustainable" bond mandates will generally have evaluation frameworks (or taxonomies) to determine what is eligible for their fund. The green bond indices also employ methodologies to determine eligibility. For example, the S&P 500 Green Bond Indices are composed of a universe of global bonds classified as "green" by the Climate Bonds Initiative (CBI) and subject to eligibility criteria.

21 The only reported public comment on the prospect of a U.S. taxonomy came from Climate Envoy John Kerry following climate discussions with European leaders in March 2021 (see the Financial Times article John Kerry Warns EU Against Carbon Border Tax, March 11, 2021). He indicated that no final decision had been made on the topic and expected that the Treasury Secretary and the Chair of the Securities and Exchange Commission may weigh in on this topic and other areas related to sustainable finance. He noted that any approach to a taxonomy would need to safeguard against excessive regulation.

The development of a Canadian taxonomy should be advanced to support achieving Canadian climate objectives and transition pathways but be mindful of the potential cost and competitiveness implications for Canadian market participants, and to seek interoperability wherever possible with the capital markets in the U.S. This Report is advancing a taxonomy for voluntary use, at least in the first instance, which means that any potential cost and competitiveness implications are not binding. However, for the taxonomy to be most useful to Canadian market participants, it is critical that taxonomy development be grounded in climate science, while being mindful of level playing field and interoperability considerations with U.S. capital markets and consistency with U.S. climate policy at federal and state levels.

Discussion and Recommendation

The assessment indicates that the opportunities for Canada of a green and transition finance taxonomy are significant.

The taxonomy can:

- promote the integrity of Canada's net-zero transition by mobilizing capital in alignment with Canada's transition pathways and climate objectives;
- further develop Canada's sustainable finance market, and help mitigate greenwashing risks;
- serve multiple use cases across public and private sectors where there would be value in having a standardized tool to benchmark climate and transition activities; and
- ensure that Canada can engage and contribute to the global taxonomy dialogue, particularly as it relates to Canada's economic interest in promoting a smooth transition for high-emitting sectors and workers in these sectors.

Against this, the assessment of the risks indicates they are not insignificant—but they can be largely minimized and managed through commitment and leadership from government and the financial sector, as well as through effective taxonomy design and implementation. Overall, the opportunities of a well-designed taxonomy far outweigh the risks.

Recommendation 1

We recommend that Canada develop a green and transition finance taxonomy.

Part Two: Taxonomy Design

In light of the affirmative recommendation, the TTEG then considered how the Canadian green and transition finance taxonomy should be designed to maximize the opportunities and minimize the risks and costs. The taxonomy framework architecture was developed in partnership with the Canadian Climate Institute.

Section A below identifies the key elements that are needed for the taxonomy to be successful. These deal with strategic considerations regarding leadership, governance and resourcing, as well as objectives and design considerations to promote credibility and usability.

The subsequent two sections (B and C) apply these requirements. The first sets out the proposed model to govern the Canadian Taxonomy initiative and the second describes the proposed framework architecture to guide taxonomy development, including the objectives and requirements for the issuance of green- and transition-classified financial instruments.

The overall approach is consistent with the general principles for taxonomy development set by the G20 Sustainable Finance Working Group (see Box 2).

Box 2: G20 Sustainable Finance Working Group:

Principles for Taxonomy Development

1. Ensure material positive contributions to sustainability goals and focus on outcomes;
2. Avoid negative contribution to other sustainability goals;
3. Be dynamic in adjustments reflecting changes in policies, technologies and state of the transition;
4. Reflect good governance and transparency;
5. Be science-based for environmental goals and science- or evidence-based for other sustainability issues; and
6. Address transition considerations.

Source: G20 Sustainable Finance Roadmap, October 2021

A) Key Elements for Success

Leadership and Governance

Joint Federal Government–Financial Sector Leadership: The leadership and commitment of the federal government and the financial sector, with strong provincial and Indigenous participation, would create optimal conditions for taxonomy development and implementation.

- Federal leadership would help ensure that the taxonomy is grounded in national climate objectives and that it informs climate and economic policy. It would bring credibility to the taxonomy exercise, including, importantly, from international stakeholders, and it would have a range of levers at its disposal to support the widespread adoption of the taxonomy. Strong provincial and Indigenous participation would reinforce many of these areas. The vast majority of taxonomies developed to date have been by governments (see Table 3 above), and, according to the World Bank and the Organisation for Economic Co-operation and Development (OECD), taxonomies are most effective when implemented alongside supporting regulation/incentives and within a broader policy framework.[22]
- Financial sector leadership would ensure that the taxonomy is usable, credible and fit for purpose, and that it is adopted as the financial sector standard for classifying green and transition financial instruments.

Effective Governance: The taxonomy's governance model needs to be transparent and results-oriented and to safeguard the scientific integrity of the taxonomy. The governance should be informed by the best-practice models observed among many financial standard-setting bodies globally and taxonomy initiatives. It should ensure that industry and technical experts inform the development of the taxonomy and that there are opportunities for a range of Canadian stakeholders to provide perspectives on the work.

Adequate Resourcing: The initiative needs dedicated and stable funding over the long term, on a level consistent with the substantive nature of the undertaking. A proper taxonomy initiative cannot be developed without a well-funded custodian that is able to attract and retain the expert staff needed to develop the framework and, in turn, develop the guidance and undertake the outreach necessary to promote its use.

Recommendation 2

We recommend that the Canadian green and transition finance taxonomy be led jointly by the federal government and the financial sector, with strong provincial and Indigenous participation, under a governance model that is transparent and results-oriented, safeguards the scientific integrity of the taxonomy, and is resourced commensurate with the importance and scope of the initiative.

22 The World Bank publication *Developing a National Green Taxonomy: A World Bank Guide* notes that "[t]he taxonomy should have the stature of an official guideline or policy for filtering such investments in both the public and private sectors," and that "[i]nternational experience also suggests a green taxonomy may not succeed in catalyzing the targeted investments to the extent desired without supporting policy and/or regulations." The OECD publication *Developing Sustainable Finance Definitions and Taxonomies* notes that "… taxonomies are only one part of the range of policies needed to mobilise investment, but that they have significant potential to mobilise investment in the context of a broader supportive policy framework," and that "[s]ustainable finance taxonomies can be tools to articulate sustainability policy objectives, and are a potentially important element of sustainability policies."

Objectives, Credibility and Usability

Climate Mitigation as the Priority Objective: Given the climate urgency, the taxonomy should focus, in the first instance, on setting green and transition criteria to mobilize private capital in support of Canada's transition pathways and climate mitigation objectives. The taxonomy should aim to set criteria for all sectors and activities that have material opportunities and risks in transition. Over time, the taxonomy should be expanded to cover other environmental and social objectives, including, importantly, climate adaptation, which is a critical issue for Canada and which would benefit from the taxonomy's benchmarking features. Many taxonomies globally cover multiple objectives.

Promoting Versatility in Use Cases: Taxonomy development should focus on classifying "green" and "transition" activities for the purposes of issuing financial instruments, including bonds and loans. Although the use case is oriented towards market participants, especially investors, companies and financial intermediaries, this does not mean the taxonomy should be confined to this single use case. Since the taxonomy sets criteria to assess whether an activity is green or transition, the taxonomy can serve many other use cases (see Table 2 above) and should be developed, as such, to facilitate and promote its broader application.

Net-Zero Commitments and Reporting: The company issuing financial instruments under the taxonomy should be required to commit to net zero by 2050 and then publish a corresponding net-zero transition plan with science-based emissions targets, followed by annual progress reporting. Specifically, the requirements should be based on emerging domestic regulatory requirements and international standards and best practices. The company should also disclose climate risks and opportunities to investors and other stakeholders in accordance with the Task Force on Climate-Related Financial Disclosures (TCFD) and forthcoming Canadian regulatory requirements and global sustainability reporting standards. In terms of issuance reporting, the taxonomy should set issuance verification requirements in line with current international best practices and, among these, encourage the use of the higher standard of third-party assurance at both the pre- and post-issuance stages.

Rigorous Screening Criteria:

- ***Objective, Science-Based:*** The criteria used to determine whether an activity qualifies as green or transition under the taxonomy should be based on Canada's transition pathways and aligned with the federal government's Emissions Reduction Plan and the goals of the Paris Agreement, including trying to limit the global average temperature increase to 1.5 °C above pre-industrial levels. The criteria should be specific, clearly defined and science-based, using thresholds (not principles) that are technology-agnostic to the greatest extent possible. The criteria and thresholds should require the reporting of standardized metrics and qualitative information, which would establish clear data requirements and support the intra- and inter-industry comparability of taxonomy alignment and post-issuance reporting.
- ***Adapt With Science and Innovation:*** The domain of climate mitigation is evolving rapidly, and it is important that the taxonomy remains relevant and up to date. To that end, the taxonomy should be reviewed regularly to ensure that the criteria and other requirements reflect the most recent climate science, government policy and technological and market innovations. For example, the European Commission is required to review the screening criteria of the European Union's sustainable finance taxonomy at prescribed intervals, namely at least every three years for transition activities and at least every five years for green activities. It is anticipated that, through this process, some activities that were previously considered taxonomy-aligned would lose their eligibility, as criteria becomes more stringent over time.

- ***Process to Consider Ad Hoc Inclusion Requests:*** In addition to regular reviews, the developers of the taxonomy should consider the merits of a mechanism that would allow for the review of material ad hoc requests from market participants to scope in one-off activities, projects and assets for inclusion in the taxonomy. As it is difficult to set criteria that would cover all intended green and transition activities, a review mechanism would provide discretion to grant ad hoc requests, in keeping with the taxonomy's climate objectives and climate science.

"Do No Significant Harm" Principle: Criteria should be set to require taxonomy users to screen out green and transition activities being considered for investment if they do significant harm to other ESG objectives (e.g., to Indigenous reconciliation (e.g., constructing a green hydrogen–enabled pipeline network in proximity to Indigenous communities absent appropriate consultation/approvals), to climate adaptation (e.g., constructing a solar farm in a projected future flood plain) or to biodiversity (e.g., building wind turbines in a wetland). The objective is to prevent myopic investment processes where the objective of climate mitigation is advanced without regard for other important objectives.

Global Interoperability: Canada should seek to align the common features and criteria of the Canadian taxonomy with the science-based taxonomies of other major jurisdictions, including, for example, the European Union's sustainable finance taxonomy. A Canadian taxonomy that is comparable and interoperable with other major taxonomies globally would promote market confidence and reduce market fragmentation. It would be attractive to international investors and promote Canada as a destination for green and transition investment.

Recommendation 3

We recommend that the taxonomy be developed, in the first instance, to focus on supporting climate mitigation objectives and be constructed so that it may support multiple use cases. The taxonomy's criteria must be rigorous, objective and anchored in climate science to build and maintain international credibility. The criteria must be reviewed and updated regularly and support interoperability with other major science-based taxonomies.

B) Governance Model

Effective governance is critical to the long-term success of the Taxonomy initiative. In keeping with the identified elements for success, the TTEG has sought to develop a governance model for the taxonomy that is transparent and results-oriented and that safeguards the scientific integrity of its criteria. The aim is to have a model that results in an objective, science-based taxonomy, issued in the form of voluntary guidance, which can be used to inform a range of use cases, with a first focus on classifying eligible green and transition activities to support issuing corresponding financial instruments.

The model set out below is based on the three-tier governance framework frequently observed among financial sector standard-setting bodies and taxonomy initiatives globally (see Annex 1 for examples), while being tailored to meet the distinct needs and circumstances of Canada (Diagram 2 below provides a summary of the governance model). Given the voluntary nature of the taxonomy, the governance model does not contemplate a compliance review and enforcement function, although its use may ultimately intersect with federal and provincials laws (e.g., issuing financial instruments under the taxonomy would be subject to provincial securities laws that are administered by provincial securities regulators, which play a compliance and enforcement function).

The three-tier model generally consists of:

1. a high-level body that is accountable for the initiative and provides strategic direction and oversight (Tier one);
2. a technical custodian body with expert and technical staff that develops the standards and technical criteria (Tier two); and
3. technical advisory groups comprising independent external experts that support the custodian's technical work, as well as forums and due process initiatives to obtain stakeholder feedback on consultation drafts (Tier three).

Tier One: Taxonomy Council

Mandate

The Taxonomy Council ("Council") would be responsible for the governance, strategic direction and performance of the Taxonomy initiative. It would be jointly governed by the federal government and Canada's financial sector, with strong provincial and Indigenous participation.

The Council would set the high-level objectives, design principles and priorities for the development of the taxonomy. The Taxonomy Custodian ("Custodian"), as the chief technical architect of the taxonomy (role described below), would develop taxonomy proposals in accordance with these parameters and strategic direction. The Council would periodically engage with the federal Net-Zero Advisory Body as an input into its priorities and planning activities.

The Council would consider for approval all taxonomy proposals submitted to it by the Custodian for publication. In reviewing a taxonomy proposal for the first time, the Council could approve it outright or send it back to the Custodian with feedback for revision. If the proposal is not approved by the Council after reconsideration, the Council would have the authority to direct the Custodian to make revisions to the taxonomy as long as these revisions do not undermine the scientific integrity of the taxonomy (e.g., the feedback could be related to the practicality of usage).[23] The Council, for example, could not direct the revision of criteria to include a prescribed set of economic activities where the scientific evidence suggests they would not be consistent with a 1.5 °C transition pathway. To the greatest extent possible, it is critical that the Council not interfere with the Custodian's technical function.

The process to consider and approve taxonomy proposals would be established in formal voting procedures set by the Council. Under these procedures, federal representatives would hold a simple majority of the votes, reflecting the initiative's public interest dimension and for credibility purposes (especially for outside observers). Upon establishment, the Council would convene an advisory committee of external experts (e.g., distinguished academics, researchers) that Council members could engage to support their assessment of taxonomy proposals as well as advise on other matters related to their duties on the Council.

The Council would review and approve the business plan, budget and other corporate reporting in respect of the Custodian and the initiative more broadly. The federal government and the financial sector would be responsible for ensuring the initiative is adequately funded, both at start-up and over time. In this context, a funding model

23 The Council, in its rules of procedure, will set the number of times a proposal can be resubmitted by the Custodian before the Council can direct the Custodian to revise the proposal. The rules would also circumscribe the use of this directive authority by the Council.

where the primary beneficiaries of the taxonomy—the financial sector, industry and government—share its costs may be appropriate. There may also be opportunities that could be explored in the future to monetize elements of the taxonomy work (e.g., sale of taxonomy-related publications).

The Council may direct the Custodian to undertake periodic reviews of financial instruments issued under the taxonomy to identify any systemic issues. The Council may consider taking actions aimed at addressing systemic issues identified during these reviews, including issuing a public statement or referring the matter to the appropriate authorities.

Composition

The federal government and the SFAC (initially) would be responsible for setting the overarching composition of the Council, and each would appoint its respective members to the Council.

Federal representation should encompass those departments and agencies whose mandates motivate a direct policy and/regulatory interest in the Taxonomy initiative. This should include, at minimum, the Office of the Superintendent of Financial Institutions, the Bank of Canada, Finance Canada, Environment and Climate Change Canada and Natural Resources Canada. Federal representation should be permanent and assigned to senior-level positions (not specific individuals) within participating federal departments and agencies.

Financial sector representation should encompass each of the major segments of Canada's financial sector, namely deposit-taking institutions, insurance companies and pension funds (core financial sector users of the taxonomy). Financial sector representation would be assigned to senior executives, selected, in the first instance, by the SFAC to represent the interests of their designated financial sector segment, and the term would be of a fixed duration (e.g., four years). As financial sector representation would rotate over time, the Council would be expected to set procedures for nominating and appointing new financial sector representatives (e.g., create a committee to identify and nominate new financial sector representatives for Council approval).

The Council would benefit from the representation of provincial governments, to promote the development and implementation of a Canadian taxonomy in a manner that is mindful of provincial considerations, including climate and transition policies and resource development. It would also crucially benefit from Indigenous representation given the taxonomy's potential impact on the economies and interests of Indigenous Peoples. The intended outcome would be for all aspects of the Taxonomy initiative to comply with the United Nations *Declaration on the Rights of Indigenous Peoples Act.*[24] Prior to finalizing the governance model, the federal government should engage with provincial governments and Indigenous rightsholders and leadership to determine how they wish to participate and be represented on the Council.

Tier Two: Taxonomy Custodian

The Custodian would be responsible for carrying out the technical work to develop taxonomy proposals for the Council's approval. The proposals must be conducted in accordance with the high-level objectives, design principles and priorities set by the Council.

24 This Act became law in June 2021, which requires the federal government to take all measures necessary to ensure the laws of Canada are consistent with UNDRIP. Article 18 of UNDRIP states that "[i]ndigenous peoples have the right to participate in decision-making in matters which would affect their rights, through representatives chosen by themselves in accordance with their own procedures, as well as to maintain and develop their own indigenous decision-making institutions," and Article 19 indicates that "[s]tates shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them."

The Custodian should be established within an independent, non-partisan organization, to have some pre-established separation from governments, the financial sector and other interests. The Custodian should have expertise in climate change and the environment, as well as an established network of experts in taxonomy-relevant areas, which could be engaged for research and advice purposes and as potential participants on technical working groups to support taxonomy development (discussed below).

The Custodian would house the taxonomy's management and technical staff, at levels in keeping with the scope of the exercise and funding levels, as set by the Council. The staff would be responsible for leading the development of the taxonomy architecture (structure, content presentation, methodologies) as well as developing the technical criteria. This would involve work planning and priority setting and establishing the technical working groups of experts needed to support the taxonomy work, based on an understood approach established with the Council. The Custodian would set an internal process, acceptable to the Council, for the review of draft taxonomy proposals before they are released for public consultation and subsequently submitted to the Council for approval. Following the taxonomy's publication, the Custodian would lead efforts to develop guidance and educate stakeholders on the taxonomy's content, as well as establish a service delivery function to respond to feedback and technical inquiries.

The Custodian would establish a process to regularly review and update the technical criteria to reflect the most recent climate science, government policy and technological and market innovations. It would also establish a formal process to consider material ad hoc requests from market participants to scope in one-off activities, projects and assets for inclusion, limited to those that reflect the taxonomy's climate objectives and are in keeping with climate science. The Council would be responsible for approving changes to the criteria and granting ad hoc requests, on the advice and recommendation of the Custodian.

Tier Three:

Technical Working Groups

The Custodian would be responsible for convening technical working groups that would support the development of technical criteria that are scientifically robust, credible and usable. Working groups may be permanent or of fixed duration and would comprise the right mix of industry, academics and subject matter experts. The working groups may be organized by sector (e.g., oil and gas, mining), topic/theme (e.g., clean technology) and/or by stakeholder group (e.g., Indigenous matters). The working groups' terms of reference and composition should aim to appropriately balance rigour and efficiency.

Stakeholder Advisory Forum

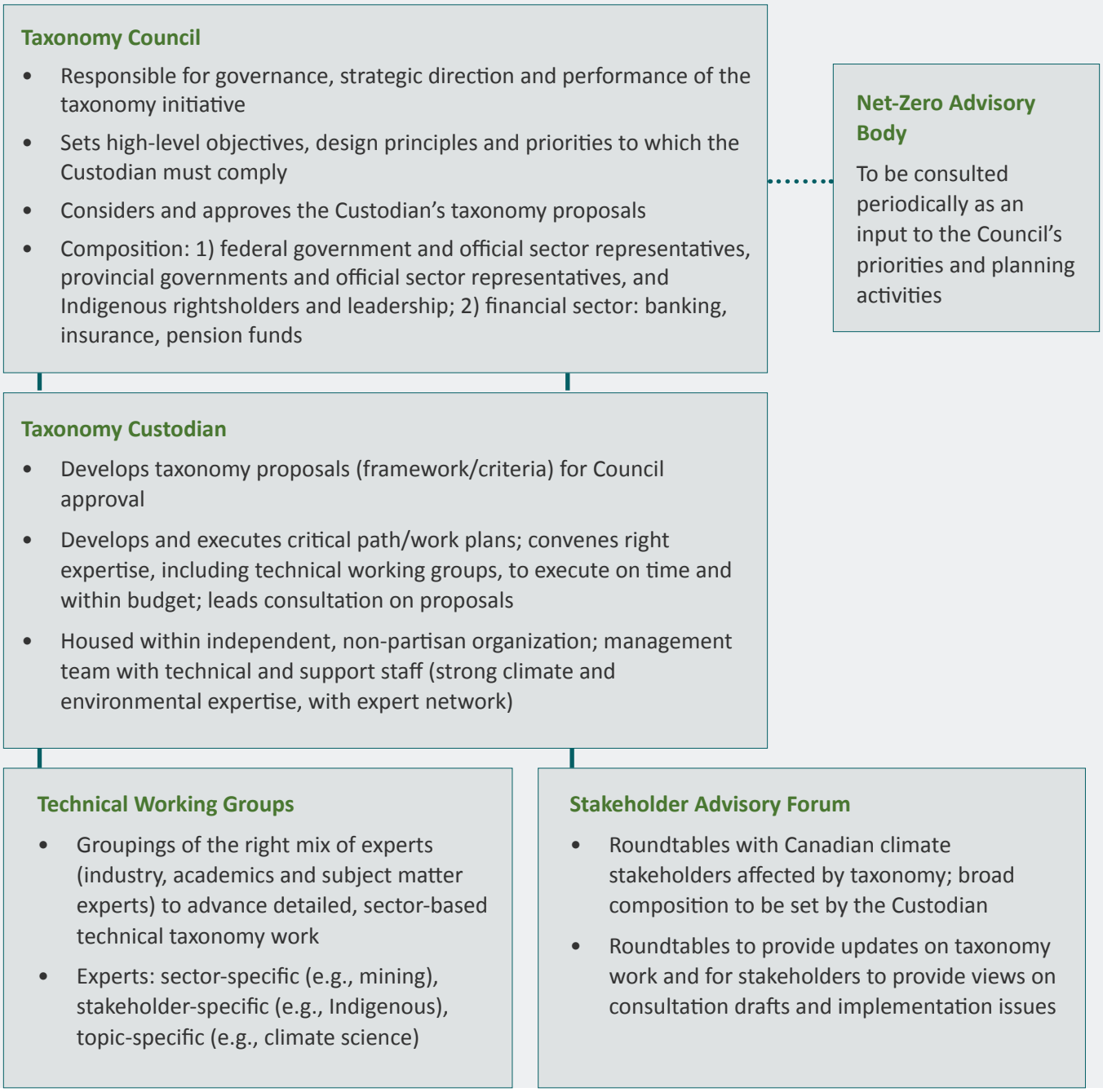
The Custodian would establish a Stakeholder Advisory Forum ("Forum") comprising stakeholders affected by the Taxonomy initiative, such as environmental not-for profit organizations, climate advocates and just transition stakeholders (e.g., industries, workers and communities). In setting the composition, the Custodian should seek to establish a broadly representative Forum.

The Forum would provide an opportunity for the Custodian to update stakeholders on the status and priorities of the Taxonomy initiative. It would be used to invite feedback on consultation drafts as well as to discuss matters related to the implementation of the taxonomy (e.g., greenwashing, "do no significant harm" principle). The Forum would not be meant as a body to develop technical criteria (this is the role of the technical working groups above), but rather to ensure that those affected by the taxonomy have an opportunity to engage with the Custodian in a dedicated forum at prescribed intervals.

Recommendation 4

We recommend the implementation of a three-tier governance model, with a Taxonomy Council (Tier one)—jointly governed by the federal government and financial sector, with strong provincial and Indigenous participation—responsible for the overall strategic direction, design and funding of the initiative; a Custodian (Tier two) that develops the taxonomy proposals and technical criteria; and, technical working groups and a Stakeholder Advisory Forum (Tier three) that provide expert input to the Custodian in support of the development of the taxonomy.

Diagram 2: Overview of the Proposed Taxonomy Governance Model



C) Framework Architecture

This section describes the recommended framework architecture to guide the development of the Canadian green and transition finance taxonomy. It sets out the objectives of the taxonomy and discusses the general and specific requirements that must be met by companies to issue green and/or transition financial instruments under the taxonomy. It can also be used to classify bonds, equity and loans held in a portfolio. The Canadian Climate Institute developed the framework architecture based on its research on domestic net-zero pathways and the implications for Canada of global low carbon shifts.

The general requirements deal with the preparation of company-level transition plans and climate disclosure to ensure that financing under the taxonomy is supporting credible transitions. The specific requirements then set out a multi-step process to evaluate whether projects are taxonomy-eligible and do no significant harm to other ESG objectives.

To support interoperability, the taxonomy builds on approaches used in other countries while incorporating new elements and thinking based on the unique attributes of the Canadian economy and the pathway to achieving net-zero emissions by mid-century. Although the section focuses on a single use case (i.e., standards for issuing green and transition financial instruments), the intention is for the framework to support other public and private sector use cases (e.g., net-zero transition planning, climate disclosure).

The framework—the criteria, metrics and thresholds—is meant to provide a strong foundation upon which to advance Canada's taxonomy agenda. It should, however, not be interpreted as final, but as an informed starting point for additional research, consultation and refinement as the initiative progresses.

Objectives

The taxonomy framework is intended to guide the issuance of green and transition financial instruments that are consistent with Canada's goal of achieving net-zero emissions by 2050, along with the interim emissions reduction milestones required to achieve this goal. More broadly, the framework is designed to be consistent with the Paris-aligned global commitment to keep global temperature rise to below 1.5 °C (based on pre-industrial levels).[25]

The framework addresses the entire lifecycle of greenhouse gas (GHG) emissions associated with economic activities, including scope 1, 2 and 3 emissions (see Box 3). Scope 3 emissions are not part of Canada's federal emissions reduction targets, but they must feature prominently in the taxonomy because they are a critical transition issue for Canada's financial sector (financed emissions) as well as other sectors, including oil and gas (emissions from third-party use or consumption).

25 SFAC recognizes that there may be inconsistencies between the emissions reduction targets established by Canadian governments and the global climate target of keeping emissions well below 1.5 °C (relative to pre-industrial levels). In its design and application, the taxonomy should err on the side of the most robust and scientifically-grounded emissions targets.

Box 3: Use of emission 'scopes' in the taxonomy

GHG emissions are categorized into three scopes by the GHG Protocol, which provides the most widely used standards for carbon accounting. Scope 1 emissions are direct emissions that occur from owned or controlled sources. Scope 2 emissions are indirect emissions that occur from the generation of purchased energy. Scope 3 emissions are indirect emissions outside of scope 2 that occur in the value chain of the reporting entity, including both upstream and downstream emissions.

The taxonomy framework includes all three scopes. While most federal and provincial mitigation targets and policies do not include scope 3 emissions, it is an increasingly important part of understanding transition risk. For example, industries whose products generate significant downstream (scope 3) emissions are vulnerable to declining product demand as climate policies become more stringent and place carbon constraints on consumers.

Scope 3 emissions are an important issue for financial institutions, as they encompass the emissions in their lending and investment portfolios (i.e., financed emissions). As a reflection of their importance, GFANZ requires members to report on all three emissions categories. Scope 3 emissions are also a major focal point in global efforts to improve climate-related disclosures, particularly in global capital markets. The ISSB is currently developing a draft global climate disclosure standard that would require companies to disclose scope 3 emissions (ISSB, 2022). The Partnership for Carbon Accounting Financials (PCAF) standard was launched in 2020 to help financial institutions consistently measure and disclose scope 3 emissions associated with their loans and investments. Scope 3 financed emissions are often the most significant part of the emissions inventory of financial institutions and thus a prime means to assess climate-related risks and opportunities.

The taxonomy focuses primarily on the role of downstream scope 3 emissions when assessing the demand-side risk of projects. This reflects the fact that downstream emissions typically represent a significant portion of scope 3 emissions of products facing material demand-side risk. Burning fossil fuels in internal combustion engines, for example, represents 70 per cent to 80 per cent of their total lifecycle emissions (IHS Markit, 2020), which would be considered the downstream scope 3 emissions for oil producers and refiners. Also, companies have little or no control over downstream emissions, whereas they can exert influence over upstream suppliers.

The credibility of the Canadian green and transition finance taxonomy hinges on this ambitious and stringent climate objective. The taxonomy is designed to set the highest possible standard and provide a path that aligns with the global transition, and global capital markets that will facilitate the transition. Where there is ambiguity, the taxonomy should err on the side of maintaining this international credibility.

In addition to the principal climate mitigation objective, the taxonomy should seek to support the advancement of other objectives that are critical to Canada in the transition, including:

- **Economic:** improving the resilience and competitiveness of the Canadian economy in the global low-carbon transition;
- **Financial:** reducing transition risks in the financial system and mobilizing private sector capital to align with the global transition; and
- **Social:** smoothing the transition for workers and their families, communities and Indigenous Peoples.

In many cases, achieving success on the taxonomy's climate objective can simultaneously drive progress on these other, secondary objectives. For example, a taxonomy with stringent emissions intensity thresholds can help mobilize capital to decarbonize existing sources of economic growth, such as emissions-intensive manufacturing. Such investments can improve the competitiveness of the Canadian economy in the global low-carbon transition, reduce transition risk for the financial sector, and also help smooth the transition for workers by maintaining employment opportunities. A taxonomy that helps mobilize capital toward new sources of growth (e.g., clean hydrogen, agtech and alternative proteins, batteries and storage) can achieve similar benefits.

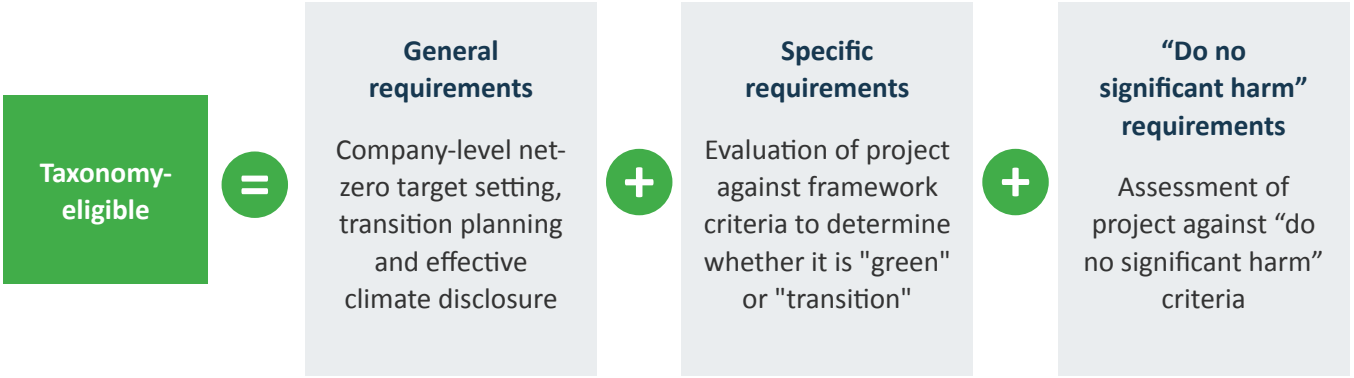
In addition to these primary and secondary objectives, consideration was given as to whether energy security and affordability should be explicitly integrated into the taxonomy. Although these are important objectives, it was decided not to recommend their integration since the taxonomy would be unable to treat them appropriately given their broad scope and complexity. There is also risk that the trade-offs that would be introduced among these objectives would reduce the clarity and information value of the taxonomy, which is fundamentally about advancing climate objectives in a science-based manner. There also does not appear to be a global taxonomy precedent for such integration. Ultimately, the taxonomy cannot successfully incorporate all critical energy transition issues, and its use should not prevent the development and utilization of different tools to consider other objectives.

Recommendation 5

We recommend that the taxonomy's principal objective be to support the achievement of Canada's emissions reduction targets, consistent with keeping global temperature rise to below 1.5 °C (based on pre-industrial levels) across all emissions categories. Grounding the taxonomy with this ambitious climate objective can build and maintain international credibility and also help drive progress on other important economic, financial and social objectives.

Issuance Requirements

Issuing companies must meet three categories of requirements to issue green and transition financial instruments under the taxonomy:



1) General Requirements

Each issuing company must comply with general requirements related to company-level net-zero target setting, transition planning and climate disclosure. These requirements are meant to ensure that the project financed under the taxonomy is being undertaken to support credible, science-based transition plans, rather than in an ad hoc, incremental manner.

Under the taxonomy, issuing companies are required to:

- set a credible and science-based, net-zero emissions target for 2050 or earlier and an interim target for 2030 on the path toward net zero (and preferably with one or more additional interim targets between 2030 and 2050);
- develop a preliminary net-zero transition plan within 12 months of the issuance and a comprehensive, science-based net-zero transition plan within 24 months thereof;
- report publicly on progress annually and review and update plans every five years; and
- prepare climate disclosures and make them public, based, in the near term, on the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD) and then in compliance with emerging domestic regulatory requirements and international standards.

As the subject matter of some of these requirements is evolving rapidly, it is important that, prior to the finalization of this category of requirements, they are reviewed and updated by the Taxonomy Custodian to reflect any best-practice developments arising from the work presently underway in this area. In this regard, noteworthy initiatives include the following:

- The Office of the Superintendent of Financial Institutions (OSFI) has issued a draft of *Guideline B-15: Climate Risk Management*, which sets out its supervisory expectations for federally regulated financial institutions in relation to climate-related governance, risk management practices, disclosure requirements and net-zero transition plans.
- The Canadian Securities Administrators (CSA) is developing a national climate-related disclosure rule for public companies; it recently published guidance for investment funds on climate and other ESG disclosure practices.

- The Government of Canada launched the Net-Zero Challenge in August 2022. Businesses that join the Challenge must commit to developing and implementing credible and effective plans to transition their facilities and operations to net-zero emissions by 2050.[26] Financial institutions that have joined GFANZ are able to join the Net-Zero Challenge through an accelerated process.
- The ISSB was established at COP26 in November 2021 to develop and maintain global sustainability reporting standards. As a first priority, it is developing standards for the disclosure of general sustainability matters as well as climate change. In response to these developments, the Canadian accounting, auditing and assurance oversight councils announced the establishment of the Canadian Sustainability Standards Board (CSSB), which will become operational by April 2023.[27] The CSSB will be responsible for reviewing and recognizing future ISSB standards for application in Canada.
- GFANZ is preparing recommendations and guidance for financial institutions on net-zero transition plans (See Box 1 presented earlier in the Report).

The Taxonomy Custodian should develop guidance on the technical aspects of the general issuance requirements that ultimately are not prescribed by regulators, but are nevertheless critical to the integrity of the taxonomy framework and voluntary issuance process. This could include, for example, providing greater specificity on what terms like "comprehensive", "credible" and "science-based" mean in the context of transition plans and net-zero commitments. It may also elaborate on the application of the general requirements in the context of smaller issuers. The guidance should be informed by domestic and international best practices, including the established global process guidelines for issuing climate-related financial instruments, which reference the use of external party and independent technical reviews for issuance verification purposes.

Recommendation 6

We recommend that companies issuing green or transition financial instruments under the taxonomy be assessed against general requirements related to company-level net-zero target setting, transition planning and climate disclosure. These would be aligned with emerging domestic regulatory requirements and international standards and best practices.

2) Specific Issuance Requirements

The issuing company must determine whether the project meets the "green" or "transition" eligibility criteria under the taxonomy, or is ineligible. To do so, Figure 2 introduces a categorization framework to evaluate and determine the eligibility of projects. The questions in this categorization framework focus on a project's absolute greenhouse gas emissions. The framework evaluates the materiality of a project's scope 1, 2 and 3 emissions, where "materiality" is based on representative pathways in a 1.5 °C scenario (see Box 4).

26 The core requirements for companies to join the Net-Zero Challenge are to: develop a preliminary net-zero plan within 12 months of joining the initiative and, subsequently, a comprehensive plan within 24 months thereof; set at least two interim emission-reduction targets consistent with achieving net zero by 2050 or earlier; and report on progress annually and review and update the net-zero plan at least once every five years.

27 See the news release titled, "Accounting, Audit, and Assurance Standards Oversight Councils announce Canadian Sustainability Standards Board."

Box 4: Determining the materiality of greenhouse gas emissions for individual projects

While the concept of materiality is well-grounded in financial and capital markets, determining the specific thresholds for material scope 1, 2 and 3 emissions are challenging. Materiality also has important implications for determining whether a project is categorized as "green" or "transition". In some cases, the question of materiality is clear. A new green hydrogen project, for example, could have low or zero scope 1 and 2 emissions and would have limited or no scope 3 emissions. Other projects, however, may not be so clear. For example, if a new blue hydrogen facility can capture and sequester 90 per cent of its emissions, are the remaining 10 per cent considered material?

Detailed and transparent materiality criteria will need to be set to categorize activities. This process could, for example, be informed by emerging best practices in climate-related disclosures, which are based on scope 1, 2 and 3 emissions. It could also use scenario analysis to assess general categories of activities or sectors in 1.5 °C pathways, similar to the approach in the Canadian Climate Institute's 2021 report, entitled *Sink or Swim*. In these scenarios, it is clear that steel, aluminum and cement manufacturers face significant scope 1 and 2 emissions, whereas oil and gas producers and refiners face significant downstream scope 3 emissions.

Transition-eligible projects

Starting at the top of the categorization framework in ***Figure 2***, the first question for a project is whether it faces or enables ***demand-side risk*** in representative 1.5 °C pathways (step #1). That is, it evaluates whether the project sells into or depends on markets that are expected to contract over time in the global transition due to decreasing demand.

Effectively, this question relates to the materiality of a project's downstream scope 3 emissions. Under a global transition, demand for products that produce significant emissions when consumed or used will decrease. These scope 3 emissions are particularly important for evaluating the transition risk of particular assets or financial products because they are emissions that individual projects and producers cannot control or address. As demand shifts toward lower-carbon options—whether due to policy, technology or consumer preferences—downstream scope 3 emissions become a significant source of transition risk and therefore need to be treated separately in the taxonomy framework.

While most fossil fuel–related projects would answer "yes" to this first question due to significant downstream emissions from the use of their products, it could include other activities, such as traditional automotive manufacturing, where demand is expected to decline significantly for these products in the transition. It could also include peat mining, which can release large quantities of stored CO_2 in end-use applications (e.g., horticulture, electricity generation).

Other types of projects may answer "yes" to this question that may be less intuitive. Building new natural gas distribution infrastructure, for example, could enable demand-side risk by locking in the consumption of natural gas for space heating and cooking and, as a result, increase the risk of the asset becoming stranded in the future. It is worth noting, however, that if future advancements in technology provide pathways to mitigate or eliminate scope 3 emissions from the combustion of fossil fuels, projects would no longer answer "yes" to this first question in the taxonomy framework.

For projects that face demand-side risk, the next question (step #2 in Figure 2) reflects ***demand-side risk time horizons*** (in a representative 1.5 °C pathway). The timing of when global demand decreases in the transition will be different for different products, which affects the relative transition risk associated with the investment. A commodity with widely available lower-carbon substitutes, such as thermal coal, faces material demand-side risk today in a net-zero pathway: it must be phased out immediately to stay on a 1.5 °C pathway and is therefore ineligible under the taxonomy.

New oil and natural gas extraction projects are also expected to be ineligible because they embody significant demand-side risk that materializes in the short term under a net-zero pathway. New extraction projects are capital intensive (especially in Canada), often with multi-decade payback periods. And, given that global demand for oil and gas must start declining in the 2020s under a 1.5 °C pathway, new oil and gas projects appear inconsistent with the transition under current climate scenarios.

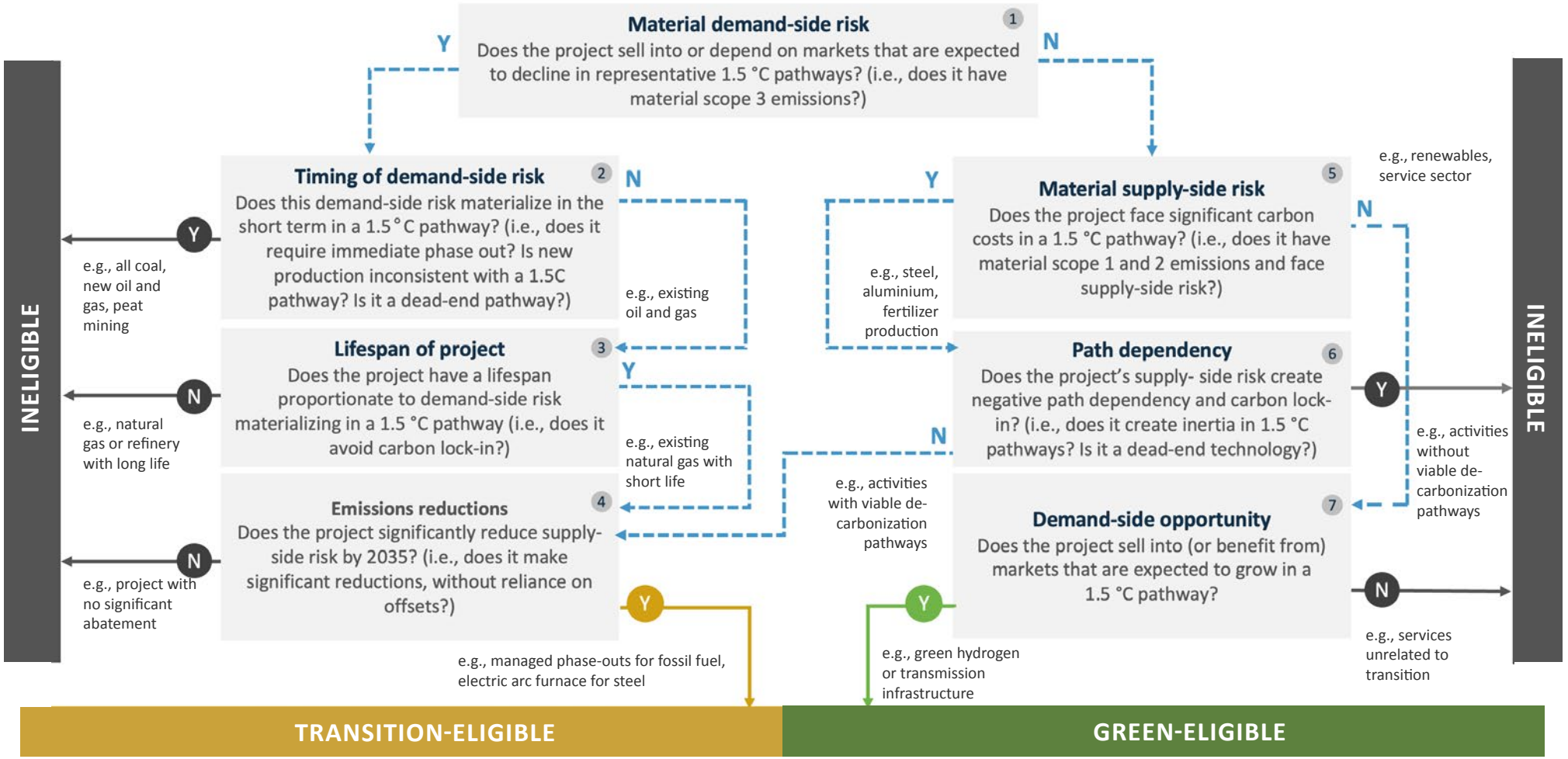
By contrast, existing oil and gas projects are not necessarily ineligible at this stage in the categorization framework, and the pathways forward for oil and gas must be assessed separately. Global demand for oil and gas will exist for several decades—even in representative 1.5 °C pathways—raising the importance of decarbonizing existing production. Reducing emissions from oil and gas production is critical for Canada to achieve its own emissions targets. As such, the taxonomy should reward projects that deploy Canadian and international technologies to reduce scope 1 and 2 emissions, even in sectors that face demand-side risk in the medium term. Box 5 provides a definition of “new” and “existing” oil and gas projects.

For projects facing demand-side risk, but where this risk does not materialize immediately, the next question (step #3 in Figure 2) is focused on the ***project lifespan*** and whether it is proportionate to when global demand for the specific product is expected to decline in representative 1.5 °C degree pathways. The rationale behind this question is to reduce the probability that projects end up locking in significant carbon emissions or become stranded in the future.

Generally, projects that have scope 3 emissions risk and shorter lifespans reflect a lower degree of transition risk and remain in the framework. The early retirement or phase out of high-emitting assets could also be included as an eligible activity if it aligns with net-zero pathways for the sector, which would be consistent with GFANZ’s Proposed Recommendations and Guidance on Financial Institution Net-Zero Transition Plans (see Box 1).

(It is worth noting that to make a project eligible for taxonomy financing, the taxonomy would require assurances from the issuer that the project will, in fact, be decommissioned by a specific date.)

Figure 2: Categorization Framework for Determining Whether a Project Is Green- or Transition-Eligible under the Taxonomy



Box 5: Defining eligible and ineligible oil and gas activities in the taxonomy

Designing a practical and credible taxonomy for Canada requires drawing boundaries around the types of activities that are consistent with 1.5 °C emissions pathways. These boundaries are important for oil and gas activities given their emissions profile, and they need to be analyzed separately, but calibrating them appropriately is a complex undertaking that will require significant technical work and industry engagement in future implementation phases.

In terms of considerations, declining global demand will take time, and investments to decarbonize oil and gas production are needed to reduce cumulative global emissions and help Canada achieve its emissions targets. The taxonomy should therefore be designed to help mobilize capital toward projects that deploy Canadian and international technologies to reduce scope 1 and 2 emissions. Against this, increasing investment in oil and gas production may carry risk. Fossil fuels produce downstream scope 3 (combustion) emissions even if upstream emissions are reduced. Increasing production from current levels may make requisite emissions reductions more difficult.

Recognizing these complexities, the taxonomy should differentiate between *existing* and *new* oil and gas extraction projects when assessing eligibility. Existing oil and gas production projects are potentially eligible but must meet a set of criteria. Existing projects include already-producing oil and gas fields and under-development fields that have received a final investment decision. It includes, for example, activities where production licences within the defined boundaries of the geological reservoir have been granted, and where significant capital expenditures have been allocated.

To be categorized as transition, existing oil and gas projects would need to demonstrate improvements to their emissions intensity by 2030. Eligible projects would therefore need to demonstrate that current and future capital expenditures put them on a track to reduce their emissions intensity such that it complies with the 2030 threshold established via net-zero modeling. Eligible projects would also need to have lifespans that are proportionate to global demand scenarios in representative 1.5 °C pathways (recognizing that the runway for gas is likely longer than for oil). Existing oil and gas extraction projects would also need to demonstrate that making the new investment to reduce emissions will not *increase* the lifespan of their operations.

Finally, new oil and gas extraction projects are expected to be ineligible under the taxonomy based on current climate scenarios reflecting 1.5 °C transition pathways. These projects involve the exploration and development of oil fields (a geographical area overlying an oil and gas pool) currently not producing or not already in development. It encompasses those exploration and development projects that, as of a prescribed date (e.g., 2023), have not received a final investment decision or government licence (or tenure), and where limited capital expenditures have been allocated.[28] Ultimately, precise definitions, criteria and thresholds for the types of oil and gas projects that qualify as transition under scenarios consistent with limiting global warming to 1.5 °C will need to be developed reflecting the latest technical knowledge and modeling, starting in Phase 1 of the taxonomy development process (see Section 3).

28 This definition is based largely on the International Energy Agency's treatment of oil and gas described in its 2021 report *Net Zero by 2050: A Roadmap for the Global Energy Sector*, where the cancellation of new licences is used as a mechanism for ending new oil and gas extraction (see, for example, the Danish approach).

If a project with material demand-side risk has a lifespan that is proportionate to when global demand for the product declines, the next question (step #4 in Figure 2) is about whether the project ***significantly reduces its scope 1 and 2 emissions***. The rationale behind this question is fundamental to the purpose and credibility of the taxonomy: rewarding only those projects that are consistent with domestic and global emissions pathways to net zero by mid-century and excluding those that are not. Significant emissions reductions can also make these assets more competitive in the global low-carbon transition by reducing its carbon costs (i.e., reducing the price paid on its emissions).

For this emissions reduction criterion, the project must demonstrate an emissions intensity that is consistent with net-zero pathways by 2030. Meeting this future time horizon is critical to ensuring the taxonomy rewards activities that not only show emissions reductions today, but that make a significant contribution on the path to net zero. These emissions reductions must also come from mitigation or abatement from within the boundaries of the project itself and cannot rely on purchasing offsets (see Box 6).

While the specific emissions-intensity thresholds for projects still need to be developed, they should be based on sectoral pathways consistent with achieving the global 1.5 °C target. The Transition Pathway Initiative, for example, already provides this type of analysis and could inform threshold development for Canada's taxonomy. Emissions thresholds could also be informed by Canada's Emissions Reduction Plan, which was released earlier in 2022.

It is also necessary to use a regional lens when determining these thresholds and operationalizing the concept of 'economic and technical viability', with particular consideration for northern Indigenous communities and Nations. Economically and technically viable pathways for Canada's south may not be viable in Canada's North, which could make it difficult (or impossible in some cases) for projects in the North to achieve the same emissions thresholds for projects in the south. Early on in the process, the Custodian will need to conduct more research, analysis and engagement with Indigenous rightsholders as it operationalizes these key concepts and develops emissions thresholds to ensure they reflect Canada's important regional differences.

Box 6: Why carbon offsets are ineligible under the taxonomy framework

While carbon offsets are expected to play a major role in achieving global climate targets, projects in the taxonomy are not permitted to rely on carbon offsets to comply with emissions-intensity thresholds. The purpose of the taxonomy is to encourage investments that directly reduce emissions. Directly abating or reducing emissions within the boundaries of a project (e.g., improving energy efficiency, fuel switching, carbon capture, utilization and storage) reduces its transition risk.

By contrast, allowing projects to purchase carbon offsets that occur elsewhere in the economy weakens the incentive to make the transformative investments necessary to align operations with the global transition. If these offsets were suddenly unavailable, or proven to have questionable credibility, it could expose the project to significant transition risk: undoing the initial offset could expose the project's emissions to a carbon price (likely at a higher cost than the offset).

As the taxonomy framework develops, criteria will need to be further developed and refined around this limitation. Drawing the boundaries around projects is particularly important. A project may, for example, rely on a third party to manage the carbon capture, utilization and storage portion of its operation to reduce its scope 1 emissions. The taxonomy would need clear guidelines for these types of projects, ensuring that the project proponent receiving taxonomy-approved financing is held accountable for those emissions reductions.

Projects that do not face or enable material demand-side risk (i.e., those that do not have material downstream scope 3 emissions) face a different set of questions in the categorization framework in Figure 2.

The first question for these projects (step #5 in Figure 2) is whether they have material scope 1 and 2 emissions and, as a result, face supply-side risk. As identified in the Canadian Climate Institute's 2021 *Sink or Swim* report, these include emissions-intensive activities that become increasingly exposed to rising prices on carbon—a necessary reality if the world is to achieve its climate targets. Over time, increasing carbon costs put upward pressure on production or supply costs for emissions-intensive producers—especially those with higher-emitting operations (among peers)—and become a dominant source of transition risk.

This category of activities includes, for example, many emissions-intensive activities and sectors, such as manufacturers of iron and steel, cement, aluminum, chemicals or the airline sector. It could also include projects that use natural gas-fired electricity to replace higher-emitting coal-fired electricity generation, but only when accompanied by stringent emissions thresholds that would require the addition of carbon capture, utilization and storage technologies. This approach has received significant attention due to the recent changes to the EU sustainable finance (green) taxonomy, which has made these types of replacement activities eligible for its green classification (see Box 7).

Box 7: The EU decision to include natural gas and nuclear in its sustainable finance (green) taxonomy

Each activity within the EU taxonomy has technical screening criteria to determine whether it is making a substantial contribution to an environmental objective and doing no significant harm to other objectives. The EU's *Taxonomy Complementary Climate Delegated Act*, which will apply in 2023, introduces screening criteria for the construction and operation of nuclear energy facilities and facilities using fossil (natural) gas.

Making these activities eligible in the EU taxonomy has sparked significant debate over whether using nuclear power and natural gas can be consistent with global climate (and other environmental) goals. It also raises important considerations for how these activities could be treated in a Canadian taxonomy. Below are some key considerations for Canada moving forward.

First, it is important to highlight that the new screening criteria for natural gas do not apply or cover upstream extraction and production (these activities are not included in the EU taxonomy). Eligible natural gas projects must be electricity generation facilities or heat generation facilities that either co-generate power or are connected to efficient district heating and cooling systems.

Second, the thresholds set by the EU criteria are stringent relative to existing emissions intensities at existing EU facilities. To be green-eligible, all power generation facilities (including nuclear and natural gas) must have lifecycle emissions below 100g CO_2e/kWh (carbon dioxide equivalent per kilowatt hour). The emissions intensity threshold for natural gas facilities permitted before 2030 are less stringent (set at 270g CO_2e/kWh) but must satisfy other criteria. For example, these facilities must be replacing a high-emitting fossil fuel-powered facility where no renewable alternatives are feasible and must not significantly increase total production capacity. They must also make a full switch to renewable or low-carbon fuel by 2036.

For perspective, the EU-wide emissions intensity for natural gas-powered electricity is estimated at 370g CO_2eq/kWh, well above the screening thresholds (Ember, 2022). Both natural gas-fired electricity and nuclear power projects would also need to satisfy the "do no significant harm" criteria to remain eligible under the taxonomy.

Finally, whereas the EU taxonomy only covers green activities, the proposed taxonomy framework for Canada covers both green and transition activities, which could help allay some of the concerns surfaced in the EU. Under this proposed framework for Canada, natural gas-fired electricity projects would be considered to have material scope 1 and 2 emissions (and therefore face high carbon costs in the future) and would therefore need to demonstrate significant emissions reductions to be categorized as transition-eligible. In these cases, the Custodian of the Canadian taxonomy could consider adopting thresholds developed by the EU, and evaluate whether they are stringent enough to comply with Canadian net-zero pathways.

The Canada-wide emissions intensity of natural gas-fired electricity was 489g CO_2eq/kWh in 2020, which is significantly higher than the EU screening criteria (ECCC, 2022). Nuclear power, on the other hand, could be categorized as green in the proposed taxonomy framework for Canada. Globally, nuclear power has a median lifecycle emissions intensity of 12g CO_2eq/kWh (Schlömer et al, 2014). These projects would also need to satisfy the "do no significant harm" criteria.

The next question for projects with material scope 1 and 2 emissions (step #6 in Figure 2) is about preventing ***pathway dependency***. Some projects and activities with supply-side risk may, in fact, create carbon lock-in and path dependency that are inconsistent with representative 1.5 °C pathways. This could include, for example, the construction of a first-generation biofuels facility producing corn or wheat-based ethanol. Scaling up these types of conventional biofuels is constrained by relatively low blending limits in the existing gasoline-powered vehicle fleet and, indirectly, could create inertia in the shift toward electric- or hydrogen-powered vehicles.[29] Projects with long lifespans can also create path dependency and carbon lock-in, particularly in heavy industrial sectors whose facilities can operate for several decades.

For supply-side risk projects that do not create path dependency, the next question is whether they make significant ***emission reductions*** (step #4 in Figure 2). This could include, for example: a steel manufacturing facility investing in an electric arc furnace that significantly reduces its scope 1 and 2 emissions; building a new line of aircraft that uses clean hydrogen to significantly reduce its combustion emissions (which, for the airline, are counted as its scope 1 emissions); a pulp and paper producer that converts to using biomass for its energy needs; or a cement manufacturer installing carbon capture and storage to significantly reduce its process emissions. Whatever it is, if the project can demonstrate significant emissions reductions (consistent with a net-zero path by 2030), it would be categorized as transition-eligible.

29 While more advanced biofuels could be eligible under the taxonomy (e.g., drop-in biofuels for hard-to-abate sectors like aviation and heavy-duty trucking), new first-generation biofuel facilities whose primary use is in light-duty vehicles are expected to be ineligible.

In summary, there are two different ways projects can be categorized as transition-eligible. Projects that face or enable material ***demand-side risk*** must meet the following criteria:

- Demand-side risk that does not materialize in the short term and is a project that does not require immediate phase-out in representative 1.5 °C pathways;
- A lifespan that is proportionate to when its global demand is expected to decline in representative 1.5 °C pathways; and
- Significant emissions reductions, consistent with a 1.5 °C pathway by 2030.

By contrast, projects that have ***supply-side risk*** must meet a similar set of criteria:

- No negative path dependency or carbon lock-in; and
- Significant emissions reductions, consistent with a 1.5 °C pathway by 2030.

In both pathways to transition eligibility, the categorization framework is designed to filter out projects and activities that are inconsistent with 1.5 °C pathways. Part of this process is filtering out activities that do not make significant emissions reductions. But it is also about avoiding dead-end pathways. As noted by Canada's Net-Zero Advisory Body, some technologies and energy sources will make net-zero pathways more difficult by "locking in building infrastructure, systems, and technologies that will need to be replaced or retrofitted again."[30]

Solid fossil fuels, peat mining and internal combustion engines are three examples of dead-end pathways that are automatically ineligible under the categorization framework. These are pathways that need to be phased out under a 1.5 °C pathway and where substitutes are both technically and economically viable. As the transition progresses, other dead-end pathways will emerge. The taxonomy framework will need to be updated accordingly.

Green-eligible projects

Projects that do not have material scope 1 and 2 emissions and that have low or zero downstream scope 3 emissions are automatically categorized as green under the framework. The only additional question for these low-emissions projects (step #7 in Figure 2) is whether they face or enable demand-side opportunity in representative 1.5 °C pathways. The *Sink or Swim* report shows that the push towards net zero will significantly increase global demand for some goods and services, representing new and growing market opportunities. The low-carbon transition is—and will continue to—directly increase demand for things like clean energy, clean or environmental technologies and alternative proteins. In other cases, goods and services may enable these activities, such as electricity transmission infrastructure or green engineering services.

Yet there are many economic activities that may have low or zero emissions but do not necessarily face opportunity in the transition. These would include, for example, a big portion of the service sector in the economy. While the taxonomy could be broadened to include these types of activities in the future, the rationale behind this question is to focus the taxonomy on activities with the greatest opportunity *because* of transition, or those projects and activities selling into growing markets.

In the initial stages of taxonomy development, issuers could assess the degree of market opportunity at a high level—recognizing that small and medium-sized issuers may have difficulty evaluating this particular criterion.

30 See Annex 3 of Canada's 2030 Emissions Reduction Plan, where the Net-Zero Advisory Body provides its overarching advice in relation to the line of inquiry on buildings.

The key markets and technologies listed in the *Sink or Swim* report, for example, could be used as a starting point, which have already been assessed for the Canadian context. Once the Custodian is established, it could provide more detailed analysis to support the evaluation of "market opportunity" that would make it easier for issuers to move through the framework. Similar to other aspects of the taxonomy, the Custodian could also update this regularly to reflect the evolving nature.

The breadth and scope of projects that would qualify as green are expected to increase significantly over time. The Canadian Climate Institute considered nine markets in its *Sink or Swim* report that are expected to grow in the global low-carbon transition, including low-carbon electricity, low-carbon transportation, agricultural technologies and alternative proteins, and clean hydrogen. These are markets where Canadian companies already have a foothold and are attracting investment, and where green eligibility under the taxonomy could help mobilize and track capital. Moreover, costs continue to fall for a range of low- or zero-carbon technologies, such as renewables, batteries and electrolysers (for producing green hydrogen), which will accelerate their adoption and market growth in the future.

Green eligibility under the taxonomy could apply to low- or zero-emissions projects across the innovation chain, from early technology development to widescale commercialization. For example, there are a range of low-carbon technologies that are not yet commercially viable, but could provide material environmental and economic benefits on Canada's pathway toward net zero. These include producing high-value chemicals from low-carbon feedstocks, such as methanol from municipal solid waste or ammonia from hydrogen with CCUS, or aviation biofuels from agricultural and wood waste. Depending on project specifications, these types of early-stage demonstration projects would be green-eligible.

It is also notable that the path for green eligibility includes projects that *enable* demand-side opportunity in the transition. These include projects and activities that may not experience demand-side opportunities directly, but rather provide the critical market infrastructure necessary to capture transition opportunities. The construction of a pea protein processing facility, for example, enables local farmers to shift their crops and grow more pea proteins. Another example is grid infrastructure that enables greater electrification.

Projects with low or zero (absolute) scope 1, 2 and 3 emissions that face significant demand-side opportunity in transition are green eligible under the taxonomy.

Recommendation 7

We recommend that the green and transition finance taxonomy embody the categorization framework introduced in this Report, where projects are determined to be taxonomy-eligible only if material scope 1, 2 and 3 emissions, excluding carbon offsets, are aligned with representative pathways in a 1.5 °C scenario. Projects that lead to significant increases in emissions and make it difficult to reduce emissions would be ineligible under the taxonomy.

3) "Do No Significant Harm" Requirements

The final step to evaluating the taxonomy eligibility involves assessing each project against a set of "do no significant harm" (DNSH) criteria, illustrated in Table 4. These are binary criteria: if a project violates any one of these criteria, it would be ineligible under the taxonomy. For example, a project that is categorized as green that also causes significant (non-climate) environmental damage would be ineligible. The DNSH terminology and concept, which was pioneered in the EU sustainable finance (green) taxonomy, is now a best practice and a common requirement of taxonomies globally.

These DNSH criteria are informed by the approach taken in the EU (see Box 8) but are adapted to meet the unique needs for Canada. A criterion to ensure projects meet minimum standards for respecting Indigenous rights and reconciliation was added to reflect the importance of this issue within the Canadian context. Another criterion was added to ensure projects do no harm to workers and communities (and align with just transition principles).

Additional development work will be needed to enrich the thresholds and minimum standards in Table 4, and to clearly define the significant harm concept so that it is used properly and not misinterpreted. Development work will also be needed to ensure that the DNSH criteria are consistent with applicable Canadian laws (e.g. environment, labour, Indigenous rights), and that they minimize duplication and additional work for issuers. The objective is to set requirements that are clearly defined and user-friendly, and which result in credible DNSH assessments.

Box 8: The EU's "do no significant harm" criteria

The EU was the first jurisdiction to articulate and include a set of DNSH criteria directly into its taxonomy. To remain eligible for the EU taxonomy, a project must meet the minimum requirements for 1) climate change mitigation, 2) sustainable use and protection of water and marine resources, 3) pollution prevention and control, 4) climate change adaptation, 5) circular economy and 6) protection and restoration of biodiversity and ecosystems.

The DNSH requirements could build on international best practices, including those reflected in the EU's sustainable finance taxonomy. Thresholds for workers and just transition could be informed by the work of the World Benchmarking Alliance as well as the International Labour Organization. In addition to the DNSH criteria, future consideration may be given to setting criteria that screen out projects that do not comply with minimum social safeguards, including in relation to international human and labour rights and anti-corruption and bribery. This could be informed by the EU approach, where projects must comply with major corporate social responsibility frameworks, including the UN Guiding Principles on Business and Human Rights and the OECD Guidelines on Multinational Enterprises.

Table 4: "Do No Significant Harm" Criteria

Objective	Rationale	Criteria
No significant harm to environmental outcomes	Some taxonomy activities may impose environmental (non-climate) damages or costs that must be minimized. This criterion amalgamates three categories from the EU taxonomy (sustainable use and protection of water and marine resources, pollution prevention and control, and protection and restoration of biodiversity and ecosystems).	Activity meets minimum requirements for water, biodiversity, pollution and waste impacts
No significant harm to climate resilience	Some taxonomy activities may be maladaptive or increase physical climate risk.	Activity incorporates best practices to reducing physical risk
No significant harm to Indigenous rights	Some taxonomy activities may infringe on the rights of Indigenous peoples, communities and nations.	Activity demonstrates adherence to the UN Declaration on the Rights of Indigenous Peoples
No significant harm to workers or just transition	Some taxonomy activities may result in unintended negative impacts to labour market transitions, including in the forms of job creation, training, investment in vulnerable communities and Indigenous equity participation.	Activity does not worsen employment outcomes for workers

Recommendation 8

We recommend that the eligibility requirements under the green and transition finance taxonomy include an assessment against "do no significant harm" criteria, which meet the unique needs of Canada, and are informed by the European Union's Sustainable Finance Taxonomy, including, but not limited to, meeting minimum standards for respecting Indigenous rights and reconciliation as well as for supporting workers and communities in relation to just transition.

Spotlight: Taxonomy in Practice – Issuing Green and Transition Bonds and Loans

Illustrative Example 1: Issuing Green and Transition Bonds

Issuers seeking to bring to market green and/or transition bonds to fund taxonomy-eligible projects are likely to do so in accordance with established global process guidelines, including the Green Bond Principles and the Climate Transition Finance Handbook published by the International Capital Market Association (ICMA).[31] According to ICMA, the vast majority of sustainability bond issuances globally refer to its principles and guidelines to support comprehensive and transparent disclosure practices.[32]

Using these guidelines, issuers would generally initiate the formal issuance process by developing and publishing a green and/or transition bond framework. This framework would explain to investors how prospective bond issuances will support the issuer's financing objectives and sustainability strategy, as well as comply with the taxonomy and the broader informational requirements set out in global process guidelines. Taken together, the framework would disclose the following types of information:

- Identification of the categories of green and/or transition projects eligible for funding with the bond proceeds as well as the corresponding screening criteria based on the taxonomy's specific and DNSH requirements;
- Description of the governance and management of the issuance process, including the evaluation and selection of eligible projects, the DNSH assessment methodology, the review of framework-related reports and disclosures and the monitoring of issuances and evolving market practices; and
- Details on the procedures to ensure that proceeds are only used for eligible projects, as well as an explanation of the frequency, nature and scope of reporting on the use of proceeds and associated environmental impact.

The framework would typically be subject to an external review, resulting in a second-party opinion on the framework's alignment with the ICMA Green Bond Principles and the taxonomy. In keeping with the Climate Transition Finance Handbook, issuers may also obtain an independent technical review of their transition plans, including in relation to the climate targets, de-carbonization pathways and the environmental materiality of the business models.

Following publication, issuers would then bring the green and/or transition bonds to market. Issuers would generally begin to publish reports on how proceeds have been used as well as the associated environmental impact within one year of issuance, and then on an annual basis thereafter. An external auditor would normally be used to verify that the proceeds are being allocated to eligible green and/or transition projects.

Throughout the issuance process, issuers would need to comply with provincial securities laws in respect of the distribution of financial instruments, including registration, disclosure and record-keeping requirements, among others. Provincial securities regulators are responsible for administering these laws, which include monitoring compliance and undertaking enforcement action in the event of misconduct (e.g., misleading disclosure, fraudulent claims). Investors also have civil remedies available to pursue damages for misrepresentation in connection with issuances on primary and secondary markets.

31 These publications are available on the ICMA's website alongside process guidelines for issuing sustainability-linked bonds and other types of sustainability bonds.

32 ICMA reported that, in 2020, 97 per cent of sustainability bonds globally were based on its process guidelines.

Illustrative Example 2: Issuing Corporate Green and Transition Loans

Similar to green and transition bonds, corporate borrowers seeking green and/or transition loans to fund taxonomy-eligible projects are likely to do so in accordance with the established global process guidelines, including the Green Loan Principles published by the Loan Market Association (LMA), Asia Pacific Loan Market Association (APLMA) and the Loan Syndications and Trading Association (LSTA).[33]

Borrowers would typically begin the loan origination process by preparing a green and/or transition loan framework, which will contain many of the same elements as its bond counterpart discussed above. As the loan market is frequently relationship driven, a borrower would often work closely with their established lenders to develop this framework. Reflecting the borrower's financing objectives and sustainability strategy, the framework would identify the categories of green and/or transition projects that would be eligible for loan financing as well as the corresponding screening criteria based on the taxonomy's specific and DNSH requirements. It would explain the internal governance process to evaluate and select eligible projects; the systems to monitor and track the loan proceeds; and the frequency of reporting to lenders on how the loan proceeds have been allocated.

The borrower may choose to publicly release the framework or limit its distribution to prospective lenders only. The framework may be standalone or integrated as part of a larger framework that covers a number of green and/or transition financial instruments. Borrowers may have some or all aspects of the framework reviewed by an external party (e.g., second-party opinion), but this may not always be undertaken, especially in instances where lenders are satisfied that borrowers have adequate internal expertise to self-certify the veracity of their proposed frameworks.

Following its adoption, the framework would be integrated into the formal green and/or transition loan (contractual) agreements between the borrowers and lenders. Although there is no market standard for the content of green and/or transition loan agreements, the Green Loan Principles guidance indicates that these agreements should clearly set out the eligible green/transition project categories in the use of loan proceeds provisions; provide the information undertakings/covenants relevant to the green/transition projects; and establish a legal obligation on the borrower to accurately report on the use of loan proceeds. The agreement should also clearly set out the consequences of a breach of the use of loan proceeds provisions, including whether it would trigger a default or simply result in a re-categorization of the loan (e.g., from green to non-labelled loan).

33 The Green Loan Principles as well as the principles and guidance for issuing sustainability-linked loans are available here.

Priority for Future Development: Evaluating the Relative Transition Opportunity and Risk of Green and Transition Projects

Issuing companies are required to use the categorization framework discussed previously as part of the requirements to evaluate whether projects are either green or transition under the taxonomy. Yet not all green and transition projects are equal in terms of transition performance, and the categorization framework does not capture the important nuances that exist, in terms of relative transition opportunity and risk, of the projects that fall within the broad categories of green and transition.

For example, an aluminum manufacturer investing to electrify its operations to dramatically lower its scope 1 and 2 emissions faces different transition opportunity (and risk) than an existing oilsands facility investing in carbon capture, utilization and storage (CCUS). The oil producer is exposed to demand-side risk that the aluminium manufacturer is not. Global demand for low-carbon aluminum is expected to grow in transition and see increased opportunity, while demand for fossil fuels is expected to decline.

The Taxonomy initiative should consider developing a methodology and criteria so that issuances in connection with green and transition projects can be classified in a differentiated matter, according to their relative transition opportunity and risk. Investors would be able to more readily consider the specific areas of transition opportunity and risk of different issuances in their investment decision-making. It would promote the credibility of the taxonomy by allowing stakeholders to understand and differentiate across the full range of transition-eligible projects and activities and how that range may change over time in the face of regular reviews and more stringent criteria. Lastly, this type of approach would align with advice from Canada's Expert Panel on Sustainable Finance, which recommended that Canada's taxonomy should be granular enough to avoid ambiguity.

The discussion below sets out proposed foundational criteria for evaluating and differentiating green and transition projects. Annex 2 introduces a scoring system to be used in conjunction with the criteria to score and classify green and transition projects, supplemented by a series of hypothetical project examples for illustrative purposes. The proposed criteria and methodologies are meant to provide the Custodian with a running start, as a possible future development priority. In addition to methodological matters, an appropriate administering body would have to be identified to apply the criteria and issue scores to issuances (e.g., ESG rating agencies, standard-setting body).

Evaluating Green-Eligible Activities

Table 5 illustrates a set of proposed criteria to evaluate the transition risks and opportunities of green projects. The first criterion in the table is focused on a project's relative emissions intensity. The thresholds for this criterion could be based on those already developed by the EU, which uses an emissions-intensity threshold based on lifecycle emissions (scopes 1, 2, 3). Using these thresholds, projects could be evaluated on whether there are no or negative emissions, or whether they are above, meet or below the sector or product average. The threshold for green hydrogen projects, for example, could use the EU's emissions threshold of 3 tonnes of carbon dioxide or equivalent per tonne of hydrogen produced ($3tCO_2e/tH_2$). Projects could be benchmarked against this threshold.

The second criterion evaluates the relative market opportunity associated with the project (and the goods or services it sells). The rationale behind this criterion is that different types of projects and activities face different opportunities. Cases where the expected market is small or highly uncertain reflect a higher degree of risk (or smaller opportunity) than those where the market opportunity is both large and certain in transition. The availability of technically and economically viable substitutes is a key consideration: projects selling into a large market with few competing viable alternatives have greater opportunity.

Table 5: Criteria and Measures for Green-Eligible Projects

Objective	Criteria	Rationale	Possible Measure
Reduce relative GHG emissions (lifecycle emissions)	Emissions intensity relative to sector/product average	Activities with lower or best-in-class emissions reflect higher transition opportunity (based largely on EU thresholds).	• No or negative emissions • Below sector/product average • Meets sector/product average • Above sector/product average
Support activities with higher market opportunity in transition	Size of value chain by 2050 in 1.5 °C pathway	Some activities have larger market demand in transition than others. Those expected to have larger markets in 2050 reflect higher transition opportunity. Larger market opportunity also implies higher scalability of technology and ability to gain/keep market share (breakeven cost).	• Large value chain by 2050 • Moderate value chain by 2050 • Small or nonexistent value chain by 2050
Sequestration projects only			
Create permanent emissions reductions	Extent to which sequestered emissions may be re-emitted into the air	Some activities provide higher certainty around the permanence of emissions reductions, reflecting higher transition opportunity.	• High certainty of permanence • Moderate certainty • Low certainty

The market opportunity for light-duty electric vehicles (EVs), for example, is significant and converging rapidly. Other types of low-carbon technologies exist for light-duty vehicles, such as hydrogen-based fuel cells, but market forecasters expect that EVs will be the dominant technology.

By contrast, the future market for clean hydrogen is expected to be large, but with a greater range of uncertainty. The market could be worth between $2.5 trillion and $12 trillion by 2050, depending on adoption rates across multiple sectors (i.e., some sectors have more viable substitutes to clean hydrogen than others, but there are still a few sectors where clean hydrogen looks like it could become the dominant technology). The market for some critical minerals is even less certain and depends on what type of battery/storage technology ultimately wins market share in the coming decades, so the market for these types of projects would embody less opportunity.

Although measuring the relative market opportunity of a particular good or service raises important challenges (see Box 9), doing so can provide useful information on the relative size of transition opportunity and risk. Thresholds, for example, could be based on the expected size of value chains under different net-zero pathways along with the relative range of estimates. Ultimately, clear and consistent thresholds for this criterion would need to be set, which would require periodic updates based on new technological developments and adjustments to representative pathways.

Box 9: Challenges with defining "the market" for projects

Drawing the boundaries around "the market" for a particular project can be challenging and has significant implications for its relative transition opportunity and risk. Consider, for example, the market for a new facility that produces small modular nuclear reactors (SMRs). On the one hand, the market for SMRs may be relatively small if we consider the availability of cheaper and more cost-effective alternatives to generating electricity, such as renewables (with or without storage technology). If, however, the market for SMRs is defined more broadly—as the entire market for clean electricity, regardless of how it is generated—then it looks much larger.

Setting the boundary around the market also raises important geographical questions. Some goods and services are very tradeable, such as new smart grid software that can be adopted anywhere in the world. The potential market for these types of products (and projects) is large. Whereas other markets, such as generating and distributing clean electricity, are more geographically bounded.

Evaluating and ranking the relative opportunity and risk associated with market size may also have implications for technologies that generate significant benefits but only for a small population. Technologies that provide clean and reliable energy to rural, remote and Indigenous communities, for example, could generate important local benefits but yet the technology could be perceived as having a small market if it does not have wider applications. These types of instances require further research as the criteria and measures are developed.

The last criterion for green projects would only be applicable to those that sequester emissions. This criterion would apply to nature-based solutions, for example, such as afforestation projects or wetland restoration. Nature-based solutions should, by definition, offer negative emissions, which means that the first criterion (emissions intensity) would not apply to these projects. This helps ensure that nature-based solutions would not be disadvantaged in the framework relative to other types of green projects.

The rationale behind this criterion is that not all sequestered emissions are the same: some may have a higher degree of permanence than others. An afforestation project planted in an area with a high risk of wildfires, for example, faces a higher likelihood that some of those sequestered emissions get re-emitted into the atmosphere. The more assurances a sequestration project has (e.g., insurance against wildfire risk or development prohibitions to protect against future encroachment), the lower the transition risk (and higher the opportunity). The thresholds for this criterion should ultimately align with established offset standards.

Evaluating Transition-Eligible Activities

The criteria for transition activities should build on the green criteria (see Table 6), starting with evaluating a project's emissions intensity in the current year. The emissions intensity for each project would be compared against a sector or product average that is based on representative net-zero pathways.[34]

34 The development of the criteria should be grounded in climate science, while being mindful of level playing field and interoperability considerations with U.S. capital markets and consistency with U.S. climate policy at federal and state levels.

But whereas the criterion for green activities uses lifecycle emissions as the primary threshold, the thresholds for transition activities are based on scope 1 and 2 emissions only. The reason for this slightly different approach is twofold. First, scope 3 emissions have already been accounted for in the categorization framework; that is, some transition projects are categorized as 'transition' precisely because of the higher climate risk associated with material scope 3 emissions. Second, the green category is intended to set the gold standard for projects and therefore accounts for the whole lifecycle of a project's emissions.[35] Transition projects face a slightly lower standard, yet must still make significant reductions in scope 1 and 2 emissions.

Transition projects would also have to demonstrate improvements in their emissions intensity over time. The rationale is that transition projects—by definition in the categorization framework in step #1—represent larger sources of absolute emissions and need to make significant reductions if they are to remain consistent with net-zero pathways.

Table 6: Criteria and Measures for Transition-Eligible Projects

Objective	Criteria	Rationale	Possible Measure
Reduce relative GHG emissions (scope 1 and 2)	Emissions intensity relative to sector/product average (today)	Activities with lower emissions reflect higher transition opportunity. Activities are assessed against their consistency with the Emissions Reduction Plan.	• Below sector/product average • Meets sector/ product average • Above sector/ product average
	Emissions intensity relative to sector/product average in 2030 (based on net-zero pathways)	Activities must demonstrate lower scope 1 and 2 emissions over time to achieve sectoral/product targets. Those that can demonstrate lower future emissions reflect higher transition opportunity (and less risk).	• Well below 2030 sector/product average • Below 2030 sector/ product average • Meets 2030 sector/ product average
Support activities with higher market opportunity in transition	Size of value chain by 2050 in 1.5 °C pathway	Markets for some transition activities could remain robust for decades, whereas others could face long-term decline. Those with larger markets in 2050 reflect higher transition opportunity. Larger market opportunity also implies ability to gain/keep market share (breakeven cost).	• Large value chain by 2050 • Moderate value chain by 2050 • Small or nonexistent value chain by 2050

35 The use of lifecycle emissions for determining green eligibility is consistent with the thresholds used in the European Union's Green Taxonomy.

Objective	Criteria	Rationale	Possible Measure
Sequestration projects only			
Reduce risk associated with deploying CCUS technology	Extent to which emissions may not be captured, or sequestered emissions are re-emitted into the atmosphere[a]	Some forms of CCUS are better than others in terms of the reliability of their capture rate and sequestration permanence.	• Low risk • Moderate risk • High risk
Demand-side risk projects only			
Avoid carbon lock-in and path dependency	Project lifetime relative to global demand for product in a 1.5 °C pathway	Transition activities with longer lifespans (or payback periods) reflect higher transition risk. Lifespan thresholds are relative to global product demand for that particular good/product.	• Short lifetime • Medium lifetime • Long lifetime

a) While the specific thresholds for this criterion still need to be developed, the objective is to reward projects that deploy CCUS technology that has reliable capture rates and can demonstrate permanent sequestration.

To qualify under this additional emissions-intensity criterion, projects must be able to demonstrate that they will make significant improvements by 2030. More specifically, projects must demonstrate, through existing capital expenditures and forward-looking capital plans, that emissions are expected to meet or fall below the 2030 threshold. Importantly, the project cannot have an emissions intensity above the 2030 threshold, which helps guarantee that all transition projects in the taxonomy make significant investments to stay transition-consistent (projects that do not make these significant emissions-reduction investments would have been ineligible already in the categorization framework in step #1).

Like the green projects, transition projects are evaluated for their potential market opportunity in transition (see Box 9 above). Using the value chain of specific goods and services as the rough proxy, a project that is selling into a larger market—and where there are fewer viable alternatives to what the project is selling into the market—has more opportunity. The market for green steel, for example, is expected to be significant in the transition.

Transition projects that sequester emissions face the same additional criterion as green projects. For transition activities, this criterion is for projects that utilize CCUS technologies to reduce their scope 1 and 2 emissions. While the specific thresholds for this criterion still need to be developed, the objective is to convey the risk of continued scope 1 and 2 emissions along a project's transition pathway.

The rationale for this additional criterion is twofold. First, avoided or abated emissions are better than generating emissions that then must be captured and stored. Second, some types of CCUS technologies have unreliable capture rates or cannot guarantee the permanence of the sequestered emissions. Both of these issues with CCUS could expose a project (and issuer) to significant transition risk (e.g., a sudden increase in unabated emissions). Recent mechanical failures with the CCUS technology at the Boundary Dam in Saskatchewan, for example, meant the facility emitted more than 500,000 additional tonnes of CO_2 in 2021 that were supposed to be captured.[36]

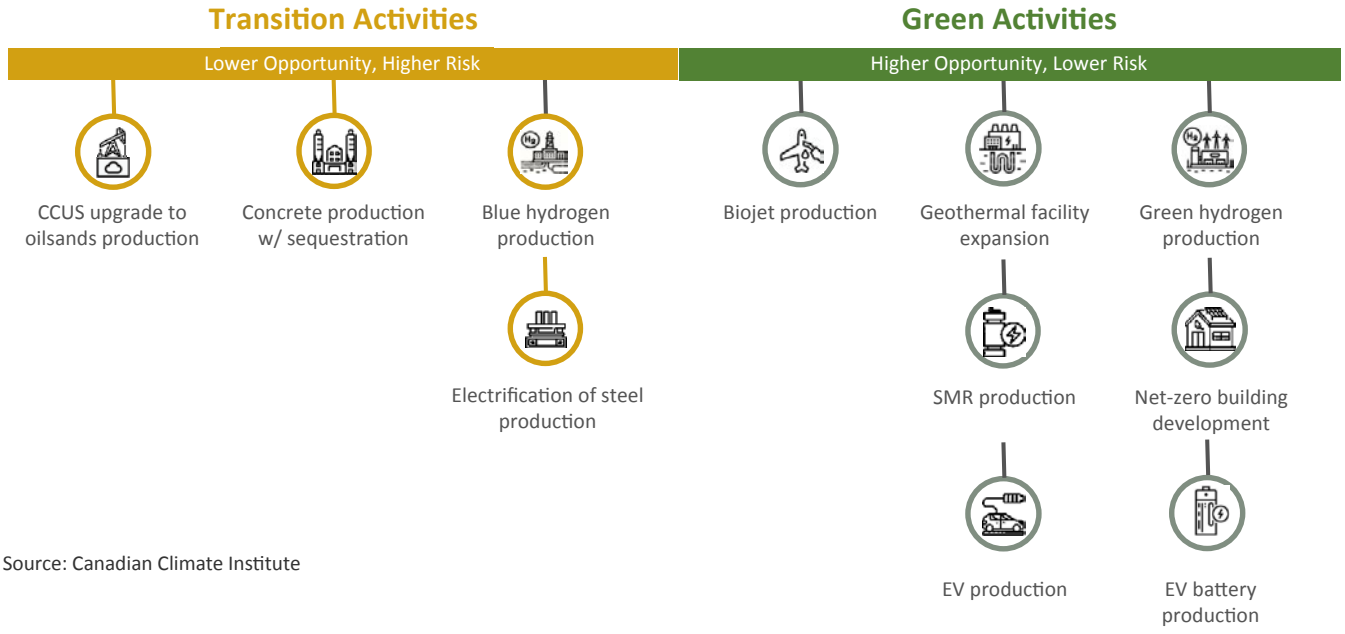
36 See S&P Global Market Intelligence article titled, Only Still-Operating Carbon Capture Project Battled Technical Issues in 2021, published on January 6, 2022.

Finally, transition projects that face demand-side risk have an additional criterion that measures the risk of carbon lock-in and path dependency. While the categorization framework in step #1 is designed to filter out projects that generate significant carbon lock-in and path dependency (e.g., coal production, developing new oil and gas fields), these issues may still be relevant for some transition projects, particularly those that involve decarbonizing existing oil and gas projects. The rationale is that projects with demand-side risk have a higher degree of risk that other projects do not.

The demand-side risk criterion is based primarily on the project's lifespan. Projects with a longer lifespan, such as a natural gas production facility with a 25-year lifespan, would face higher transition risks. While the precise thresholds for this criterion still need to be developed, the timelines need to be proportionate to the relative demand-side risk for that particular activity. That is, the definition of a "long" lifespan for natural gas production facilities may be different than for oil production facilities, given that global demand for natural gas is expected to be more robust (and for longer) than demand for oil.

Taken together, Figure 3 below illustrates how this type of scoring system could work in practice. It shows a range of hypothetical green and transition projects, evaluated based on their relative transition risk and opportunity. These examples are, however, for illustrative purposes only. The actual evaluation or scoring of projects will ultimately require developing the rigorous methodology and criteria discussed above. It will also require identifying an appropriate delivery model for its use and administration (e.g., ESG rating agencies, standard-setting body). See Annex 2 for more details on the scoring methodology, which informs the relative placement of projects in this figure.

Figure 3: Hypothetical Green and Transition Projects



Source: Canadian Climate Institute

Recommendation 9

We recommend that the Taxonomy initiative consider, as a future priority, developing a methodology and criteria to differentiate the relative risk and opportunity of green and transition projects, to enhance investment decision-making and the taxonomy's sophistication and credibility.

Part Three: Implementation

There is an imperative to proceed expeditiously to develop and implement the Canadian green and transition finance taxonomy. Delays would present missed opportunities for Canada to mobilize green and transition capital in a meaningful way as well as influence the global taxonomy dialogue. Proceeding expeditiously, however, cannot come at the expense of quality and credibility. Given these considerations, the TTEG recommends that the taxonomy be developed and implemented in two discrete phases, as follows:

Phase 1: Running start led by the SFAC (Fall 2022 to Summer 2023)

- Publish a short-form taxonomy covering priority sectors and activities.
- Lay the groundwork for the implementation of the taxonomy, for the long term

The SFAC endorsed and submitted this Report to Canada's Deputy Prime Minister and Minister of Finance as well as the Minister of Environment and Climate Change for consideration and action in fall 2022. The Ministers will likely require time to consider the Report and provide a formal response to the SFAC on its recommendations.

In the interim, the SFAC, subject to prima facie federal support, would direct the TTEG to develop the taxonomy architecture introduced in this Report, with a focus on establishing voluntary issuance requirements and green and transition criteria for an initial set of priority sectors and activities, identified through a risk- and needs-based assessment.

To advance this work quickly, the TTEG would seek to harness the substantial body of taxonomy-relevant knowledge and expertise that exists domestically and internationally.[37] To do so, it would rely on the SFAC's contracted research resources as well as engage with its network of knowledge partners. This work would include undertaking additional in-depth research and stakeholder engagement on critical issues identified over the course of developing this Report, including defining existing versus new, separately for oil and gas production projects, as well as working with SFAC participating organizations (e.g., property and casualty insurance, reinsurance) and other stakeholders on how to incorporate adaptation and resilience into the

37 The TTEG, in developing the green and transition finance taxonomy, should leverage, as appropriate, the green/sustainability criteria set out in the EU sustainable finance taxonomy. This could accelerate the development process and promote interoperability with a global best practice taxonomy.

taxonomy's framework architecture. Industry engagement will also be critical to field test the criteria for usability and practicality. The aim would be to publish a short-form taxonomy, under the banner of the SFAC, by spring-summer 2023.

In parallel, the SFAC and the TTEG would begin to lay the groundwork for the implementation of the taxonomy, for the long term. This would involve implementation-related dialogue with federal and provincial governments and Indigenous rightsholders and leadership, identifying funding models and potential contributors, preparing a short list of financial sector representatives for the Taxonomy Council and identifying possible custodian organizations. It could also involve initiating discussions towards formalizing information sharing and mutual assistance arrangements with taxonomy initiatives in other jurisdictions.

Phase 1 would be led by the SFAC and the TTEG. It would continue to rely on the existing governance arrangements, including engagement with the federal-provincial Official Sector Coordinating Group[38], while recognizing that balanced engagement will be needed with provincial governments, industry and other stakeholders to support implementation towards Phase 2.

Phase 2: Full implementation led by the federal government and SFAC (summer 2023 onwards)

- The federal government and the SFAC establish the Taxonomy Council ("Council"), select its composition and provide establishment funding (summer-fall 2023).
- The Council conducts a merit-based process to select the Taxonomy Custodian ("Custodian") (by end-2023).
- The Custodian hires the staff and convenes the technical working groups needed to develop a comprehensive taxonomy, using the short-form version as the starting point (by mid-2024).
- The Custodian develops the draft taxonomy, publishes it for consultation (early-2025) and submits it to the Council for approval (fall 2025).
- The approved taxonomy is published (end-2025); the Council sets the next phase of the taxonomy development work (ongoing).

The federal government and the SFAC, in summer-fall 2023, would formally establish the Council as the governing body of the Taxonomy initiative. The Council could be prescribed in legislation, established as a ministerial committee under existing legislation or convened through non-legislative means, such as by memorandum of agreement. As speed of establishment is an important consideration, non-legislative approaches may be preferable; however, each option should be assessed to determine which one would best meet the overall needs of this initiative.

Upon establishment of the Council, the federal government and the SFAC would assign representatives to serve on the Council. Federal representation would be set by the Ministers responsible for the initiative. The SFAC would establish a process to identify and select a representative from each of the major segments of Canada's

38 Members of the Official Sector Coordinating Group are Finance Canada, Environment and Climate Change Canada, Bank of Canada, the Office of the Superintendent of Financial Institutions, Autorité des marchés financiers (Québec), Ontario Securities Commission, Alberta Securities Commission, British Columbia Securities Commission, Financial Services Regulatory Authority of Ontario and the British Columbia Financial Services Authority.

financial sector. Provinces may be engaged at this time to invite representation (e.g., securities regulators). The federal government and the SFAC (i.e., voluntary contributions from its participating organizations) would provide the start-up funding to establish the Council.

The Council would lead a merit-based process to identify and select a research organization by end-2023 to serve as the Custodian. With the Custodian in place, including its senior leadership team, the Council would then direct it to develop and submit for its approval the complete version of the taxonomy by fall 2025. The Custodian would use the published short-form taxonomy as the starting point and proceed to broaden the issuance requirements and green and transition criteria for all sectors and activities in Canada that are material from a climate mitigation perspective. As part of this exercise, it would undertake best efforts to develop criteria in support of climate adaptation and resiliency objectives.

The Custodian's senior leadership would proceed expeditiously to build the capacity necessary to meet this milestone. It is expected that, by mid-2024, the Custodian would have the requisite expert staff and external technical working groups in place and that substantive taxonomy development would be well underway. In parallel, the Council would implement the balance of the infrastructure needed to consider and approve taxonomy proposals, including developing voting procedures and rules, a framework to measure performance and outcomes, as well as establishing the expert advisory committee.

The Custodian would issue a consultation draft of the taxonomy by early-2025. In addition to inviting public comment at this time, the Stakeholder Advisory Forum would be launched and the inaugural meeting would be used to invite feedback from participants on the draft. The Custodian would review the feedback, make any necessary revisions and submit the final taxonomy proposal to the Council for approval by fall 2025, with a target milestone for publication by end-2025.

Additional discussions would need to take place during the development process, particularly among the Council's government and regulatory representatives, to determine what status the taxonomy should take (e.g., voluntary or policy guidance, basis for a regulatory proposal). The Custodian would be responsible for accompanying the release of the taxonomy with supplementary explanatory materials, as well as conducting education and awareness-raising activities.

In the period following the taxonomy's launch and implementation, the Council would set the objectives and priorities for the next phase of taxonomy development, which could include formalizing the process to periodically review the green and transition criteria, deepening elements of the published taxonomy (e.g., climate adaption and resilience, DNSH criteria) and expanding the taxonomy to include other priority environmental and social objectives.

Recommendation 10

We recommend that the green and transition finance taxonomy be developed in two discrete phases. Phase 1 would see the SFAC publishing a short-form taxonomy covering priority sectors and activities by mid-2023, as well as laying the groundwork for the implementation of the taxonomy for the long term, including governance, funding and strategic planning. Phase 2 would involve the full implementation of the Taxonomy initiative and publishing a substantially more complete and detailed taxonomy by end-2025 at the latest.

Annex

Glossary of Key Terminology

Carbon costs: The price that an entity pays for their greenhouse gas emissions. Carbon costs could be direct through carbon pricing, or implicit through regulation. An entity that reduces its emissions faces lower carbon costs and improves the carbon competitiveness of its products.

Carbon lock-in: Emissions-intensive assets, technologies and energy systems that have long lifespans (or capital payback periods) and 'lock in' future emissions and, as a result, 'lock out' lower-carbon alternatives and are inconsistent with representative 1.5 °C climate scenarios. Investing in assets prone to lock-in restricts future flexibility and can both increase emissions and the costs of climate action. Carbon lock-in can apply to both supply-side risk projects and demand-side risk projects (see definitions).

Carbon offset: An emissions unit issued by a carbon crediting program that represents an emission reduction or removal of a greenhouse gas emission. Carbon offsets are uniquely serialized, issued, tracked and cancelled by means of an electronic registry.

Dead-end pathway: Technologies and technological pathways that are inconsistent with the global climate goal of keeping the rise in global temperatures below 1.5 °C degrees, and that require immediate phase-out based on these pathways. Dead-end pathways often have economically and technically viable alternatives and play no or limited role in the transition to 2050 climate goals.

Demand-side risk: The extent to which global demand for a product will decrease in the global low-carbon transition. Projects that have significant downstream (scope 3) emissions face high demand-side risk, particularly when they have long lifespans. Projects that must be immediately phased out to align with 1.5 °C climate targets also face high demand-side risk.

Path dependency: The extent to which incumbent assets, technologies and energy systems create inertia and reinforce political, market and social factors that delay or block climate action.

Scope 1 emissions: Direct greenhouse gas emissions that occur from sources that are owned or controlled by an entity. Examples are emissions from combustion in owned or controlled boilers, furnaces, vehicles; or emissions from chemical production in owned or controlled process equipment.

Scope 2 emissions: Indirect greenhouse gas emissions that occur from the generation of purchased electricity, steam, heating or cooling consumed by an entity. Scope 2 emissions physically occur at the facility where electricity, steam, heating or cooling is generated.

Scope 3 emissions: Indirect emissions outside of scope 2 that occur in the value chain of the reporting entity, including both upstream and downstream emissions. Examples for a petroleum refinery are emissions from the extraction and transportation of crude oil (upstream) and from the distribution and combustion of refined products (downstream).

Supply-side risk: The extent to which a project's scope 1 and 2 emissions increase its exposure to higher carbon costs in the global low-carbon transition. Higher carbon costs increase production costs, which diminishes a project or company's competitiveness as carbon emissions increasingly become a liability. Generally, projects with higher scope 1 and 2 emissions face higher supply-side risk.

Stranded assets: Assets that, prior to the end of their economic life (as assumed at the investment decision point), are no longer able to earn an economic return, as a result of changes associated with the transition to a low-carbon economy (lower than anticipated demand or prices).

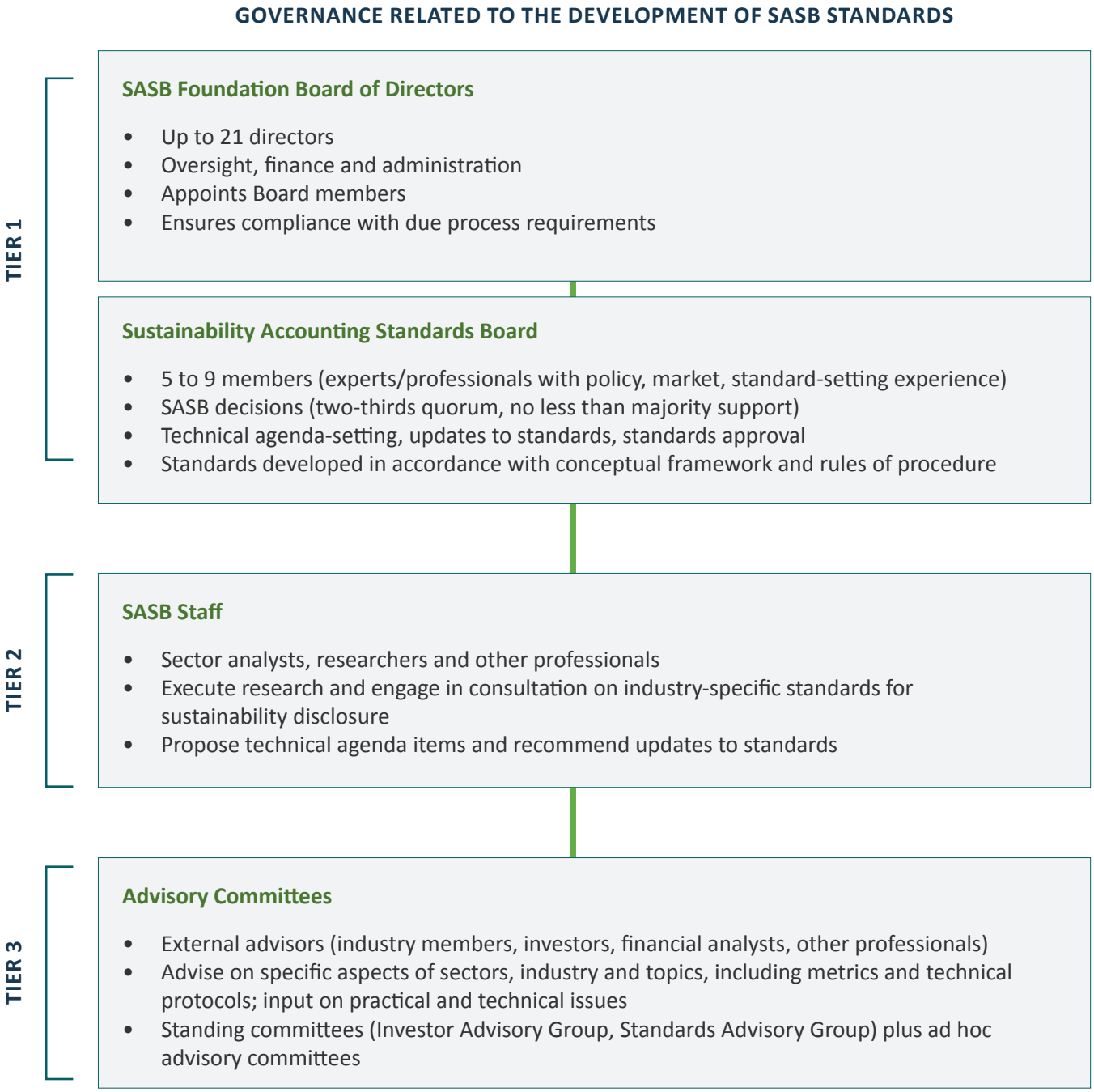
Transition opportunity: The quality of having significant market growth potential in a global low-carbon transition. Having low or best-in-class emissions, large projected future demand or high certainty of emissions reductions all reflect high transition opportunity.

Transition plan: An aspect of an entity's overall strategy that lays out a set of targets and actions supporting its transition toward a lower-carbon economy, including actions such as reducing its emissions.

Transition risk: The quality of having stagnant or negative market growth potential in a global low-carbon transition. Having high emissions, shrinking projected future demand, carbon lock-in or low certainty of emissions reductions all reflect high transition risk.

Annex 1: Examples of Three-Tier Governance Models

Sustainability Accounting Standards Board (SASB) (pre-merger with the International Integrated Reporting Council) [39]



39 Information on SASB's governance structure is provided in SASB's Rules of Procedure. In June 2021, SASB and the IIRC merged under the banner of the Value Reporting Foundation (VRF). The VRF was consolidated into the IFRS Foundation in August 2022.

Climate Bonds Initiative

GOVERNANCE RELATED TO THE CLIMATE BONDS INITIATIVE AS WELL AS ITS CLIMATE BONDS STANDARD AND CERTIFICATION SCHEME[40]

TIER 1

Climate Bonds Initiative Board of Trustees

- 8 trustees (climate, law, accounting, financial services)
- Provides strategic and financial oversight

Climate Bonds Standards Board

- 6 members (investor networks, environmental groups)
- Oversees the implementation and operation of Standard and Certification scheme; decisions on certification
- Supervises working groups

TIER 2

Climate Bonds Secretariat

- Research, coordination, administration
- Funding, logistics, public consultation, contracting

TIER 3

Climate Science Reference Group

- Advises on scope of low-carbon economy and eligible projects
- Recommends technical working groups

Technical Working Groups

- Develops eligibility criteria for each investment area (e.g., low-carbon transport and property, water, agriculture)

Industry Working Groups

- Reviews the practicality of proposed eligibility criteria and of various aspects of the operation of the certification scheme

40 Additional governance information is available on the Climate Bonds Initiative website.

European Union Taxonomy

GOVERNANCE RELATED TO THE INITIAL DEVELOPMENT OF THE EU TAXONOMY (PRIOR TO THE CREATION OF THE DOMESTIC PLATFORM ON SUSTAINABLE FINANCE)[41]

TIER 1

European Commission

- Oversees taxonomy development by the technical expert group (TEG)
- Responsible for taxonomy proposals sent to European Parliament for approval

TIER 2

TEG Members

- 32 members (serving as independent experts)
- Approve provision of advice to the European Commission
- Project coordination; appoint sector chairs

Sector Chairs

- 8 sector groups, each with Chairs/Co-Chairs and dedicated members
- Chairs coordinate sector groups, ensure appropriate composition, serve as link between TEG members and sector groups

TIER 3

Technical Experts

- Members of sector groups, provide technical expertise to develop sector-based taxonomy activities and criteria

Sector Chairs

- Review the practicality of proposed eligibility criteria and of various aspects of the operation of the certification scheme

41 See page 75 of the *Taxonomy Roadmap Report for Chile* (May 2021), which provides a figure summarizing the government structure that was implemented to develop the EU Taxonomy.

Annex 2: Piloted Methodology to Score Green and Transition Projects

The following discussion introduces a system to score green and transition projects, according to their relative transition opportunities and risks, reflecting the proposed criteria introduced in this Report. The scoring system was developed to test the feasibility of concept, and may serve as a starting point for the Taxonomy Custodian. Further work is needed to refine and test the piloted approach.

Scoring Green Projects

As summarized in Table A1, each green project would receive a score out of 6 based on its performance against the proposed criteria. Scores between 1 and 2 would receive a Green(+) classification. This represents the best possible score in the transition framework, reflecting significant transition opportunity and limited or no transition risk. Scores between 3 and 4 would receive a Green classification, while scores between 5 and 6 would receive a Green(-) classification. Projects with the Green(-) classification would still show opportunity in the transition (they are, after all, activities and projects that demonstrate low or zero emissions); however, certain attributes of the project would show some elements of relative risk.

Table A1: Criteria and Measures for Green Projects

Criteria	Measure
Emissions intensity relative to sector/product average	0 = N/A (negative emissions) 1 = Below sector/product average 2 = Meets sector/product average 3 = Above sector/product average
Size of value chain by 2050 in a 1.5 °C pathway	1 = Large value chain by 2050 2 = Moderate value chain by 2050 3 = Small or nonexistent value chain by 2050
Sequestration projects only	
Extent to which sequestered emissions may be re-emitted into the air	0 = N/A 1 = High certainty of permanence 2 = Moderate certainty 3 = Low certainty

Scoring Legend

Total between 1 and 2 = **Green** ⊕

Total between 3 and 4 = **Green**

Total between 5 and 6 = **Green** ⊖

Table A2 shows how a range of hypothetical examples of green projects would be scored using the criteria and measures discussed above.

Table A2: Evaluating Hypothetical Green Projects

Projects	Performance Measure	Performance Outcome	Score
New green hydrogen facility In operation by 2026 with an intensity of 2 tCO_2e/tH_2	Lifecycle emissions intensity relative to product average in net-zero pathway	Lifecycle emissions intensity below product average	1/3
	Value chain market size in a 1.5 °C pathway by 2050	Clean hydrogen market expected to be large, but with significant uncertainty (between $2.5 trillion and $12 trillion by 2050)	2/3
	Certainty of sequestered emissions permanence	N/A: no sequestration	N/A
Classification: Green			**Total: 3/6**
Afforestation development project Large-scale afforestation project on designated and protected lands	Lifecycle emissions intensity relative to product average in net-zero pathway	N/A: negative emissions	N/A
	Value chain market size in a 1.5 °C pathway by 2050	Large and growing market for certified negative-emissions solutions	1/3
	Certainty of sequestered emissions permanence	Planted area with low risk of forest fires	1/3
Classification: Green ⊕			**Total: 2/6**

Projects	Performance Measure	Performance Outcome	Score
Retooled electric vehicle production Retooled facility already in operation with an intensity of 35 gCO_2/km until 2030	Lifecycle emissions intensity relative to product average in net-zero pathway	Lifecycle emissions intensity above product average	3/3
	Value chain market size in a 1.5 °C pathway by 2050	EV market expected to be worth over $1 trillion by 2030	1/3
	Certainty of sequestered emissions permanence	N/A: no sequestration	N/A
Classification: Green			**Total: 4/6**
New biojet production facility In operation by 2025 with an intensity of 1,343 gCO_2e/RTK until 2035. Medium market. No sequestration.	Lifecycle emissions intensity relative to product average in net-zero pathway	Lifecycle emissions intensity above product average	3/3
	Value chain market size in a 1.5 °C pathway by 2050	Global market expected to reach $800 million by 2030 but highly uncertain after that	2/3
	Certainty of sequestered emissions permanence	N/A: no sequestration	N/A
Classification: Green −			**Total: 5/6**

Transition Projects

As summarized in Table A3, transition projects would receive a minimum score of 3 and a maximum score of 15. Those with a total score of between 3 and 5 would receive a Transition(+) classification, whereas those with a score of between 6 and 10 would receive a Transition classification. Those with a score of between 11 and 15 would receive a Transition(-) classification.

Table A3: Criteria and Measures for Transition Projects

Criteria	Measure
Emissions intensity relative to sector/product average (today)	1 = below sector/product average 2 = meets sector/product average 3 = above sector/product average
Emissions intensity relative to sector/product average in 2030 (based on net-zero pathways)	1 = well below 2030 sector/product average 2 = below 2030 sector/product average 3 = meets 2030 sector/product average
Size of value chain by 2050 in a 1.5 °C pathway	1 = Large value chain by 2050 2 = Moderate value chain by 2050 3 = Small or non-existent value chain by 2050
Sequestration projects only	
Extent to which emissions may not be captured or sequestered emissions re-emitted into atmosphere	0 = N/A 1 = Low risk 2 = Moderate risk 3 = High risk
Demand-side risk projects only	
Project lifetimes relative to global demand for product in a 1.5 °C pathway	0 = N/A 1 = Short lifetime 2 = Medium lifetime 3 = Long lifetime

Scoring Legend

Total between 1 and 5 = **Transition** (+)

Total between 6 and 10 = **Transition**

Total between 11 and 15 = **Transition** (−)

Table A4 below shows how a range of hypothetical examples of transition projects would be scored using the criteria and measures above.

Table A4: Evaluating Hypothetical Transition Projects

Projects	Performance Measure	Performance Outcome	Score
New blue hydrogen facility In operation by 2024 with an intensity of 27 $kgCO_2e$/GJ. Reliance on CCUS for sequestering 90 per cent of emissions	Emissions intensity relative to product average in net-zero pathway (in 2022)	Emissions intensity well below 2022 product average	1/3
	Emissions intensity relative to product average in net-zero pathway (by 2030)	Emissions intensity well below 2030 product average	1/3
	Value chain market size in a 1.5 °C pathway by 2050	Clean hydrogen market expected to be large, but with significant uncertainty (between $2.5 trillion and $12 trillion by 2050)	2/3
	Sequestration projects only: risk of deploying CCUS technology	Carbon capture process highly reliable, sequestered emissions have high certification standards	1/3
	Demand-side risk projects only: payback period relative to demand-side risk in a 1.5 °C pathway	N/A: draws on existing gas supply, no new demand-side risk	0/3
Classification: Transition +			**Total: 5/15**

Projects	Performance Measure	Performance Outcome	Score
Electrified steel production Electrification of a facility already in operation with an intensity of 1.5 tCO_2e/t steel until 2030	Emissions intensity relative to product average in net-zero pathway (in 2022)	Emissions intensity above 2022 product average	3/3
	Emissions intensity relative to product average in net-zero pathway (by 2030)	Emissions intensity well below 2030 product average	1/3
	Value chain market size in a 1.5 °C pathway by 2050	Global market for steel valued at nearly $1T, expected to rise by 2050	1/3
	Sequestration projects only: risk of deploying CCUS technology	N/A: no sequestration	0/3
	Demand-side risk projects only: payback period relative to demand-side risk in a 1.5 °C pathway	N/A: no new demand-side risk	0/3
Classification: Transition +			**Total: 5/15**
Retrofitted natural gas production Methane capture retrofit of a facility already in operation with an intensity of 62 gCO_2e/MJ and a lifespan of 10 years	Emissions intensity relative to product average in net-zero pathway (in 2022)	Emissions intensity meets 2022 product average	2/3
	Emissions intensity relative to product average in net-zero pathway (by 2030)	Emissions intensity meets 2030 product average	3/3
	Value chain market size in a 1.5 °C pathway by 2050	Market starts declining in 2020s but demand remains robust for low-cost, low-emissions producers	2/3
	Sequestration projects only: risk of deploying CCUS technology	N/A: no sequestration	0/3
	Demand-side risk projects only: payback period relative to demand-side risk in a 1.5 °C pathway	Short payback period, expected to close by 2032	1/3
Classification: Transition			**Total: 8/15**

Projects	Performance Measure	Performance Outcome	Score
Retrofitted oilsands production CCUS retrofit for existing facility with an intensity of 90 $kgCO_2e/bbl$. Facility closes in 2045.	Emissions intensity relative to product average in net-zero pathway (in 2022)	Emissions intensity above product average	3/3
	Emissions intensity relative to product average in net-zero pathway (by 2030)	Emissions intensity below product average	2/3
	Value chain market size in a 1.5 °C pathway by 2050	Market starts declining in 2020s (faster than gas). Demand highly uncertain and volatile post-2035.	3/3
	Sequestration projects only: risk of deploying CCUS technology	Potential challenges with capture reliability, high certification storage standards	2/3
	Demand-side risk projects only: payback period relative to demand-side risk in a 1.5 °C pathway	Long payback period, expected to close in 2045	2/3
Classification: Transition ⊖			**Total: 12/15**

Annex 3: Sustainable Finance Market Snapshot

Overview

GLOBAL MARKET: SUSTAINABLE BONDS

Total: US$2.7 trillion

2021 issuance: US$1.1 trillion
(+105 per cent year over year)

2021 by category:
Approximately 55 per cent green bonds, 19 per cent social, 16 per cent sustainability, 10 per cent sustainability-linked, 0.4 per cent transition

CANADIAN MARKET: SUSTAINABLE BONDS

Total: US$49 billion

2021 issuance: US$20 billion
(+105 per cent year over year)

2021 by category:
Approximately: 67.2 per cent green bonds, 17 per cent sustainability, 12.4 per cent sustainability-linked, 3.4 per cent social

What are the Types of Sustainable Debt?

The universe of sustainable debt consists of an evolving realm of financial instruments falling primarily within two debt-financing categories: ***use-of-proceeds***, and ***performance-*** or ***sustainability-linked debt***. The key difference between these two categories is the way in which the proceeds can be utilized.[42]

1. **Use-of-proceeds** finance is any type of bond or loan instrument where proceeds are exclusively made available to finance or re-finance eligible environmental and/or social projects. Many thematic categories have emerged over time, including green bonds/loans, social bonds/loans as well as sustainability and transition bonds.

2. **Sustainability-linked finance** is any type of bond or loan instrument that aims to incentivize material environmental and/or social achievements by linking the financial terms of the bond or loan to pre-defined entity-level sustainability performance targets (SPTs) measured by key performance indicators (KPIs). Unlike the use-of-proceeds model, sustainability-linked debt proceeds can be used for general corporate purposes. This category consists of sustainability-linked loans (SLLs) and sustainability-linked bonds (SLBs).

42 The International Capital Market Association has developed extensive voluntary guidance on use-of-proceeds and sustainability-linked bonds, which can be viewed here. Similar guidance for use-of-proceeds and sustainability-linked loans has been developed by the Loan Market Association, Asia Pacific Loan Market Association and Loan Syndications & Trading Association, which can be viewed here.

Global Market: 2021 Overview

With sustainable debt issuance exceeding US$4 trillion[43] by the end of the year, 2021 was a period of exceptional growth driven by record-high annual issuance volume of $1.65 trillion – an increase of 115 per cent from 2020, and 184 per cent from 2019.

Sustainable bonds[44] accounted for nearly 70 per cent of the 2021 total and achieved the symbolic, but much anticipated milestone of $1 trillion in annual issuance for the first time. Green bonds, the oldest and most established bond segment, remained atop the market as issuance doubled to $621 billion. However, newer categories, including sustainability and sustainability-linked bonds, are gaining momentum, as demonstrated by the green bond's declining share of the bond market, which decreased from 90 per cent in 2017 to 55 per cent in 2021.

Meanwhile, after a moderate decline of 10 per cent between 2019 and 2020, sustainable lending returned to growth in 2021, with sustainable loans accounting for 30 per cent of the annual total. Sustainability-linked loans[45] were responsible for the entirety of this growth, as lending more than tripled to reach $428 billion. Green loan lending declined by a modest 1 per cent and was the only category to register a decrease in issuance.

Figure A1: Cumulative sustainable debt issuance (US$tn)

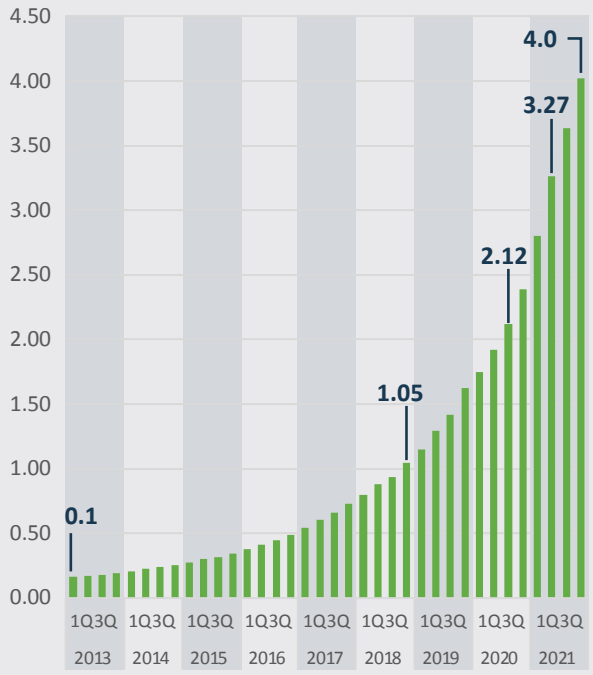
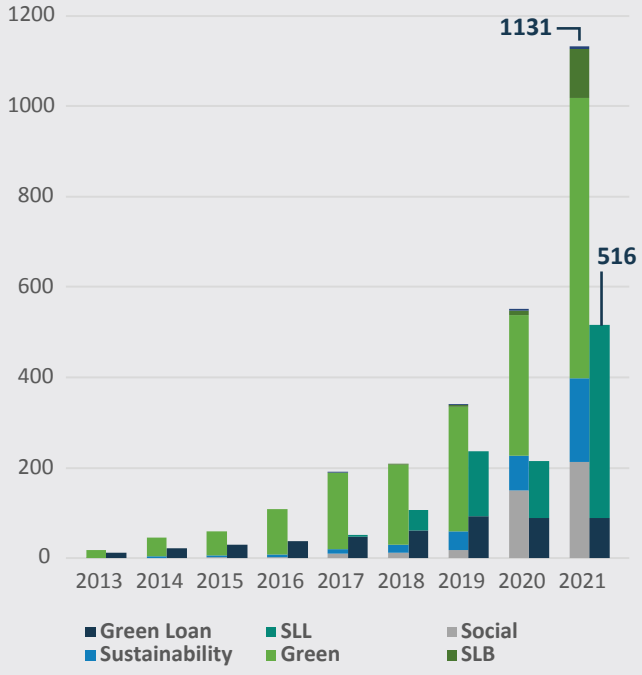


Figure A2: Annual sustainable bond and loan issuance, by category (US$bn)



Source: BloombergNEF

43 All figures expressed in U.S. dollars unless otherwise noted.

44 In this report, sustainable bonds refer to green, social, sustainability, transition and sustainability-linked bonds.

45 In this report, sustainable loans refer to green and sustainability-linked loans.

Sustainable Bonds

- Issuance volume of $1.1 trillion—more than doubled 2020 issuance. Cumulative issuance totaled $2.7 trillion.
- Record-high annual issuance across all five thematic bond categories.
- Approx.: 55 per cent green bonds, 19 per cent social, 16 per cent sustainability, 10 per cent SLB, 0.4 per cent transition.
- 6,000 debt instruments issued by more than 1,500 issuers.[46]

The $1 trillion milestone arrives amid growth across all thematic bond categories. Most notably, issuance of sustainability-linked bonds, the first of which was issued in 2019 by Italian energy company, Enel, was nearly nine times higher than 2020.

Sustainability bond issuance more than doubled, whereas social bond issuance, which was coming off a huge surge in 2020 amidst the COVID-19 Pandemic, experienced a more modest increase of about 40 per cent during 2021. Transition bonds, which accounted for just under $5 billion in issuance, have so far enjoyed less clarity than the other use-of-proceeds bonds regarding eligible projects. This lack of certainty is likely a contributing factor to the category's comparatively modest growth. Notable issuances this year included the EU's inaugural €12 billion green bond, as well as two United Kingdom sovereign green issuances totalling $22 billion.[47] Meanwhile, the Province of Ontario's C$2.75 billion (US$2.2 billion) green issue was the largest green issue by a local authority in 2021[48]

Figure A3: Share of annual issuance volume by category (%)

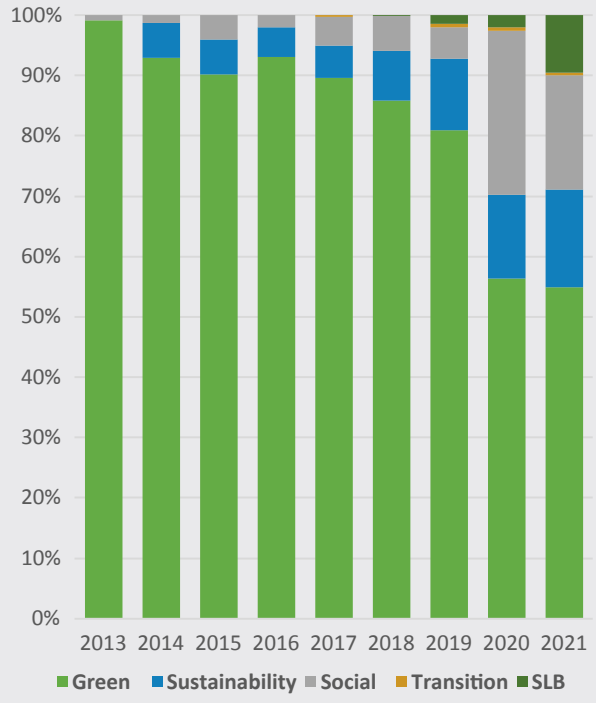
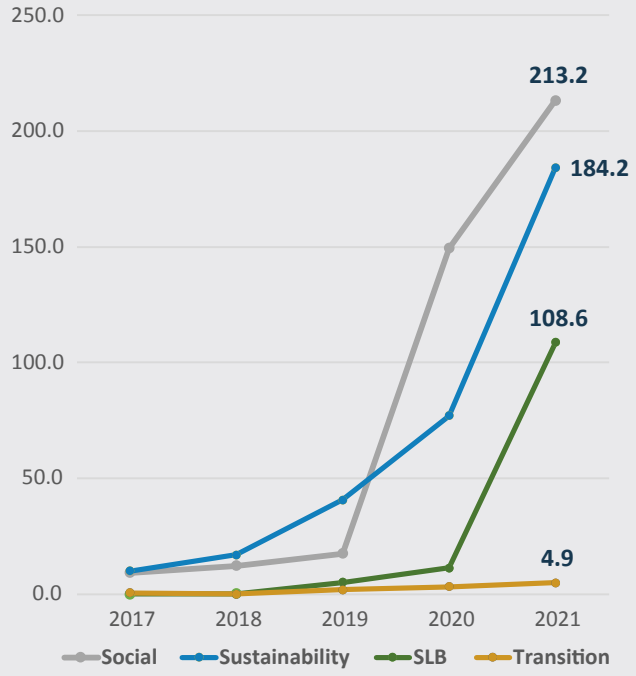


Figure A4: Other bonds continue to gain momentum (US$bn)



Source: BloombergNEF

46 As reported by the Climate Bonds Initiative. See: Sustainable Debt: Global State of the Market 2021.

47 See press release: European Commission successfully issues first green bond to finance the sustainable recovery. The EU's inaugural green bond was 11 times oversubscribed, attracting total investor demand of €135 billion. The UK's £10 billion inaugural green sovereign issuance in September attracted investor demand of £100 billion, the highest ever recorded for a UK government bond sale. The bond exhibited a price premium or "greenium" of 2.5bps, saving the Government £28 million over the life of the bond (see: Financial Times).

48 See: Ontario 8-year – $2.75 Billion DMTN CAD Green Bond

Canadian Sustainable Bond Market in 2021[49]

Growth in sustainable bond issuance by Canadian issuers kept pace with the broader global market as annual issuance reached a record ***US$20 billion in 2021***, just over double the $9.75 billion issued in 2020. At year-end, cumulative sustainable bond issuance stood at approximately $49 billion, positioning the Canadian market to surpass $50 billion in early 2022. There were ***32 issuers in 2021***, with eight bringing more than one bond to market. For information on the top five issuers of 2021, see Table A5.

With $13.4 billion in 2021, green bonds continue to account for the majority of total issuance. However, ***the market continues to diversify amid the arrival of the social, sustainability and sustainability-linked bond labels*** in 2018, 2019, and 2021 respectively. The green category's share of the market has declined from 100 per cent in 2017 to 67 per cent in 2021 as a result.

Provincial and municipal governments account for 25 per cent of cumulative issuance volume. The Province of Ontario, which is the largest issuer by far, is joined by the Province of Quebec and the cities of Ottawa, Toronto and Vancouver.

In November 2021, Bruce Power, the operator of the Bruce Power Nuclear Generating Station in Ontario, issued a C$500 million bond recognized ***as the world's first green bond dedicated to nuclear power.***[50] In July 2022, Ontario Power Generation (OPG) issued a $300 million nuclear green bond, to support a project to refurbish the Darlington nuclear power generating facility.

Figure A5: Annual sustainable bond issuance
(US$bn)

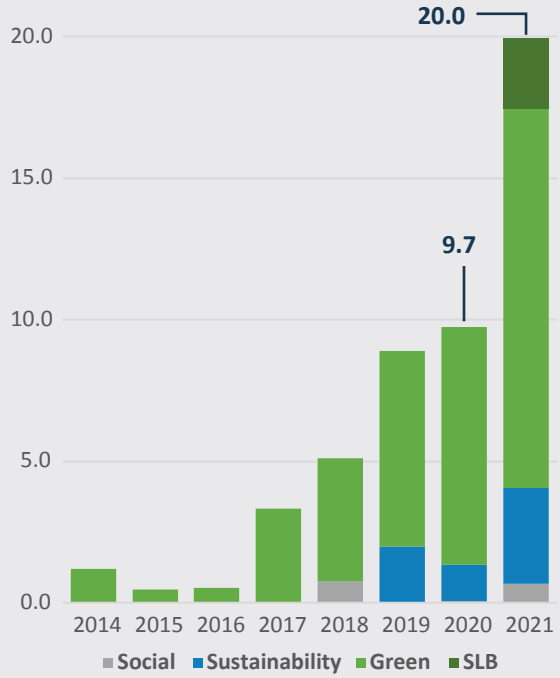
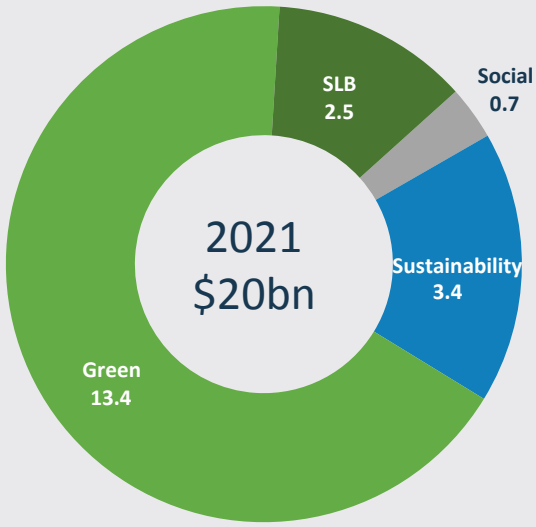


Figure A6: Sustainable bond issuance, 2021
(US$bn)



Source: BloombergNEF

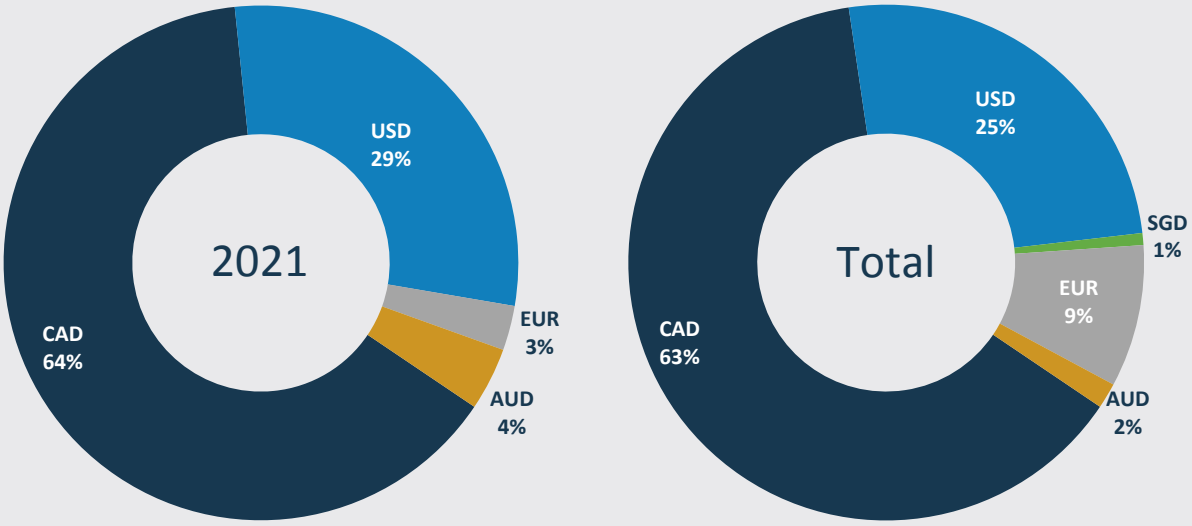
49 Due to limited data availability, loans have not been included in the overview of the Canadian market; however, sustainability-linked lending is increasing in Canada.

50 According to Bruce Power, this green bond is a global first for nuclear power.

The top ten all-time issuers combined for US$28.7 billion in issuance, or 58 per cent of cumulative issuance volume. All ten entities are repeat issuers, with the Province of Ontario and the National Bank of Canada leading with ten each. Three have had a presence in the market since its early stages in 2014. Enbridge, a first-time issuer in 2021 with the issuance of two sustainability-linked bonds, is the most recent entrant to the top ten list. For more information on top issuers, see Table A6.

Overall, bonds have been issued in five currencies. CAD is the most common issuing currency, accounting for 63 per cent of cumulative issuance volumes. USD is a distant second, followed by the Euro, the Australian dollar, and the Singapore dollar.

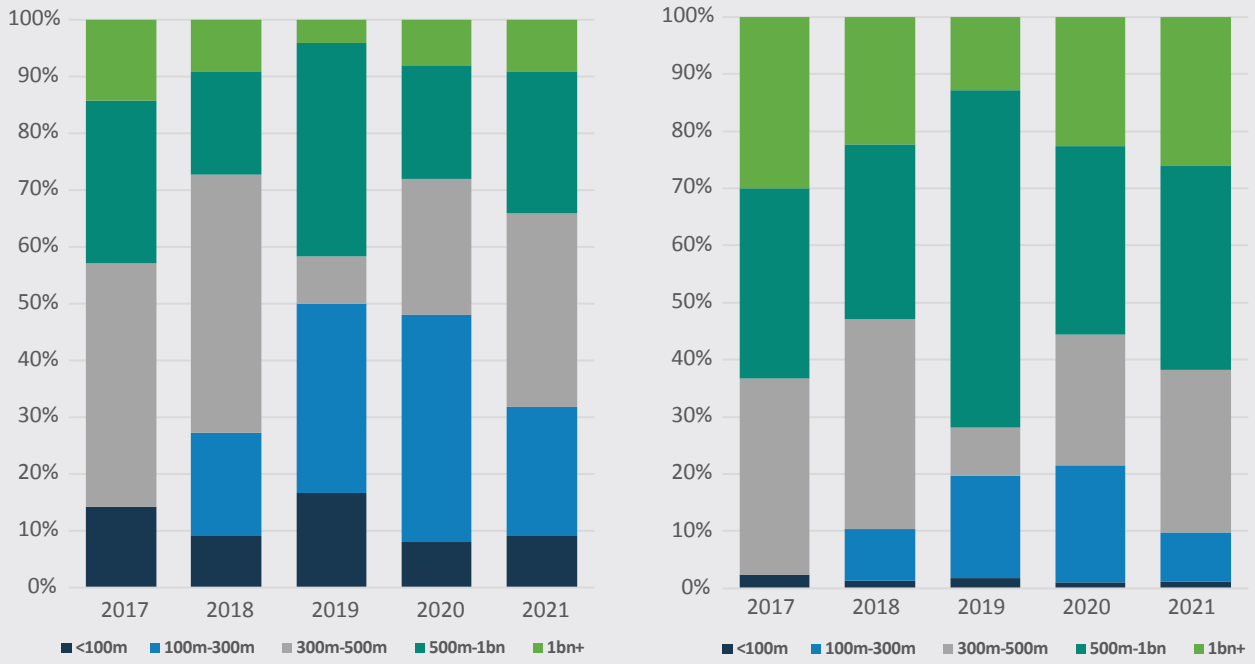
Figure A7: Share of issuance volumes by currency



Source: BloombergNEF

Cumulatively, 33 per cent of bonds had an issuance size of US$500 million or more, accounting for $29.5 billion, or 60 per cent of total issuance. US$300-500 million is the most common issuance size.

Figure A8: Issuance size by: Share of bonds issued (left) and share of issuance volume (right).



Source: BloombergNEF

Ontario's Ten Green Issuances[51]

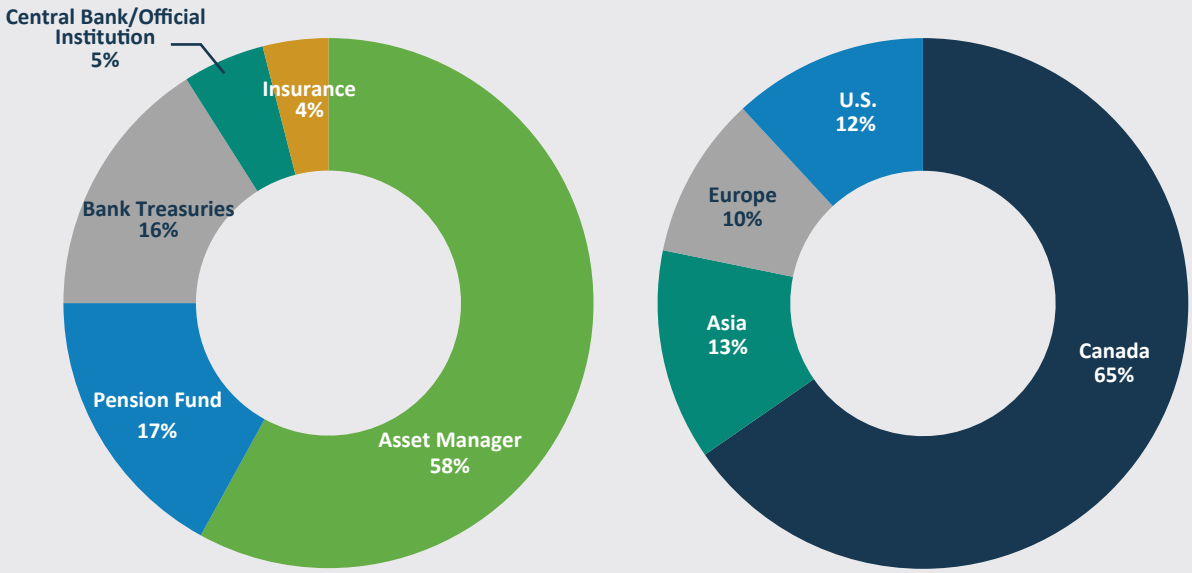
Ontario is the largest issuer of Canadian dollar green bonds. In 2021, the Province issued its 10th and largest green bond to date in the amount of C$2.75 billion (~US$2.2 billion), exceeding C$10 billion in cumulative issuance (~US$8.4 billion).

As of November 2021, 89 per cent of proceeds have been disbursed across 27 projects in clean transportation (75 per cent), energy efficiency and conservation (21 per cent) and adaptation and resilience (3 percent).

The green bond program has played an important financing role in Ontario's mass transit buildout. And, with C$148 billion in planned infrastructure investments over the next ten years, including C$61 billion in transit infrastructure, the Province has signaled its desire to continue the program, with plans to bring multiple green issuances to market annually.

51 Ontario Financing Authority: 2021 Green Bond Newsletter

Figure A9: Investor demand by region and type across all ten issuances.



Source: Ontario Financing Authority: 2021 Green Bond Newsletter

2022 YTD Highlights

By the beginning of June, ***at least US$10.6 billion has been issued*** across 13 green, sustainability and sustainability-linked bonds.[52] This figure is higher than the total issuance in 2020, and more than half of the total issuance in 2021. ***The Government of Canada's C$5 billion inaugural sovereign green issuance*** was the largest green bond issued globally in Q1 2022.[53] With a final order book of C$11 billion from 98 institutional investors,[54] the bond attracted strong demand.

First-time issuers included OMERS and PSP Investments, with a dual-tranche sustainability bond offering totaling US$1.1 billion and a C$1 billion green bond respectively. With previous offerings from CPPIB, OTPP, and CDPQ, ***Canadian public pension plans have issued a combined US$9 billion.*** This is a unique feature of the Canadian market – as of July 2021, no pension funds outside of Canada had issued green debt.[55]

Provincial and municipal governments account for at least US$2.3 billion of 2022 issuance so far, after offerings from repeat issuers Ontario (US$1.3 billion), Quebec (US$781 million), and the City of Ottawa (US$155 million).

Other first-time issuers include iA Financial (sustainability) and Tamarack Valley Energy (SLB). Other repeat issuers include QuadReal (green), TELUS (SLB), Manulife (green), and Dream Industrial REIT (green).

52 As of June 2022. Values may not reflect full 2022 YTD issuance volumes.

53 Environmental Finance, Q1 Sustainable Bond Roundup

54 RBC, Canada's Inaugural Green Bond

55 Capital Monitor, Hard reality: Why Canada's pension plans are blazing a trail in green bond issuance.

Table A5: Top-Five Canadian Issuers of 2021

Issuer	# of Deals	Issuance (US$m)	Share of Volume	Type
Province of Ontario	2	3,186	15.96%	Green
Enbridge*	2	1,860	9.32%	SLB
CDP Financial* (CDPQ)	1	1,000	5.01%	Green
Bank of Nova Scotia	1	1,000	5.01%	Sustainability
Allied Properties REIT*	2	871	4.36%	Green
Totals	**8**	**7,917**	**39.67%**	**–**

* First-time issuer

Source: BloombergNEF

Table A6: All-Time Top Issuers (as at December 31, 2021)

Issuer	# of Deals	Issuance (US$m)	Share of Volume	Type
Province of Ontario	10	8,364	16.97%	Green
CPPIB Capital	7	4,637	9.41%	Green
Province of Quebec	6	2,542	5.16%	Green
Toronto-Dominion Bank	4	2,453	4.98%	Green, Sustainability
National Bank of Canada	10	2,441	4.95%	Sustainability
Export Development Canada	5	1,884	3.82%	Green
Enbridge	2	1,860	3.77%	SLB
Ontario Power Generation	4	1,571	3.19%	Green
Bank of Nova Scotia	2	1,500	3.04%	Green, Sustainability
Ontario Teachers' Finance Trust	2	1,453	2.95%	Green
Totals	**52**	**28,706**	**58.25%**	**–**

Source: BloombergNEF

Tab 4

EETP

ELECTRIFICATION AND
ENERGY TRANSITION PANEL

ONTARIO'S CLEAN ENERGY OPPORTUNITY

REPORT OF THE ELECTRIFICATION AND ENERGY TRANSITION PANEL

DECEMBER 2023

TRANSMITTAL LETTER

Dear Minister Smith,

As Chair of the Electrification and Energy Transition Panel it is my honour to present to you our final report and recommendations. Thank you for the privilege to chair this Panel and for the trust you placed in us to advise you on some of the key questions facing Ontario's energy and economic future. I could not think of more important work at this juncture than contributing to the energy transition and Ontario's future prosperity.

Thank you to my highly capable co-panelists, Dr. Monica Gattinger and Chief Emerita Emily Whetung, whose collective expertise, experiences, and diverse perspectives enriched our deliberations and the quality of this report. Their dedication to this endeavor has been invaluable, and it has been an absolute pleasure working alongside these two tremendous leaders.

I must also extend our appreciation to all those who have shown a keen interest in the Panel's work, including energy sector stakeholders, Indigenous partners and the public. The engagement and feedback we received throughout this process were instrumental in shaping the recommendations we present today. They demonstrate a broad interest in a successful energy transition for Ontario.

Finally, I want to express our heartfelt gratitude to the dedicated staff at the Ministry of Energy, other ministries, the Independent Electricity System Operator and the Ontario Energy Board for their commitment and support in assisting the Panel in fulfilling our mandate, including advice, research support and facilitation of meaningful engagements.

Building on the "What We Heard" report that summarized the insights we received from energy sector stakeholders, Indigenous partners, and the public, along with extensive research on other jurisdictions' approaches and experiences, our final report outlines what we believe is a robust and well-informed framework for Ontario's path toward developing a prosperous clean energy economy. Recognizing the good work already underway, we recommend a series of actions that would help align government, economic and social forces for long-term success in a rapidly changing world.

Thank you once again for the honour of serving as Chair, and for your commitment to a cleaner, prosperous and electrified Ontario.

Sincerely,

David Collie
Chair, Electrification and Energy Transition Panel

EXECUTIVE SUMMARY

The global energy landscape is undergoing a profound and rapid transformation. Driven by technological change and the commitment to address climate change, societies around the world are developing ways to decarbonize their energy supply and improve energy efficiency. Against this backdrop, transforming Ontario into a clean energy economy is a key strategic opportunity for the province. By building on our history and wealth of industry expertise, innovation and abundant clean energy resources, and in partnership with Indigenous communities, Ontario can prosper in the global transition to a clean energy economy. To seize this economic opportunity, government will need to align economic and social forces around the common vision and purpose necessary to navigate a multi-decade social, economic, and political process that will affect every sector and community in Ontario.

The Government of Ontario established the Electrification and Energy Transition Panel to advise government on opportunities for the energy sector to help Ontario's economy prepare for electrification and the energy transition, and to identify strategic opportunities and planning reforms to support emerging electricity and fuels planning needs.

Panel engagements with stakeholders and Indigenous partners, carried out between December 2022 and July 2023, revealed broad-based enthusiasm to seize the opportunities of electrification and energy transition. These conversations were crucial to the Panel's deliberations, along with written submissions and an extensive review and analysis of the experience and future commitments and plans of other jurisdictions in Canada and internationally. Informed by this research and engagement, the Panel's recommendations lay out the principles and next steps for Ontario to navigate and succeed in the transition towards a clean energy economy in the long term:

- Establishing a government-wide commitment to develop a clean energy economy by 2050 to align private, social and public forces, and act as a catalyst for pursuing dynamic opportunities to enhance Ontario's prosperity.
- Articulating a clear strategic policy vision to focus the sector, bring alignment in managing change and deliver an orderly transition that prioritizes affordability, reliability and resilience. This is an urgent need.
- Building meaningful partnerships with Indigenous communities that advance reconciliation and provide Indigenous opportunities in electrification and energy transition. Partnerships

are the only way Ontario will be successful in making energy infrastructure investments at the pace and scale necessary to build a clean energy economy.

- Carefully modifying the existing institutional framework in which the Ministry of Energy continues to lead energy planning. This is the best way to achieve cross-sector coordination and prepare for electrification and energy transition. Government will need to provide direction on complex and contentious issues to ensure an orderly transition that allocates resources effectively and protects customers.
- Undertaking a series of actions to ensure that Ontario's planning and regulatory systems are ready for electrification, support the move to a clean energy economy and can manage increasing pressures in a proactive, coordinated and adaptive manner. The Independent Electricity System Operator (IESO) and the Ontario Energy Board (OEB) will play central and distinct roles in this process.
- Ensuring effective collaboration and integration in energy planning across fuels, especially electricity and natural gas, across end use sectors and across levels of government, to ensure investments and innovation can be deployed in a way that unlocks their full value.
- Most importantly, building and maintaining public support for electrification and the energy transition with a principled pragmatic approach grounded in cost-effectiveness and solutions tailored to the specific and often local needs and circumstances of people as customers, citizens and community members. Ontarians need to be able to see themselves and their community in the province's clean energy economy vision. Governments and the energy sector have important roles to play in supporting and working with customers and communities in this process.

OVERVIEW OF RECOMMENDATIONS

Below is an overview of the Panel's recommendations. The full text of each detailed recommendation can be found in the respective sections of the report and listed in **Section 10** at the end of the report.

PLANNING FOR ELECTRIFICATION AND THE ENERGY TRANSITION

Recommendation 1: The provincial government should develop and communicate a commitment and associated policy principles for achieving a clean energy economy for Ontario by 2050.

Recommendation 2: The provincial government should convene an internal clean energy economy planning and implementation body, such as an existing committee of Cabinet.

Recommendation 3: The provincial government should continue to seek alignment and coordination of clean energy economy objectives, standards and policies with other governments (within and outside Canada) whenever practical and consistent with the province's economic and policy interests.

Recommendation 4: The Ministry of Energy should develop and communicate an energy transition policy vision that is inclusive of Indigenous perspectives and informed by clean energy economy policy principles.

Recommendation 5: The Ministry of Energy should develop and release on a regular cycle an integrated long-term energy plan that will guide Ontario's development of technical energy plans, strategies and actions to support the transition to a resilient and affordable clean energy economy.

Recommendation 6: The Ministry of Energy should provide policy direction on the role of natural gas in Ontario's future energy system as part of its next integrated long-term energy plan.

Recommendation 7: The Ministry of Energy should develop a strengthened framework for local energy planning and decision-making and take steps to facilitate its implementation.

Recommendation 8: The provincial government should establish an external Energy Transition Advisory Council to provide advice, independent of government and on an ongoing basis, on the overall trajectory of Ontario's energy transition, emerging governance or energy system-level questions and the integration of energy planning and coordination with sectoral strategies.

Recommendation 9: The provincial government should fund, on an ongoing basis, independent whole economy energy pathways studies, in a way that allows for iterative improvement of modelling and assumptions, transparency on costs, and with meaningful input from relevant stakeholders and Indigenous communities.

GOVERNANCE AND ACCOUNTABILITY

Recommendation 10: The Ontario Energy Board (OEB) and Independent Electricity System Operator (IESO) should take steps to enable the effective evolution of innovative business models in line with clean energy economy goals and to help consumers benefit from electrification and the energy transition.

Recommendation 11: Safety regulators and technical standards organizations must be included in energy planning and energy sector regulation to enable proactive coordination and the effective deployment of new technical solutions.

Recommendation 12: The OEB should employ all tools within its existing mandate to implement activities consistent with Ontario's goals for a clean energy economy and the requirements of the energy transition for Ontario.

Recommendation 13: In the years following release of the energy transition policy vision (Recommendation 4), the provincial government should undertake a review of the OEB's activities in respect of achieving objectives within the policy vision to determine if potential legislative and/or regulatory changes are needed to implement the vision effectively.

Recommendation 14: The IESO should be empowered, within the broad direction established by government, to independently procure electricity resources and lead bulk-system planning (including potential use of interties) and regional electricity system planning.

Recommendation 15: The OEB should conduct reviews of cost allocation and recovery policies for natural gas and electricity connections, as well as natural gas infrastructure investment evaluations to protect customers and facilitate development of the clean energy economy.

Recommendation 16: The Ministry of Energy, working with the OEB, IESO, LDCs (local distribution companies), municipalities and gas utilities, should develop a formal and transparent co-ordination framework that sets out the scope and objectives for enhanced planning and co-ordination at the bulk, regional and distribution levels.

Recommendation 17: To make full use of the innovation in distributed energy resources and the electricity distribution sector, the OEB and IESO must continue to find ways within their existing mandates and in anticipation of the clean energy economy policy commitment (Recommendation 1) to provide proactive and transparent thought leadership on regulatory policy and critically review and revise their existing policies and processes.

Recommendation 18: The government should regularly assess the need for resources (skills, staff, other supportive resources) across ministries and agencies to steer energy planning and decision-making competently and effectively through the energy transition, and ensure required resources are provided.

TRUE PARTNERSHIPS WITH INDIGENOUS PARTNERS

(Note: There are several other recommendations across the report referencing Indigenous partners and recommending actions to support meaningful Indigenous participation in the clean energy economy.)

Recommendation 19: The government should support meaningful Indigenous participation in the clean energy economy through consistent and enhanced capacity-building support.

Recommendation 20: The government should advance economic reconciliation through flexible financing models and mechanisms that incentivize Indigenous project ownership across small, medium and large-scale energy projects.

Recommendation 21: The government should amend the enabling statutes of the IESO and OEB to ensure Indigenous representation on the Boards of Directors.

Recommendation 22: The Ministry of Energy should review its current resources to enhance the Ministry's capacity to support Indigenous partners' effective participation in energy planning and decision-making.

INNOVATION AND ECONOMIC DEVELOPMENT

Recommendation 23: The Ministry of Energy should take further steps to reflect in policy and regulation the key role that clean, affordable and reliable energy will play in the development of globally competitive and future-oriented industries by enabling proactive planning decisions, fostering effective and efficient permitting and identifying key clean energy value chains.

Recommendation 24: The government should consider a mission-oriented approach to economy-wide industrial strategy that is centered on the development of a clean energy economy.

Recommendation 25: The government should clearly set out a policy vision for how electrification and the energy transition will be funded, including a realistic assessment of the distributional impacts of funding choices on different groups.

CONSUMER, CITIZEN AND COMMUNITY PERSPECTIVES

Recommendation 26: The government, IESO and OEB should play a key role in engaging with the public and Indigenous partners to ensure transparent access to high-quality information and meaningful opportunities to participate in decision-making.

Recommendation 27: The government should explore mechanisms to support broad adoption of fuel switching, decarbonization and supportive technologies, including active engagement and communication on benefits and risks as well as mechanisms to help customers manage up-front costs.

Recommendation 28: Existing electricity rate mitigation and affordability programs should be redesigned to better target support to those who need it most, and to streamline program application and enrollment processes for increased accessibility.

Recommendation 29: The government, IESO and OEB should support capacity-building for utilities and communities to conduct assessments of climate change impacts to energy infrastructure and to support effective climate resilience efforts and adaptation planning and implementation.

1. INTRODUCTION

The global energy landscape is undergoing a profound and rapid shift. Driven by technological change and the commitment to address climate change, societies around the world are developing ways to decarbonize their energy supply and improve energy efficiency. With its history and wealth of industry expertise, innovation and abundant clean energy resources, Ontario is well-positioned to prosper through the transition to a clean energy economy. This is a strategic moment.

How exactly electrification and the energy transition will materialize is yet unclear. It will take commitment from government to align economic and social forces around a common vision and purpose. It will require partnerships with Indigenous communities to effectively develop the energy system based on shared values. And it will take careful and improved planning, frequent reevaluation, and adjustments along the way.

1.1 MANDATE AND SCOPE OF WORK

We thank the Honourable Todd Smith, Minister of Energy, for entrusting us with the development of recommendations on how Ontario can navigate a rapidly changing energy landscape and prepare for electrification and the energy transition.

The Ontario government established the Electrification and Energy Transition Panel (EETP) in April 2022 and finalized its membership in November 2022. The Panel was established to:

- Advise government on the highest value short, medium, and long-term opportunities for the energy sector to help Ontario's economy prepare for electrification and the energy transition.
- Identify strategic opportunities and planning reforms to support emerging electricity and fuels planning needs in the context of energy demand, emerging technologies, environmental considerations and overall costs to consumers.

The Panel interpreted this mandate broadly to consider the role of Ontario's energy sector, today and in the future – and to determine what changes are needed to enable successful electrification and energy transition. Recommendations put forward here centre on the

fundamental principles and approaches that should guide Ontario and key changes and additions to existing energy planning and governance frameworks.

The Panel was also expected to consider the interests and perspectives of Indigenous communities, both with regard to energy project development and with regard to recommendations on the process of long-term energy planning.

The Panel received important advice on the opportunities offered by specific technologies but decided that this was not the place to recommend one or another technology as particularly promising. In addition, the Panel heard clearly that a sufficient supply of qualified labour would be crucial in enabling electrification and the energy transition, and that the natural emergence of this workforce, in line with need, could not be taken for granted. The Panel agrees with this assessment but found it outside the scope of its mandate to offer specific recommendations. While many factors will contribute to a successful energy transition, this report focuses particularly on the crucial role of institutional and policy frameworks for energy planning and governance.

1.2 ACKNOWLEDGEMENT

Mr. David Collie and Dr. Monica Gattinger would like to recognize the expertise, dedication, and contributions of Chief Emerita Emily Whetung-MacInnes, who brought a critical and essential perspective regarding collaboration, partnership-building and reconciliation with Indigenous communities to the Panel's engagements and final report. Ms. Whetung-MacInnes played a key role in facilitating conversations with Indigenous partners; encouraging non-Indigenous stakeholders to consider Indigenous perspectives throughout engagements; and ensuring the Panel's report reflects the feedback from engagements with Indigenous partners. Ms. Whetung-MacInnes, who was appointed to the Panel in November 2022, was unable to remain on the Panel for its concluding deliberations due to conflicting professional obligations and stepped down from the Panel on July 23, 2023. She has the Panel's deepest gratitude, respect and appreciation for the gift of her time and wisdom to this body of work.

1.3 ENERGY TRANSITION, ELECTRIFICATION AND ONTARIO'S ECONOMIC OPPORTUNITY

There is now a broad consensus that we are at the beginning of a fundamental change in how our lives and economy are powered. The Panel finds that based on its economic strengths and given past and current investments in energy infrastructure, Ontario is in an excellent position to benefit from this opportunity and build a more prosperous economy and society.

The term "energy transition" refers to the structural transformation of how a society supplies and uses energy, usually driven by technological developments and shifts in human needs and goals. Past transitions from muscle power and biomass as the primary sources of energy to fossil fuels (first coal and then petroleum and natural gas) illustrate how profoundly energy transitions transform societies and economies as a whole. The current transition to clean energy is driven by an emerging global commitment to reduce greenhouse gas emissions and the use of unabated fossil fuels as a primary driver of climate change. This transition involves a strategic evolution towards clean and renewable energy sources, greater electrification of energy end-uses and a comprehensive effort to enhance energy efficiency. The integration of advanced technologies, innovation, and the alignment of economic growth with environmental sustainability play central roles.

In advanced industrialized economies like Ontario, all economic activity is linked to the use of significant amounts of energy. In addition, Ontario's climate requires substantial heating and cooling for buildings. Like most jurisdictions, in Ontario, electricity represents a relatively small proportion of end use energy (roughly 20 per cent), while fossil fuels provide the vast majority (about 75 per cent) of final energy use.

Electrification and the transformation of Ontario's economy to clean energy sources is unprecedented in pace and scale and can therefore be expected to be at times uneven and contested. It will be a multi-decade social, economic, and political process that will affect every sector and community in Ontario.

To situate its recommendations, the Panel conceptualizes the stages of this transition in the following manner:

- Short-term: present-2030 – A period of innovation and change during which government is needed to provide clear leadership in setting up the planning and regulatory frameworks that will be required to support the rapid but orderly transformation, much of it customer-driven, that can be expected to intensify after 2030.

- Medium-term: 2030-2050 – An intense transformation affecting every part, sector and community in Ontario, leading to the establishment of a clean energy economy.
- Long-term: post 2050 – If done well, the transition to a clean energy economy has been accomplished. It will be important to continuously plan for and manage the clean energy system to address new and emerging challenges for future generations.

1.4 THE PANEL'S JOURNEY

Following initial briefings with Ministry staff and deliberations on scope and process, the Panel conducted extensive engagements with key energy stakeholders and Indigenous partners across four streams from March to July 2023. These streams included one-on-one and group-style stakeholder discussions, engagements with Indigenous partners, fifteen thematic roundtables and an open call for written submissions. Findings from these engagements guided the Panel's recommendations. Over 200 stakeholders, Indigenous partners and communities, government departments and agencies, and members of the public provided input to the Panel.

More information about the Panel's engagement process, including detailed feedback summaries, can be found in the 'What We Heard' report, which is included as an appendix to this report.

The global energy landscape is evolving at an unprecedented pace. While different parts of the world grapple with different problems, common themes include aligning transition objectives with economic opportunities, reforming policy, regulatory and planning frameworks to foster an orderly transition, and ensuring ongoing public support for transition. In the energy system itself, common themes include ensuring energy remains affordable, reliable, resilient and secure, electrification of energy end uses, decarbonization of energy supply, how to maximize energy efficiency and, crucially, how new technologies and business models can be integrated into existing energy systems they were not built to accommodate.

Energy transition is already underway in Ontario, and despite the diversity of Ontario's energy sector and very different perspectives and interests, there is a shared sense of urgency, excitement and willingness to collaborate and contribute to this global shift towards clean energy. It will take a concerted effort to align these forces, and government must play a key role in actively facilitating a successful and coordinated path forward.

Ontario's ability to successfully transition will require building meaningful, long-term, and collaborative partnerships with Indigenous communities and entities, and ensuring that

Indigenous perspectives are included at the earliest opportunities. The only way forward is together.

Importantly, the transition to a sustainable energy future is not the sole responsibility of any single entity, be it a government, agency, corporation, or community. The process must be a holistic, integrated and collaborative endeavor designed for the long term, and dedicated to bringing the energy sector and public along to secure widespread understanding and enduring support for change.

As we navigate this complex landscape, it is evident that the transition is not unfolding uniformly across Ontario, with distinct regions, communities and organizations facing unique challenges and opportunities. There is a pressing need to recognize and respect this diversity and to ensure that the province's approach ultimately benefits everyone in Ontario.

Electrification and the energy transition are marked by uncertainty. The process is simply too long, complex and multi-dimensional to predict its precise trajectory or what technologies will become dominant. This uncertainty calls for ongoing collaboration, innovation, experimentation, learning and adaptability. The core focus of our collective efforts should be to approach transformation of our energy systems and broader economy with an open mind and to strategically seize opportunities in the short, medium and long terms.

The Panel's key objective has been to develop recommendations that lay out the next steps for Ontario to navigate the transition towards a clean energy economy and to propose principles that should guide this work in the long term.

1.5 PANEL MEMBERS

MR. DAVID J. COLLIE, FCMA, FCPA, C.DIR., MBA

David Collie is the past President and CEO of the Electrical Safety Authority of Ontario (ESA). Prior to ESA, he held several executive positions in the energy sector, encompassing both electric and natural gas distribution systems, including Burlington Hydro, Hydro One and Enbridge (formerly Union Gas).

David is a faculty member of the Directors College of Canada and their Energy Executive-in-Residence. He is a frequent speaker on the topics of energy transition, grid innovation and modern regulatory practices and a guest faculty of the Harvard Kennedy School's executive program on strategic regulatory oversight. David is the past Chair of Plug'n Drive and the Electricity Distributors Association as well as past Vice Chair of the Energy Council of Canada.

He was a founding member of the Ontario Smart Grid Forum and a member of the Energy Transformation Network of Ontario. Professionally, David is a Chartered Professional Accountant (Fellow) and a Chartered Director.

PROFESSOR MONICA GATTINGER, PHD

Professor Gattinger is Director of the Institute for Science, Society and Policy, Full Professor at the School of Political Studies and Founding Chair of Positive Energy at the University of Ottawa where she has worked for over 20 years.

She is a fellow at the Canadian Global Affairs Institute, board member of the Clean Resource Innovation Network, and serves on advisory committees for the National Research Council Canada, the Nuclear Waste Management Organization, the Ontario Energy Board, the Ottawa Science Policy Network and the University of Calgary.

Dr. Gattinger received the 2020 Clean50 Award for her thought leadership in the energy sector. Her research and engagement focus on public and investor confidence in energy policy and regulation in the context of climate change.

CHIEF EMERITA EMILY WHETUNG, JD

Chief Emerita Whetung grew up in Curve Lake First Nation. She pursued a Bachelor of Arts at Trent University and a Juris Doctor at Osgoode Hall Law School after which she practiced in real estate law, a field she has worked in for over a decade.

Chief Whetung was elected Chief of Curve Lake First Nation from 2019–2022. She is passionate about the rights of First Nations people, including protecting the environment for future generations and protection of treaty rights.

She uses her expertise and knowledge to ensure that the voices of Indigenous people are heard and respected. She is interested in finding ways to ensure economic advancements occur in a sustainable manner and building healthy relationships between First Nations and Canadians.

2. ONTARIO'S OPPORTUNITY IN THE GLOBAL ENERGY TRANSITION

The global energy system is changing. Strong international commitments to decarbonization, technological advancements in the generation and management of electricity and seismic shifts in the geopolitics of energy are ushering in a new era, a clean energy revolution. Trillions of dollars are being invested globally to build a new economy based on the clean and sustainable use of energy resources. Ontario, with its clean grid and innovative energy sector, has a strategic opportunity to lead in and prosper from this new clean energy economy. Meaningful inclusion and collaboration with Indigenous communities is not only crucial to maximize Ontario's advantage, but also necessary to ensure a successful energy transition across the province.

2.1 THE GLOBAL CONTEXT

A major trend in global energy markets is the emergence and growth of a new clean energy economy. According to the International Energy Agency (IEA), global investment in clean energy has risen by 40 percent since 2020 and is strongly outpacing investment in fossil fuels. Total global energy investment in 2023 is expected to hit an all-time record of US$ 2.8 trillion, of which nearly two-thirds is being spent on clean energy development. In 2023, one in five cars being sold globally is electric, more than 500 gigawatts (GW) of renewable generation capacity are being added to the global system (a new record), and more than US$ 1 billion a day is being spent on the deployment of solar power alone. Investment in the clean energy economy will likely grow as nascent industries scale up, new innovations are commercialized, and further policy commitments are made. The IEA estimates that global decarbonization will require a tripling of annual clean energy investment to around US $4 trillion by 2030.

The growth in clean energy investments has been driven in part by ambitious policy commitments across the global economy. 93 countries and the European Union have now pledged to meet a net zero emissions target, covering more than three quarters of global emissions, along with a myriad of subnational jurisdictions, corporations and financial institutions. These net zero policy commitments have been driven by climate concerns. Large-

scale international agreements like the Paris Climate Accord, wherein 195 members of the United Nations Framework Convention on Climate Change committed to work to keep the rise in mean global temperatures well below 2°C (and preferably less than 1.5°C) above pre-industrial levels, have institutionalized ambitious commitments to emissions reduction. Such commitments have also been motivated by subsequent reports of the Intergovernmental Panel on Climate Change (IPCC) warning that climate change poses a threat to human well-being and planetary health and that decarbonization to limit global warming will require rapid and far-reaching transitions in energy, land use, infrastructure, and industrial systems. The accelerating consequences of a changing climate are becoming more acute and more dangerous, with the increasing frequency and intensity of extreme weather events and 2023 witnessing the hottest year on record globally. These acute climate effects further underscore the need for ambitious energy policy action to counteract the threats to the physical integrity, reliability and adequacy of energy systems. Notwithstanding environmental motivations, commitments to net zero are increasingly becoming an indicator of alignment with the current direction of global economic development and a criterion for competitiveness.

Net zero pledges now cover 90 percent of global gross domestic product (GDP). More and more international businesses and financial institutions are incorporating environmental considerations and decarbonization policies into their capital investment decisions, as part of organizational environmental, social and governance (ESG) initiatives, requirements and commitments. As a result, the global market for emissions-intensive products and services can be expected to shrink over time, particularly as major trading partners pursue and implement stricter controls on carbon emissions. The United States (U.S.) and the European Union, two major Ontario trading partners, are already exploring measures to compensate for the competitiveness impacts of decarbonization policies, including through the implementation of Carbon Border Adjustment mechanisms. In the economy of the near future, alignment with energy transition objectives will be a key factor in maintaining competitiveness. Companies that can anticipate these developments will be better positioned in this regard.

The increasing synergy of climate policy commitments and economic competitiveness is highly salient for Ontario. Our largest trading partner, the U.S., has embarked on an ambitious policy agenda to stake a claim as a global leader in clean economy industries. The high-profile Inflation Reduction Act of August 2022 leverages nearly a half-trillion dollars in tax credits, loan guarantees and grants over the next decade, to kickstart the development of clean energy industries and scale clean energy innovations. California, Michigan and New York – three of our five largest state trading partners – have recently published detailed, economy-wide plans with sector-specific strategies for building a net zero economy and have all cited economic growth and job creation as intended outcomes. In November 2023, Michigan passed legislation to mandate an 80 per cent clean electricity supply by 2035 and 100 per cent by 2040 (the definition

of 'clean' includes renewables, nuclear and gas plants with carbon capture). The legislation also includes a complementary labour package. The growth of clean economy industries in the U.S. and state-level net zero commitments are slated to not only shrink the market for emissions-intensive goods and services, but significantly expand the market for clean energy innovations. As an established trading partner, this presents Ontario with a unique opportunity to position itself in continental supply chains and capture market share in clean energy industries.

These global developments, and especially the ambitious policy commitments made by our biggest trading partners, suggest that the economic imperative for the energy transition is intensifying alongside environmental objectives. If Ontario takes advantage of the opportunities presented by the emergence of the clean energy economy, it can maintain and enhance the province's economic competitiveness and future prosperity. The province can attract key investments and jobs with a clean, affordable and reliable electricity grid and with an economy that is part of the global solution.

2.2 THE ONTARIO ADVANTAGE

Ontario is well positioned to seize the opportunity of the clean energy economy. It is widely understood that the clean energy transition will primarily involve the electrification of energy services. Ontario's electricity supply is largely emissions-free because of historic investments in clean hydropower and nuclear, and government's leadership in recent years retiring coal-fired generation, expanding renewables, investing in nuclear refurbishments, and maximizing conservation and demand management programs. Electricity output in 2022 was about **90 percent emissions-free**. This clean electricity supply mix puts Ontario in an enviable position compared to many advanced economies globally, including the United States and Europe. The emissions intensity of Ontario's electricity system is considerably lower than our American neighbours in New York, Pennsylvania, Ohio, Michigan and Wisconsin. Ontario has been able to achieve this while maintaining a reliable and cost-competitive supply of electricity.

The province is poised to build on this advantage with new investments to meet growing demand for electricity. In ***Powering Ontario's Growth***, Ontario made a number of emission-free and low emission resource announcements, including the start of pre-development work to site up to 4,800 MW of new nuclear generation on the Bruce nuclear site, advancing three additional small modular reactors (SMRs) in addition to the one currently being developed at the Darlington nuclear site for a total of 1,200 MW of capacity, and directing the Independent Electricity System Operator (IESO) to begin planning for a new competitive electricity procurement focused on clean resources such as wind, solar, hydroelectricity, battery storage and biogas.

To help attract investment from companies with specific clean energy commitments, Ontario is establishing a Clean Energy Credit Registry. This is an important step that responds to the increased role of ESG commitments in investments. It can also help Ontario anticipate additional sustainability requirements from innovative companies in the future. Companies are increasingly committed to not only reducing their own emissions but also **contributing to broader decarbonization efforts with their business investments**. Demonstrating a clean energy advantage is quickly becoming a core component of attracting new investment, building and maintaining prosperity and developing good jobs.

Ontario is also host to an innovative energy sector, with robust breadth and depth. As a leader in the development of SMR technology, the province is developing a mature value chain in the provision of nuclear equipment, components, and services. With a wealth of critical minerals and recent large-scale investments in manufacturing capacity, the province is building a strong value chain in the production of electric vehicles. Innovative investments are positioning the province as a leader in low-carbon steel manufacturing. With innovation strength in areas such as hydrogen, biofuels, energy storage and smart grids, the province has a demonstrated record of innovation on clean energy technologies and applications. A transition of the global energy sector toward a clean energy economy will require transformative changes to the ways we produce and consume energy. Ontario's innovative energy sector is well positioned to contribute meaningfully to this process.

2.3 A UNIQUE ALIGNMENT: GLOBAL ECONOMIC DIRECTION MEETS ONTARIO'S ENERGY ADVANTAGE

There is thus a unique alignment between the global trend of decarbonization in energy and economic policy and the traditional and emerging strengths of Ontario's energy sector. The province is well positioned to seize the economic opportunities of the energy transition, position itself in emerging global value chains, and maximize prosperity while pursuing decarbonization. If Ontario embraces this unique alignment, the future is bright.

The Panel envisions a bright future for Ontario if it embraces global and local trends through emphasis on five key themes, further developed in the following sections of this report.

FOSTERING TRUE PARTNERSHIPS

A successful future Ontario will foster meaningful Indigenous participation and partnerships in clean energy projects, including both energy infrastructure and energy efficiency, conservation and demand management initiatives. It will include Indigenous perspectives, participation and collaboration at the earliest stages of energy planning at the community, regional and provincial levels, and in the governance of key energy entities. It will build durable capacity in Indigenous communities, including stable capacity funding to support meaningful and ongoing Indigenous engagement, consultation, participation, and partnerships.

Most of the proposed solutions for achieving a clean energy economy rely on using Indigenous lands and resources to build clean and renewable energy infrastructure and extraction projects. The energy transition in Ontario provides an unparalleled opportunity for meaningful inclusion and collaboration with Indigenous communities from the beginning of what is likely to be an incredible transformation with generational effects.

DELIVERING INTEGRATED ENERGY PLANNING

The future of long-term energy planning in Ontario is integrated, led collaboratively by government, and considers the relationship between electricity, natural gas, and other fuels in a holistic way. A transformed planning process will deliver certainty and predictability to align actors across the energy sector – and the economy – in striving for a common goal of a clean energy future without straying from the sector's imperative to ensure an affordable and reliable supply of energy, that supports the province's prosperity. Ontario's new planning process will embrace collaboration, innovation, flexibility and creativity in meeting Ontario's energy needs.

BUILDING ACCOUNTABLE GOVERNANCE

A successful alignment of Ontario's energy system with the opportunity of a clean energy economy means that the agencies and institutions governing the energy sector can embrace innovative technologies and solutions and pursue objectives that support electrification and the energy transition. Accountable governance will involve measuring progress toward our clean economy goals with flexible, non-prescriptive metrics and deep, ongoing engagement with stakeholders and Indigenous partners.

CENTERING CONSUMER PERSPECTIVES

Successfully achieving our long-term goals requires centering and embracing the perspectives, objectives and concerns of energy consumers. A durable energy transition is paced properly and managed carefully to maintain affordability, reliability, resilience, and consumer choice. Aggressive decarbonization policies have triggered backlash and discontent in other jurisdictions when they ignore the needs, preferences and vulnerabilities of customers. It is essential to bring people along on this journey, through ongoing community, customer and citizen support and transparent communication, public education and meaningful and accessible engagement.

MAXIMIZING ECONOMIC PROSPERITY

Embracing this unique alignment means that Ontario can lead in a clean energy economy future. The province can capture its share of the massive investment that is needed to electrify and decarbonize the world. By using an integrated energy, economy and technology lens, Ontario can link the significant changes in the global energy landscape with prosperity right here at home. It can become the jurisdiction of choice for low-carbon manufacturing of a broad variety of clean economy products, leading to enhanced productivity, better-paying jobs and export growth. This in turn could lead to a new wave of technological advancements made here in Ontario and designed to capitalize on the changing tides of the energy transition.

Our goal should be the development of a clean energy economy, supported by a provincial energy system with abundant, reliable, affordable, sustainable energy. The time is now to take advantage of this alignment and create a prosperous and inclusive future for Ontario. It will require a commitment to forward-looking, future-oriented and collaborative governance that anticipates where the sector is going and deploys the tools to strategically pursue those opportunities.

3. FUNDAMENTALS OF SUCCESS: PRINCIPLES FOR ONTARIO'S ENERGY TRANSITION

The energy transition will be a cross-cutting, multi-decade endeavor involving all of government, business and society, including Indigenous communities and all customer groups. This transformation will impact all economic sectors and, in Ontario alone, the investment of hundreds of billions of dollars. Government can play a key role in navigating this transition successfully and ensuring economic prosperity and broad societal support. The Panel suggests the following principles should guide Ontario's energy transition:

PRINCIPLE 1: NORTH STAR: A PROSPEROUS CLEAN ENERGY ECONOMY FOR ONTARIO BY 2050

As the world moves rapidly toward a global net-zero goal, trade and investment are increasingly influenced by climate and clean economy considerations. In this context, there is a generational opportunity for Ontario to build on its clean energy system and industrial strengths to prosper.

To seize this opportunity, Ontario's energy transition and associated government policies, including industrial strategies, must be guided by a common commitment to achieving a clean energy economy by 2050. Government has an opportunity to make key directional decisions to coalesce social and economic forces and avoid working at cross purposes.

Transitioning to a clean energy economy will only be possible if trust in the energy system and energy fundamentals, namely reliability, affordability and resilience, are maintained.

PRINCIPLE 2: VISION, POLICY CLARITY, CONSISTENCY AND ADAPTABILITY

Government can play a key role in reducing uncertainty for investors and ultimately reducing costs for consumers. Guided by a clear vision for the energy transition and goals regularly communicated through integrated energy plans, energy planning entities will be empowered to work with the energy sector in charting the most effective and supportive path for Ontario, enabling growth and integrated solutions at the right pace and scale.

To ensure an orderly transition when planning and making decisions, government and all sector entities should justify how current decisions align with the long-term commitment to a clean energy economy by 2050.

Planning and navigating a multi-decade transition to a clean and prosperous energy economy requires that learning, adaptability and continuous improvement are built directly into planning processes and governance arrangements.

PRINCIPLE 3: EFFECTIVE GOVERNANCE AND ADEQUATE RESOURCING

To achieve a clean energy economy, government must put in place robust governance and accountability mechanisms that encourage iterative planning, measurement, verification and tracking of progress and that are sufficiently flexible to adapt to rapidly shifting circumstances.

Decisive action and investments will be needed. To preserve optionality, it will be crucial to focus on careful planning and design (plan carefully) and then executing quickly on well-developed investment plans (act fast).

The transformation of Ontario's energy system is a multi-decade change management exercise that will require new planning and regulatory responses, supported by well-designed policy and programs, and clarity over the respective roles and responsibilities of government ministries and agencies. Government must invest in the necessary expertise and adequately resource its own operations as well as those of the Independent Electricity System Operator (IESO), the Ontario Energy Board (OEB) and external advisory bodies, such as the Energy Transition Advisory Council, a new entity recommended by the Panel.

Recommendation 18: The government should regularly assess the need for resources (skills, staff, other supportive resources) across ministries and agencies to steer energy planning and decision-making competently and effectively through the energy transition, and ensure required resources are provided. Agencies should continue to actively forecast their long-term resource needs and communicate those via existing business plan development and approval processes.

Recommendation 22: The Ministry of Energy should review its current resources to enhance the Ministry's capacity to meet the demands of electrification and the energy transition, including:

a. Appropriate resources to the Indigenous Energy Policy Unit to support proactive relationship-building and increases to the volume of engagement and Consultation with Indigenous communities.

b. Continued dedicated policy and legal expertise to support the Ministry's early engagement and Consultation work, such as,

    a. Responding to and addressing community concerns.

    b. Understanding the spectrum of engagement and Consultation.

    c. Identifying impacted communities for engagement and Consultation.

    d. Delegating procedural aspects of Consultation where appropriate.

    e. Ensuring that the Ministry has diligently discharged its constitutional obligations under the Duty to Consult.

PRINCIPLE 4: PLAYING THE LONG GAME: ENSURING ONGOING AND DURABLE PUBLIC SUPPORT

Ongoing public support for the transition to a clean energy economy requires a reasonable, pragmatic approach with a focus on cost-effectiveness and solutions tailored to local circumstances, not strict adherence to rigid standards.

Governments will have a hard time staying committed to supportive and consistent policy unless Ontarians continue to receive reliable and affordable energy services and feel supported through the unavoidable economic and social transformations that transitioning to a clean energy economy will entail.

Government must engage consistently with individuals as citizens, as customers and as community members, and with Indigenous communities, to build sustained support for the transition and to involve them in energy decisions.

The pursuit of clean energy economy targets must be paced such that energy security and affordability are not compromised. Where structural transformation of the energy economy leads to negative disruptive change to an industry, sector, region or community, government must play a critical role to mitigate and minimize impacts. Affected communities must be involved early in developing transition plans.

PRINCIPLE 5: FULL INDIGENOUS PARTICIPATION

The meaningful inclusion of Indigenous peoples in decision making and governance structures, going well beyond inclusion in project development, presents a significant opportunity to advance reconciliation. It is also a necessity for Ontario to be successful in building a clean energy economy. True partnerships between the province, energy companies and Indigenous communities must go beyond transactional exchanges and include the commitment to building, supporting and maintaining mutually beneficial relationships through ongoing transparency, trust, and collaboration.

PRINCIPLE 6: MANAGING UNCERTAINTY: ADVANCED INSIGHTS AND STRATEGIC FORESIGHT

As the world enters a period of rapidly intensifying technological change, unprecedented investment in clean energy and the widespread electrification of energy services, ongoing anticipatory research and analysis will be required to ensure risks are well-understood and decisions can be taken at the right time using the right mechanisms. In a quickly evolving energy landscape, reactive policy, regulatory and planning actions can mean missing out on important economic opportunities or not being able to respond effectively to emerging risks.

The Ministry of Energy's Cost-effective Energy Pathways Study is an important first step to understand options in a comprehensive and integrated manner. Moving forward, the government should ensure that whole-economy energy pathways studies are iterated regularly to ensure continuous learning and model refinement, as new evidence becomes available.

In addition, government and sector entities will need to acknowledge and creatively explore uncertainties and potentially disruptive dynamics facing the energy sector. This will require the development of scenarios and evaluating new approaches to meeting energy needs by working closely with Canadian and international partners who are grappling with similar questions and developing solutions.

Both energy modelling and qualitative explorations of uncertainties, opportunities and solutions must systematically recognize the importance of and include broad stakeholder and Indigenous participation.

Recommendation 9: To ensure energy planning and policy development are supported by the best evidence available, the government should fund, on an ongoing basis, independent whole economy energy pathways studies, in a way that allows for iterative improvement of modelling and assumptions, transparency on costs, and with meaningful input from relevant stakeholders and Indigenous communities.

PRINCIPLE 7: PLANNING AND DECISIONS CLOSER TO THE CUSTOMER

Developments in energy technology are leading to new models for balancing energy supply and demand. While in the past, centralized electricity and gas grid infrastructure had an economic edge over distributed solutions, this is no longer necessarily the case. In combination with the need to bring people and communities along in the move to a largely electrified clean energy economy, there is significant promise in broadening the energy planning and decision-making framework to meaningful incorporate customers and local solutions.

Putting customers at the centre acknowledges that customers will be making many of the decisions that will transform the whole energy system. Customer-driven solutions can be nimble and scale quickly. That said, sometimes a local utility or another entity can develop solutions that produce better outcomes for all. As well, overarching regulation is regularly needed to protect

customers and ensure individual and system-wide costs and benefits are adequately balanced. And importantly, government policy should establish the broader planning framework and make key decisions that involve the allocation of significant public resources.

On a geographic basis, local decisions and distributed solutions can often be implemented and scale more quickly than centralized approaches, produce co-benefits (such as resilience) and build sustained local support by making communities partners in their energy future. As a result, energy planning and decision-making should always consider local, distributed solutions as potential options. Regional, provincial and interprovincial solutions should be deployed as required and where they can be shown to be more economically efficient.

Moving planning and decision-making closer to the customer does not diminish the role of the government or provincial entities. Overarching policy direction and ongoing support and collaboration across planning levels will be crucial to achieve the alignment necessary for an orderly transition.

4. TRUE PARTNERSHIPS: BUILDING A PATHWAY FOR FUTURE GENERATIONS

The energy transition in Ontario provides an opportunity for meaningful and coordinated inclusion of Indigenous communities at the beginning of what is likely to be an incredible transformation for generations. It is also the only way that Ontario will be successful in building a clean energy economy.

This section does not attempt to develop a universal definition, or a one size fits all approach to building true partnerships with Indigenous communities. Arguably, the fundamental spirit of a true partnership is one that is beyond transactional and where all parties are committed to building, supporting and maintaining a mutually beneficial relationship through ongoing transparency, trust, and collaboration.

This section discusses the interplay between the current legal framework and electrification and the energy transition. It discusses the diversity of Indigenous communities, as well as the barriers and opportunities, including promising developments and potential partnership models to advance full Indigenous participation and partnerships in the clean energy economy. The section identifies three key action areas to support a long-term vision for success for the present and future generations, which are meant to complement and build from each other, including the need for early and coordinated engagement, supporting economic reconciliation through flexible financing mechanisms, and improving Indigenous governance participation and collaboration.

The section concludes with four core recommendations to advance meaningful Indigenous participation and partnerships in the clean energy economy. Several other recommendations throughout this report identify actions to support Indigenous communities and enable effective participation. Please refer to the complete list of recommendations at the end of this report.

4.1 CURRENT LEGAL FRAMEWORK

Building true partnerships with Indigenous communities is an evolving practice that has been gradually supported, albeit inconsistently, across various sectors and governments. Until the

1970s there was no legal construct or political framework (recognized by the Canadian government) that required government, energy developers or corporations to consult with Indigenous communities.[1] Infrastructure projects and the like could proceed without the legal obligation to consult with Indigenous communities, despite the negative impacts of development projects on Indigenous communities.

Engagement with Indigenous communities is distinct from engagement with non-Indigenous stakeholders. As such, it is important to acknowledge the legal duty of the Crown to consult with Indigenous communities and the connection to Indigenous inclusion throughout electrification and the energy transition. Section 91(24) of the Constitution Act, 1867 identifies Indians and Lands reserved for Indians as exclusive federal authority. The existence of 133 Indian reserves within the province of Ontario means that this exclusive authority necessarily overlaps with provincial jurisdiction.[2] The provision of energy that is generated and transmitted across the Province, from power generation to electricity and fuels distribution, all take place on traditional and treaty lands.

The Constitution Act, 1982 entrenched the rights of Aboriginal people, through Section 35(1) that recognizes and affirms inherent Aboriginal and treaty rights. The legal doctrine known as the Duty to Consult and Accommodate was established through case law, following various courts' interpretation of this section of the Constitution. The Duty to Consult continues to develop as a variety of cases make their way to the Supreme Court of Canada, and could impact the way that jurisdictions, including provinces and proponents, satisfy the Duty.

The Duty to Consult impacts electrification and energy transition in Ontario in that major energy infrastructure projects cannot move ahead without Consultation with and Accommodation, where appropriate, of Aboriginal and Treaty rights holders.

In 2021 the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) Act came into force in Canada as federal legislation.[3] Following decades of global Indigenous legal and human rights advocacy efforts, the UNDRIP was adopted by the United Nations (UN) General Assembly in September 2007 as an international instrument on the rights of Indigenous Peoples.

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[1] The Supreme Court decision in the Calder v. Attorney-General of British Columbia (1973) case was seen as a landmark case that affirmed the existence of Aboriginal land title for the first time in the legal system.

[2] We acknowledge that the establishment of 133 Indian reserves within the Province of Ontario is a construct of Canadian laws. The boundaries of the Province of Ontario do not necessarily align with the Territory of those Indigenous Nations and there is overlapping Territory across provinces.

[3] Government of Canada, Backgrounder: United Nations Declaration on the Rights of Indigenous Peoples Act

It establishes "a universal framework of minimum standards for the survival, dignity and well-being of the Indigenous Peoples of the world."[4]

With the recent broad awareness in Ontario and across Canada of the treatment of Indigenous peoples – from the unmarked graves identified at former Indian Residential Schools to the lack of safe drinking water available to everyone across Canada — there is also a demand from many people in Ontario to find a meaningful, inclusive path forward on new projects that are on Traditional and Treaty lands. This social licence imperative is one more reason that Indigenous people must become a real part of the energy conversation as we move forward.

Indigenous leadership across Canada at all levels has been calling for early, meaningful, and coordinated engagement with Indigenous communities. Given the early stages of a significant and intentional transition to a clean energy economy this is a significant opportunity to correct historic wrongs and walk together on a path of true partnership that seeks to benefit everyone in Ontario.

Successful energy transition and electrification in Ontario requires full participation of Indigenous communities. Managed well, the transition offers significant opportunities for Indigenous economic participation and to advance reconciliation.[5]

There continues to be growing acknowledgment from across Canada of the importance of building meaningful relationships and partnerships with Indigenous Nations and communities on various projects, including infrastructure and energy development.

Objectives of reconciliation are well aligned with those of a successful transition, such as working collaboratively to advance a safe, reliable, transparent, and viable future for everyone in Ontario.

4.2 INDIGENOUS COMMUNITIES IN ONTARIO

Indigenous communities are present across Canada in every province and territory and include diverse cultures, languages, laws, and governance structures, as well as similarly diverse energy needs and interests.

[4] United Nations Declaration on the Rights of Indigenous Peoples | Division for Inclusive Social Development (DISD)

[5] Government of Canada, Truth and Reconciliation Commission of Canada

Ontario alone is home to 23 per cent of all Indigenous peoples in Canada. There are 133 First Nation communities located across Ontario, representing at least 7 major cultural and linguistic groups. These communities are located from Windsor in the South to the northern shores of Hudson Bay. Five of the 20 largest bands in Canada are in Ontario.

There are approximately 18 First Nations communities in Ontario that are considered remote, accessible only by air year-round or ice road for much of the year. There are more remote First Nations in Ontario than in any other region. Urban centres with significant Indigenous populations living off-reserve are found in Thunder Bay, Sudbury, Sault Ste. Marie, Timmins, Ottawa and Toronto.[6]

Métis people are also represented in Ontario.[7] The term "Métis" in section 35 of the Constitution refers to distinctive Métis collectives who, in addition to their mixed ancestry, developed their own customs, way of life and group identity, separate from their First Nation, Inuit or European forebears.[8]

The Métis Nation of Ontario (MNO) represents the rights and interests of some of the Métis people and communities throughout Ontario and has built a province-wide governance structure, including a centralized registry of Métis citizens; regions which cover areas where there are historic Métis communities; several Chartered Community Councils which represent Métis citizens at the local level in Ontario; a provincial governing body; a charitable foundation which promotes and supports Métis culture and heritage (Métis Nation of Ontario Cultural Commission); and an economic development arm (Métis Voyageur Development Fund).

Just as Indigenous peoples and Nations in Ontario are geographically, culturally and linguistically diverse, Indigenous communities have diverse energy needs, preferences, and interests – and they have their own distinct governance structures, laws, protocols and internal decision-making processes to determine their community's participation in energy projects, and in what manner a community participates.

The diversity of Indigenous communities across Ontario underscores the importance of early, ongoing and coordinated engagement and partnership building on a nation-to-nation basis, particularly as large-scale development ramps up to reach clean energy economy goals.

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[6] Government of Canada, Indigenous Communities in Ontario

[7] The Métis are recognized in Section 35 of the Constitution, through the landmark case, R. v. Powley, Supreme Court of Canada

[8] Ontario Court of Appeal, R. v. Powley [2001]

Committing to and investing in true partnerships with Indigenous communities will be essential for successful energy transition and electrification.

4.3 CONTEXT: FULL INDIGENOUS PARTICIPATION IN THE ENERGY SECTOR

JURISDICTIONAL AND GOVERNANCE REALITIES

To enable Indigenous participation and achieve true partnerships, it is important to understand the economics of Indigenous governments and how they differ from other forms of government in Canada.

For example, although the federal government has jurisdiction for 'Indians and Lands reserved for the Indians', First Nations continue to operate at multiple levels of government – subject to provincial laws, Band Council bylaws, and reporting to the federal government.[9] Further, First Nations are often left out of the municipal legislative and service scheme, meaning that First Nations are responsible for public health in their communities but do not necessarily benefit from the service of public health units. First Nations are expected to maintain and upgrade critical infrastructure like roads, sewage systems, water treatment plants and building inspection services, to name a few. Significantly, First Nations are prohibited from taxing community members living on reserve. For generations, the only revenue First Nations received came from direct transfer payments to them – funds that were strictly allocated to federal and later provincial priorities. Funds were and continue to be strictly audited and if not expended on government priorities must be returned to the federal government.

In short, First Nation, Inuit, and Métis communities do not always have access to sufficient funding to support consultation or their economic participation in projects that affect or appeal to them. However, the constitutional protection of Aboriginal rights and the doctrine of the Duty to Consult and Accommodate, mean that if Aboriginal rights are not considered and communities are not consulted, Indigenous groups can and will receive support from the courts to prevent energy projects from moving forward.

Given the diversity of Indigenous people and communities across Ontario, it is necessary to begin consultation by understanding the unique needs and context of each group. It is imperative that

[9] Given the federal statute The Indian Act applies to Indians defined therein, both the Métis and Inuit have protected rights but significantly less clear governance rules.

the process be driven by building lasting relationships that create and foster open and transparent communication.

Through early engagement and investing in true partnerships, government and the energy sector can collaborate with Indigenous communities and entities to learn what has worked well, build on success and find creative solutions to improve Indigenous inclusion and participation.

INTERSECTING INEQUITIES: LIMITED ACCESS TO SAFE, RELIABLE AND AFFORDABLE ENERGY

Energy is essential in our lives and economic activities. Access to and the use of safe, reliable, and affordable energy are emerging as a priority in policy agendas worldwide and have continued to be a vital determinant of a household's well-being and living standards.

Lack of access to safe, reliable and affordable energy restricts the development of communities and can hinder the province's overall economic growth. Access to electricity reduces poverty, increases opportunity, improves health, productivity and living standards and powers devices that make daily living more efficient.

Empirical research considering the impacts of energy poverty has found that when compared with households without energy poverty, energy poor households tend to suffer more from health problems, spend more on medical care, have lower educational attainment and lower earning opportunities.[10]

Electrification and the energy transition promise the potential of supporting people across Ontario to access safe, reliable and affordable energy but questions remain about how governments and the sector will ensure that the benefits of transition and electrification will be evenly and fairly shared across the province.

Indigenous communities continue to experience disproportionately higher rates of poverty compared to non-Indigenous communities in the province, including energy poverty.[11] The Canada Energy Regulator states that a household may be described as experiencing energy poverty when it spends more than 10 per cent of its income on utilities. By this measure, an

[10] According to Papada and Kaliampakos (2016), the definition of energy poverty can be summarized as "the difficulty or the inability of a household to afford an adequate coverage of its energy needs (heating comfort and other essential energy services)

[11] Statistics Canada. Disaggregated trends in poverty from 2021 Census of Population

estimated 8 per cent of Canadian households experience fuel poverty.[12] According to some estimates, one third of Indigenous households in Ontario, or 42,000 households, have experienced energy poverty.[13] In 2021, Statistics Canada released the results of the 2016 Census, which found that low-income rates were lower for the non-Indigenous population than for all Indigenous groups in all geographic areas across Canada. The highest low-income rates were found for First Nation individuals living on reserve, and particularly for lone mothers living on reserve.[14]

These challenges are compounded by the increase of extreme weather events (e.g., wildfires, floods and ice storms), which can exacerbate existing inequities in communities, including respiratory, cardiovascular, water, foodborne, chronic and infectious diseases, as well as financial strain and food insecurity.

A 2010 federal study found that death, injuries, and destruction of property related to house fires in First Nation communities, particularly remote communities, far exceeded those in comparable off-reserve communities.[15]

Lower income households experience barriers related to equipment and installation expenses to address their homes' energy needs, improve their homes' energy efficiency and/or electrical safety features. For some communities, this can result in a higher number of house fires due to poor electrical safety, or the need to access alternative energy sources, including wood-burning stoves, propane or diesel.

Health Canada has examined health risks associated with exposure to particular fuel types and energy sources, including potential adverse health effects associated with diesel fuel use, and suggests ongoing efforts to reduce emissions and exposure.[16]

OPPORTUNITIES FOR INDIGENOUS COMMUNITIES

Some of the potential benefits of electrification and the energy transition range from overall improved energy efficiency for both homes and businesses resulting in lower long-term energy bills, broader environmental and health benefits related to lower carbon emissions and better air

[12] CER – Market Snapshot: Fuel poverty across Canada - lower energy efficiency in lower income households (cer-rec.gc.ca)

[13] Canadian Urban Sustainability Practitioners Network (CUSP). Equity Implications of Energy Poverty in Canada

[14] Statistics Canada. Low-income statistics for the population living on reserve and in the North using the 2016 census

[15] Government of Canada. First Nations Fire Protection Strategy 2010-2015

[16] Health Canada. Human Health Risk Assessment for Diesel Exhaust.

quality, as well as various economic benefits such as new business opportunities, advancing sustainable development models and stimulating local job creation.

THE PROMISE AND POTENTIAL OF FUEL SWITCHING

According to the International Energy Agency, some of the benefits of fuel switching include lower energy bills for consumers and protecting households from global energy price shocks.[17]

A widespread switch to electricity presents unique challenges for Indigenous communities, particularly tenants and low-income households, who may not be able to access the benefits of electrifying, may not have the option to switch their home energy system or may experience disproportionate costs to fuel switch. Poor access to reliable energy in Indigenous communities compounds the financial strain and ability to fuel switch for low-income households.

For those communities that have established infrastructure, ways of life and economies built around gasoline, natural gas and other non-renewable energy sources, developing flexible, collaborative, and coordinated approaches will be essential to fostering a successful transition and electrification process, and to upholding inherent Aboriginal rights. For example, many Indigenous communities rely on gasoline-powered boats, snowmobiles, and all-terrain vehicles, to hunt, fish and practice culture and treaty rights.

Likewise, gas stations, either wholly owned by an Indigenous community, or operating within an Indigenous community, often represent an integral aspect of a community's local economy, where both Indigenous and non-Indigenous people purchase gasoline and other goods, including locally made products. As more electric vehicle (EV) charging stations are installed across communities in Ontario, questions emerge about how this will impact local Indigenous economies, and whether the benefits of electrification will be evenly distributed. In collaboration with Indigenous communities, electrification and the energy transition could potentially create positive business opportunities for the local economy where EV charging stations could become a designated space to purchase local goods and products while both Indigenous and non-Indigenous patrons wait for their cars to charge.

Many Indigenous communities have identified the importance of building a sustainable energy system for generations to come and emphasize that the pathway to a clean energy economy must be achieved with Indigenous communities' full participation very early in the policy, program and planning decision-making process. Additional time and supports will be required to

[17] International Energy Agency. What is behind soaring energy prices and what happens next?

support Indigenous communities throughout the transition and ensure inherent Aboriginal rights are upheld.

4.4 PROMISING DEVELOPMENTS AND PARTNERSHIP MODELS

Indigenous participation and partnerships in clean and renewable energy projects are occurring across Canada, with several jurisdictions developing and implementing some form of policy, regulation, procurement measures or support programs to improve and support Indigenous participation.

Over the last two decades, the number of medium and large hydro, wind, solar and bioenergy electricity generating projects (projects generating one megawatt or more of electricity) with Indigenous participation has grown substantially. By some estimates, First Nation, Métis, and Inuit entities are partners or beneficiaries of almost 20 percent of Canada's electricity-generating infrastructure, much of which produces renewable energy.[18] In Ontario, there are over 450 renewable energy projects that are owned by or partnered with Indigenous communities.[19]

It is estimated that since 2017, the number of medium and large Indigenous clean energy projects across the country has grown by 29.6 per cent, including hydro, wind, solar, bioenergy and hybrid energy sources. There has also been an increase in smaller Indigenous clean energy projects, with many Indigenous communities installing community-scale or small-generation systems for local supply and in some instances selling power into provincial and territorial grids.[20] Likewise, Indigenous participation in oil and natural gas projects has grown substantially in recent years, including participation in pipelines, tank farms and liquefied natural gas facilities, particularly in Western Canada.

Since 2015 Canada has seen a significant rise in Indigenous participation in electricity transmission projects. A reported total of 19 such projects have been completed or are in construction, including some linked to grid access for major projects (e.g., La Romaine Hydro, Quebec), off-grid community interconnection (e.g., Wataynikaneyap Power, Ontario), and grid strengthening (e.g., Bipole III, Manitoba). This development is notable and highlights a significant

[18] Indigenous Clean Energy. Waves of Change.

[19] IESO Progress Report on Contracted Supply

[20] Indigenous Clean Energy. Accelerating Transition

acceleration in renewable energy projects in remote and Northern communities, contributing to reduced reliance on diesel-fueled generators.

The Giizis solar project in the Ontario community of Kiashke Zaaging Anishinabek began operations in 2020 as Canada's first fully integrated solar-storage project, tied into the local power and distribution system.

The nature of Indigenous participation across energy projects ranges from ownership or co-ownership to revenue sharing or lease agreements to Impact Benefit Agreements (IBAs) and/or various partnership agreements.

PROJECT OWNERSHIP

Project ownership is one model that has been used to improve Indigenous participation in various energy projects. In Ontario, there are several examples where the level of Indigenous ownership of clean energy projects ranges from strong minority ownership of 25 to 50 per cent to majority ownership.

For example, Hydro One has launched an equity partnership model where First Nations will be offered a 50 per cent equity stake in all of Hydro One's future new large scale capital transmission line projects with a value exceeding $100 million. Eight First Nations represented by Gwayakocchigewin Limited Partnership (GLP) and Lac de Mille Lacs First Nation are to hold 50 per cent investment in the Waasigan Transmission Line project. This project is a proposed new double-circuit 230 kilovolt transmission line between Lakehead Transformer Station (TS) in the Municipality of Shuniah and Mackenzie TS in the Town of Atikokan, and a new single-circuit 230 kilovolt transmission line between Mackenzie TS and Dryden TS in the City of Dryden.

THE WATAYNIKANEYAP POWER TRANSMISSION PROJECT

Many Indigenous communities continue to experience regular and prolonged brownouts and blackouts due to poor access to safe and reliable energy sources. This was the case for Pikangikum First Nation, located about 500 kilometres northwest of Thunder Bay, and one of 17 communities in the region that was not accessible by road year-round and relied solely on diesel generators for its electricity.

Pikangikum used approximately 12,000 to 15,000 litres of diesel fuel per day. Most of the fuel was flown into the remote community, at a high cost, just to keep the lights on. Frequent brownouts limited the amount of electricity people could use in the community and moratoriums were issued for non-essential electrical use. Frequent brownouts and poor access to clean and stable energy meant that the community was unable to build new homes required to address housing shortages, and the delivery of critical services was affected, including programs meant to address food insecurity.

In 2018, Pikangikum became the first remote First Nation community to be connected to the provincial power grid as part of the Wataynikaneyap Power Transmission Project.

The Project includes the Line to Pickle Lake, which is a new 300 km system reinforcement between the Dryden area and Pickle Lake, and the extension of the grid to 16 remote First Nation communities across northwestern Ontario over an additional 1,500 km of new infrastructure. With a projected completion date expected in 2024, the project will be the largest Indigenous-led infrastructure project in Canada, and the most far-reaching remote First Nations grid connection initiative in Ontario's history. When complete, the project will provide over 18,000 First Nation people in northwestern Ontario with a clean, reliable and affordable supply of electricity.

The licensed transmission company is equally owned by 24 First Nation communities (51 per cent), in partnership with Fortis Inc. and other private investors. Communities will have the ability to increase their ownership and control to 100 per cent. The Ontario Government is providing a loan of up to $1.34 billion for the Wataynikaneyap Power Project's construction costs. Ontario's loan will save ratepayers money by providing financing to the project at a lower rate than could be achieved through private financing alone. The project will also be cost-shared with the federal government, which has committed $1.56 billion in funding at project completion.

Wataynikaneyap Power works with the project contractor to ensure environmental requirements and community protocols are followed, including bans on the use of pesticides to prevent negative health and environmental impacts on community members and the surrounding land.

Opiikapawiin Services LP (OSLP), is 100 per cent Indigenous owned and responsible for administering projects and programs for Wataynikaneyap Power. The programs are grounded in First Nations' knowledge, culture and ceremonies and help to provide skills development and training to support Indigenous employment and participation throughout the project. As of March 31, 2023, 50 training programs had been administered and 603 individuals had completed training.

While there have been barriers and hurdles to advance a project of this scale, this example demonstrates the ways in which government and industry have the capacity to support collaborative, flexible and innovative partnerships with Indigenous communities. The project was designated a priority by both the federal and provincial governments, which helped to advance approvals, and signal its importance.

The Project is also supported through the Ontario Aboriginal Loan Guarantee Program (ALGP), which supports Indigenous participation in new transmission and renewable energy generation projects, such as wind, solar and hydroelectric power. The program provides a Provincial guarantee for a loan to an Indigenous entity to finance a portion of its equity investment in an eligible project.

There are also significant positive impacts and mutual benefits to the Project, including enabling community-driven projects; addressing infrastructure gaps in communities; increasing access to safe and reliable energy; and improving Indigenous participation and project ownership with long-term economic benefits for all equity partners.

Considering costs in a holistic way by including the environmental, social and cultural costs associated with a particular project is a key learning from the Wataynikaneyap project. The project also encourages governments and proponents to consider the anticipated environmental, social, and cultural costs of not supporting Indigenous participation and leadership in energy projects.

The increase in Indigenous project ownership represents a promising development that deserves further active support and investment from government and the energy sector. While many equity partnerships represent opportunities for long-term economic benefits, government and the sector should engage with Indigenous communities and entities on how project ownership can better provide immediate and medium-term benefits for Indigenous communities. For example, additional benefits may include, but are not limited to, stable funding to build capacity

and skills development that support informed energy discussions and participation in community, regional and provincial energy planning.

In addition to considering how equity partnership models can support participation and produce broader socio-economic benefits, government and the sector should develop a clear plan, informed by engagement with Indigenous communities, on how organizations/entities will support and finance Indigenous equity participation and project ownership on an ongoing basis.

4.5 INDIGENOUS PARTICIPATION IN CLEAN ENERGY INITIATIVES AND BUILDING RESILIENCY

Improving housing energy efficiency in Indigenous communities represents a significant opportunity to reduce energy use and costs, support local employment and investments, and generate positive impacts to community health and well-being through safer housing. The Panel spoke to several Indigenous organizations that reiterated the importance of ensuring there is adequate federal funding for quality, safe and affordable housing on-reserve as a precursor to success for energy efficiency initiatives.

The Remote First Nation Energy Efficiency Program, supported by the Independent Electricity System Operator (IESO), is a pilot program delivered in Kasabonika Lake, North Caribou Lake, Sachigo Lake and Wunnumin Lake First Nation since 2019. The program has been expanded to additional remote First Nation communities and is offered at no cost to participants. The program funds a designated community coordinator and delivery agent to conduct energy audits, identify opportunities for the installation of energy-efficient products for homes, small businesses, recreational facilities and band-owned buildings. The program supports, but is not limited to, basic energy efficiency upgrades, appliance replacements, insulation and draft-proofing upgrades, all of which contribute to long-term bill savings and improving the safety and comfort of homes and businesses.

Indigenous communities, and particularly northern and remote communities, experience disproportionate impacts of climate change, including extreme weather events that may result in damage to critical infrastructure, evacuation and further displacement from traditional territories, which impact hunting and harvesting rights, heighten food insecurity and exacerbate other existing health and socio-economic inequities.[21]

[21] Health Canada. Climate Change and Indigenous Peoples' Health in Canada.

Building resilience across Ontario, and particularly in Indigenous, northern, and remote communities, will be essential to a successful transition and electrification process.

Energy storage is a critical component of the grid, supplementing wind, solar, hydro, nuclear and fossil fuels as well as demand-side resources and system efficiency assets. Ultimately, storage is an enabling technology that can help consumers save money, improve reliability and resilience, and help reduce environmental impacts.

For example, energy storage is critical to decarbonization as it allows for non-emitting renewable power to supply a greater portion of electricity baseload and peak demand. The accelerated pace of electrification and the energy transition represents an opportunity to continue to explore innovative energy projects between Indigenous communities, utilities, and electricity-planning agencies.

The Oneida energy storage project proposed by Six Nations of the Grand River Development Corporation and partner NRStor, is to provide battery power supply for grid peaking. According to the project proponents, it is expected to yield no less than $1 million per year to the Six Nations community for the projected 20 plus year project lifespan. The project is expected to reduce 4.1 million tonnes in carbon emissions and provide 900,000 hours in local employment over a 20-year period. It will be among the first of its size and demonstrates the economic potential of the role of Indigenous partnerships in low carbon energy projects.[22]

4.6 A LONG-TERM VISION FOR SUCCESS

Supporting full Indigenous participation and building true partnerships with Indigenous communities across energy planning, development, investment, ownership, and the operation of projects, has the promise of contributing to a more open and participatory electrification and energy transition, where the benefits are distributed locally and collectively.

Although there is an increasing recognition of the importance of partnerships with Indigenous communities and greater Indigenous participation in and leadership of energy projects and planning, government and the sector must play a more consistent and active role to ensure a successful energy transition across Ontario, and to advance the process of reconciliation.

[22] Six Nations Future. Oneida Energy Storage - Six Nations Future (snfuture.com)

It is critical to engage with Indigenous communities to identify how the transition should progress and what is needed to support communities' safety, security and success, and their immediate, medium and long-term vision. It is also critical that Indigenous communities are supported to determine how they want to partner with the government and how they would like to participate in energy planning and project development, including supporting Indigenous leadership and ownership in projects.

The following are key action areas, which are meant to complement each other, and that the government should consider in order to co-develop true partnerships and a successful pathway for a clean energy economy with Indigenous partners:

- **Early and coordinated engagement**
- **Economic reconciliation and flexible financing mechanisms**
- **Governance participation and collaboration**

4.7 EARLY AND COORDINATED ENGAGEMENT

The call for early and coordinated engagement has been consistently emphasized by Indigenous leadership and communities regarding energy planning and project development. While early and coordinated engagement alone is not sufficient to enable true partnerships, it is foundational to help to define each distinct partnership between respective Indigenous communities and with the province and proponents.

Early and coordinated engagement with Indigenous communities is critical as the pace of electrification and the transition accelerates and intensifies. Prioritizing ongoing relationship building through regular and coordinated engagement is necessary to improve transparency and accountability to Indigenous communities. This includes facilitating discussions related to the anticipated costs and impacts of electrification and the transition and demonstrating how the feedback received through engagements has informed policy development and decision-making.

With respect to wise practices to facilitating engagement, many Indigenous communities have publicly available engagement and consultation protocols and guidelines that outline how they would like government and proponents to approach engagement and Consultation. Some Indigenous communities have shared their Nation's policies, laws, constitutions, and regulations that support Indigenous decision making around projects and investments on their lands.

For example, Manito Aki Inakonigaawin, or Grand Council Treaty #3's Great Earth Law, proclaimed on October 3, 1997, validated through traditional ceremony, and ratified by the National Assembly, emphasizes Indigenous values as driving decision making on, for example, energy and infrastructure development projects in Treaty #3 territory. In February 2023, Grand Council Treaty #3 announced the official launch of the Manito Aki Inaakonigewin (MAI) toolkit. The Toolkit, which is publicly available, is meant to support the relationship between Treaty #3, proponents, the Crown and others, build partnerships, support clear and transparent communication, and protect the environment, including sacred and ceremonial sites throughout the territory.[23]

Some Indigenous nations have used other approaches to make Indigenous values-based decisions with community members to guide involvement in projects and determine project impacts. Government and proponents would benefit from enhancing their own internal capacity-building to familiarize themselves with Nations' policies, laws and constitutions ahead of initiating and coordinating engagement and consultation. Improving government and proponents' knowledge and understanding of community approaches could contribute to trust building and more consistent and coordinated engagement and consultation across the energy sector.

Stable capacity funding is required to support early and coordinated engagement and Consultation with Indigenous communities. Stable capacity funding to Indigenous communities is a critical element to facilitate meaningful engagement and is essential to enable open discussions on how the Province can better support collaborative partnerships, improve the safety and success of communities throughout the transition and advance Indigenous communities' participation, inclusion, and leadership in energy planning and project development.

4.8 CAPACITY-BUILDING AS A DRIVER FOR ENGAGEMENT AND PARTICIPATION

Many Indigenous communities are inundated with engagement and consultation requests on energy and non-energy related projects, often with narrow lead times to meaningfully incorporate Indigenous perspectives and insufficient stable capacity funding to support meaningful Indigenous participation.

[23] Grand Council Treaty #3. Launch of Manito Aki Inakonigewin Toolkit.

As a result of the legacy of colonialism, many Indigenous communities are responding to multiple, and often overlapping crises with smaller numbers of designated staff available to properly engage on energy projects and technical energy planning discussions.

Evergreen funding to enable early, meaningful and coordinated engagement is a critical lever to address the unique barriers that prevent full Indigenous participation in the energy system. While efforts to build capacity take time to increase communities' technical energy and systems knowledge, government and the sector must create space for Indigenous perspectives throughout energy and technical planning discussions.

Given the potentially rapid pace of electrification and transition, the government and the sector should support larger scale community capacity-building efforts to enable full Indigenous participation in planning, including technical regional and provincial planning discussions, and enable opportunities to address the cumulative impacts of energy development projects.

The scope and scale of capacity-building supports may differ across communities based on respective energy needs and interests. Critical capacity-building efforts may include:

- Building community knowledge and awareness of Ontario's energy system, such as the roles and responsibilities of the Province, agencies, transmitters, local distribution companies (LDCs), etc.
- Tailored training and learning tools for Indigenous leadership to support informed community energy conversations.
- Education and skills development to enable participation in regional and provincial energy planning, including technical planning discussions.
- Learning/funding for designated community members/staff to regularly assess and evaluate community energy needs and interests.

AGENCY-LED CAPACITY-BUILDING

The IESO offers a suite of Indigenous Energy Support Programs that support participation in the energy sector by enabling Indigenous communities and organizations to develop energy plans and projects and hire and train energy workers in their community. In 2022, the IESO provided funding for 83 projects across 53 recipients for a total of $9.8 million in funding, and 28 dedicated energy workers were funded across the province.

Throughout the Panel's engagements, flexible program approaches with funding for dedicated staff to improve community capacity, were identified as wise practices to enhance community knowledge and participation in energy conversations. Providing longer-term funding and increasing salaries for designated staff, like Community Energy Champions (who help plan, implement and evaluate energy-related priorities), as well as providing funding for relevant training, and for required program equipment/supplies were also identified as positive program elements to support Indigenous participation in engagement and energy planning.

INDIGENOUS-LED CAPACITY-BUILDING

The 20/20 Catalyst Program delivered by Indigenous Clean Energy Inc. (ICE) was highlighted as an existing Indigenous-led program that facilitates capacity-building across Indigenous communities. The program provides practical and applied learning about renewable energy projects, community energy planning, energy efficiency and conservation, business management, and advanced energy systems. Participants are supported to move clean energy projects forward on the ground.

The program emphasizes Indigenous communities' participation in energy efficiency and renewable energy projects as foundational to their health and well-being. Financing the construction of energy efficient homes and the retrofitting of older homes to be energy efficient is a crucial component to both climate adaptation and sustainable development, by reducing energy emissions, and by facilitating job creation for Indigenous people.

Similarly, Conservation on the Coast (COTC) has focused on delivering conservation demand management programs in three James Bay communities - Attawapiskat First Nation, Kashechewan First Nation and Fort Albany First Nation - that own their own local distribution companies. COTC, in partnership with Five Nations Energy Inc. and the IESO, have successfully completed deep retrofits for 40 homes, including the addition of heat recovery ventilators.

Partnerships have been crucial to the success of these community-based capacity-building efforts, as well as government support that is flexible, consistent and relationship-based.

Opportunities to expand and scale up existing capacity-building programs should be pursued, including opportunities for additional wrap-around-supports to facilitate communities' participation and for designated staff helping to deliver community programs.

As mentioned above, building capacity in Indigenous communities should also be met with an ongoing commitment from government and the sector to build their internal capacity with

respect to enhancing Indigenous cultural competency, building greater awareness, and understanding of treaties and community engagement protocols, governance structures, and an ability to demonstrate how Indigenous perspectives are included and inform decision-making.

There are several organizations across the energy sector that have developed or are in the process of developing Indigenous or Reconciliation Action Plans, establishing or enhancing Indigenous relations units and seeking to improve partnerships with Indigenous communities. These actions signal a hopeful development taking root and provide an opportunity to improve cross-sector learning and knowledge sharing to establish wise practices across Ontario's energy sector.

GOVERNMENT'S ROLE IN SUPPORTING ENGAGEMENT

In addition to stable capacity funding to Indigenous communities, the Ministry has a crucial role to play in supporting engagement and Consultation with Indigenous communities to ensure Indigenous communities are meaningfully involved and benefit throughout the process. This is imperative to ensure the province can keep pace as the demand for electrification and energy transition intensifies.

Most of the proposed solutions for achieving a clean energy economy rely on using Indigenous lands and resources to build clean and renewable energy infrastructure and extraction projects. These projects include new non-emitting electrical generation power plants, expanded transmission lines, energy storage, hydrogen fuel production, and new mines to provide the raw materials needed for electric vehicle battery production. Given that all these projects will be built on Indigenous lands, any opposition or delay to proposed projects will significantly impact the province's ability to seize the economic opportunities of electrification and the energy transition.

Currently, the Ministry of Energy undertakes and coordinates engagement and consultation with Indigenous communities on proposed policy actions and energy projects in Ontario and often delegates the procedural aspects of the Duty to Consult to proponents on energy projects. The Indigenous Energy Policy Unit within the Ministry also provides guidance to proponents to support engagement and consultation and is responsible for working with Indigenous communities and proponents to address any related issues that may arise throughout the engagement and consultation process.

Ensuring adequate resources and capacity to satisfy the Duty to Consult will be essential as the volume of development projects grows to advance electrification and the energy transition. Supporting the Ministry's capacity to better respond to an increase in requests for engagement

and Consultation will also help the Ministry to better build and maintain long-term relationships with Indigenous communities, support more proactive, coordinated, and open discussions with Indigenous communities throughout the transition and help to facilitate collaborative partnerships and full Indigenous participation in the emerging clean energy economy.

Where governments and proponents have taken the time to invest in long-term relationship-building with Indigenous communities, engagement and consultation will likely be more constructive and productive. As opposed to solely engaging on specific projects as they emerge, establishing sustained channels with Indigenous communities could serve to maintain positive relationships and support collaborative and transparent conversations related to energy planning, policy development and decision making as electrification and the energy transition progresses.

4.9 ECONOMIC RECONCILIATION AND PARTNERSHIPS

Simply defined, economic reconciliation can be understood as the inclusion of Indigenous people, communities, and business in all aspects of economic activity. As outlined in the Truth and Reconciliation Commission of Canada (the "TRC") Final Report, all reconciliation efforts require the following overarching principles of trust building, joint leadership, accountability, transparency and a substantial investment of resources.

It is not enough to engage with Indigenous communities to advance true partnerships and economic success. Indigenous perspectives in major project benefits and risk assessments, Indigenous-led investment decisions, and Indigenous-held equity stakes are becoming increasingly common.

For generations, Indigenous leaders have advocated for the need to include Indigenous perspectives in projects that impact Indigenous lands and communities. The recognition and advancement of Indigenous rights through advocacy efforts and legal court decisions affirms the importance of including Indigenous perspectives in critical energy and mineral projects.

Many Indigenous communities view the economy as being interconnected with land, resources, politics, ceremony and spirituality. Taking an integrated and holistic view of the economy is to view "shareholders" as the community itself. The values and goals in an Indigenous partnership involve not only maximizing profits but also economic development that supports communities' long-term economic and social health and well-being.

There are existing Indigenous and community-led organizations that help to facilitate positive partnerships with Indigenous communities on major energy development projects.

A significant aspect of the work of the First Nations Major Projects Coalition (FNMPC) is to support First Nations and companies initiating partnerships on major projects. The organization states that the approach by which partnerships with Indigenous communities or entities are initiated and implemented is vital, and that this includes providing capital markets, governments and the public with assurance of project success. Industry proponents are increasingly interested in better understanding the wise practices and key learnings from successful Indigenous and industry partnerships on major projects.

With appropriate and stable resourcing, Indigenous-led organizations could continue to facilitate more equitable partnerships between Indigenous communities, government, and proponents, and ensure that partnerships produce shared economic success for all parties, in addition to improvements to overall community health and well-being.

ACCESS TO CAPITAL AND FLEXIBLE FINANCING FRAMEWORKS

Through federal policy such as the Indian Act, Indigenous communities often do not have reasonable and competitive access to capital for investment and economic development.[24] Systemic barriers like the Indian Act have prevented Indigenous businesses from raising capital, and in combination with many Indigenous communities' remote geographic location and fewer human and financial resources, have placed Indigenous communities at a significant competitive disadvantage.[25]

Governments play a vital role in major project success through lessening regulatory burdens and administering programs like the Aboriginal Loan Guarantee Program (ALGP). The ALGP is an example of a creative financing mechanism that helps to enable Indigenous participation and address some of the challenges Indigenous communities experience with raising sufficient capital to participate in competitive projects in their territories.

The ALGP supported, in part, the Lower Mattagami Project, a partnership between Moose Cree First Nation and Ontario Power Generation. Under the Amisk-oo-Skow Agreement, Moose Cree First Nation received a 25 per cent equity stake in the project. The Project is Ontario's largest

[24] Government of Canada. Indian Act (R.S.C., 1985, c. I-5

[25] First Nations Major Projects Coalition. TVDE 2023 Conference Primer.

northern hydroelectric-generating construction project in 40 years and has increased Ontario's supply of clean, renewable power by about 440 megawatts. The partnership agreement also provided training and employment opportunities. Moose Cree businesses were awarded over $300 million worth of project contracts and at peak construction periods, the project employed over 250 Indigenous workers.

Opportunities to expand or learn from the ALGP could support Indigenous communities and entities who want to participate in various energy projects across their territories, particularly as the volume of projects is expected to increase throughout the transition.

INDIGENOUS INCLUSION IN ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) FRAMEWORKS

Discussions around the use of environmental, social and governance (ESGs) strategies and programs to indicate how an organization is performing and whether an investment is attractive, have been the topic of evolving conversations throughout various corporate, investment and governments sectors, particularly as investors demand more robust governance and oversight. Globally, discussions are ongoing around the development and implementation of policies, regulations and targets related to ESG, including the use of mandatory ESG reporting. The use of ESG is growing in reach globally. As of 2020, 88 per cent of publicly traded companies, 79 per cent of venture and private equity-backed companies, and 67 per cent of privately-owned companies had ESG initiatives in place.[26]

ESG is currently, and will continue to be, viewed through an investor's lens. Rising expectations for organizations to measure and disclose their ESG performance will require them to demonstrate through performance metrics and data, that they are assessing and improving the environmental, social, and governance elements of their business. It is likely that they will be increasingly expected to demonstrate that they are addressing the risks of climate change, including both physical risks to their organizations' assets and risks as Ontario transitions towards a clean energy economy.

As the influence of ESG increases, it represents an opportunity for the inclusion of Indigenous perspectives in each of the three pillars, as there is clear alignment between Indigenous interests and ESG.

[26] Northeastern Alberta Aboriginal Business Association. The Sustainability-Indigenous Nexus: The Case for Indigenous Inclusion in ESG.

As noted above, building a clean energy economy requires development on traditional territories. This requires strong relationships and collaboration with Indigenous nations and communities, which can contribute to achieving long-term business, sustainability, and collective goals. For example, Indigenous people have been living on this land since time immemorial and are aware of the effects of climate change, energy transition, and how energy development impacts collective well-being and their inherent Treaty and cultural rights. Many Indigenous nations and communities emphasize the interconnectedness between people and the land, whereby sustainability is viewed as an active and reciprocal relationship between people and the environment.

In conversation with Indigenous communities, there is an opportunity to provide meaningful guidance on the appropriate integration of Indigenous perspectives into organizational governance, decision-making processes and to collaborate on inclusive operational and governance metrics. There is also an opportunity to explicitly include Indigenous perspectives in ESG disclosure standards and frameworks.

There are ongoing discussions between Indigenous leaders, businesses and organizations with respect to the alignment between ESG and improving Indigenous communities' access to equity for the purposes of investment and development. Indigenous nations and communities are increasingly participating in Indigenous-owned investment capital projects in a way that aligns with their values and objectives, which informs and contributes to the broad objectives of ESG investing. Opportunities to consider Indigenous investment capital as a potential requirement for ESG investing is an idea worth further consideration.[27]

INDIGENOUS VALUE-THEMED BONDS

While financial returns are significant to investors, producing environmental and social outcomes has become increasingly appealing to asset owners. At over US$120 trillion, the bond market (including all bonds) is the biggest capital market in the world. Coupled with increasing investor interest and the broadening of bond types to include Indigenous value-themed bonds, there are opportunities to scale financing to attract capital for Indigenous economic development.

For example, since 2014, the First Nations Financial Authority (FNFA) has issued at least nine bonds/debentures to raise funds to provide First Nations with long-term fixed rate loans. In March 2022, the FNFA issued a debenture worth C$354 million. This bond is supporting projects in 19 First Nation communities throughout Canada, including a solar energy farm in Ontario, a hydro-electric project in Quebec, an elder care facility, housing and other infrastructure.

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[27] First Nations Major Projects Coalition. Top 10 List for Roadmap for Investing in Canada: Indigenous Inclusion in ESG.

SOVEREIGN WEALTH FUND

Simply defined, a sovereign wealth fund (SWF) is a state-owned investment fund that invests in real and financial assets in a variety of asset classes such as stocks, bonds, real estate, private equity, and hedge funds.

In July 2018, Ontario announced the completion of the sale of over 14 million shares in Hydro One to Ontario First Nations Power Holdings LP, a limited partnership wholly owned by Ontario First Nations Sovereign Wealth LP, which in turn is owned by 129 First Nations in Ontario. The deal represented 2.4 per cent of the outstanding common shares.

The purchase was financed through a 25-year term loan from the Province, with the interest rate for the term loan provided at the Province's relevant borrowing rate, plus 15 basis points. The shares sold in the transaction were pledged as security for the term loan provided by the Province. The Province also provided seed capital of approximately C$29 million in cash to a new investment fund wholly owned by Ontario First Nations Sovereign Wealth LP.

The OFN receives quarterly dividends from Hydro One, which are used to make interest payments on the loan, with the remaining re-invested by an independent investment manager for greater gains. Dividends from utilities remain secure, although economic recessions and impacts to the market are a consideration. This financing framework has been successful in providing ongoing and long-term economic benefits for the collective interest of many Ontario First Nation communities.

As shown above, there are a variety of financing mechanisms and instruments that have been used to support Indigenous economic development and enable Indigenous participation and partnerships with Indigenous communities. Flexible financing models are crucial to ensure that Indigenous communities and entities have access to capital and thus receive a fair opportunity to participate in a competitive economy, particularly as projects and new technologies quickly emerge to advance electrification and the energy transition.

Incorporating Indigenous values and perspectives to inform the development of partnership agreements is a wise practice as there is early focus on relationship building and time invested in understanding project partners' values, goals and limitations. In the case of the Wataynikaneyap Project, project partners negotiated requirements as part of their partnership agreement to align with community values and protect the people and the lands' health and well-being over the course of the project's life cycle.

4.10 EMBEDDED AND COLLABORATIVE GOVERNANCE PARTICIPATION

Indigenous partners bring a significant wealth of knowledge, experience and perspective, as well as valuable approaches to partnerships. Moving towards a clean energy economy represents an opportunity for government to collaborate with Indigenous nations and communities on shared decision-making and synergetic governance models, including Indigenous participation on boards of directors and joint committees, and incorporating Indigenous approaches to topics like resolving disputes and managing land and resources.

The notion of embedded governance participation aims to improve Indigenous participation and the inclusion of Indigenous perspectives within existing structures that govern and regulate Ontario's energy system. This includes, for example, ensuring Indigenous representation from Ontario on the Boards of Directors of the Ontario Energy Board (OEB) and the IESO. In addition to ensuring Indigenous representation on executive boards, agencies and industry proponents should clearly demonstrate how policy development and decision making include and are informed by Indigenous perspectives.

Indigenous representation on government agency boards would serve as an important signal to some in industry about the importance of Indigenous representation on corporate boards.

In addition to embedded governance participation, the notion of collaborative governance participation refers to new approaches to shared governance between government, industry proponents and Indigenous communities. It requires early engagement and an understanding of Indigenous communities' various governance structures and laws which inform the nation's decision making and preferred partnership approach.

For example, Hydro One's Waasigan Transmission Line project team includes a representative from Gwayakocchigewin Limited Partnership (GLP), a coalition of eight First Nations. GLP consists of eight of the nine First Nation communities that have signed a 50 per cent equity partnership on the line with Hydro One. A designated team member from GLP has a key role as a full member of Hydro One's Waasigan Project Team. They play an integral role in internal Hydro One meetings to support the project and facilitate meetings with GLP and/or its member communities and the public. Project governance structures like this have the potential to result in increased transparency and improve communication and understanding between project partners.

There are potential learnings from other sectors that may be helpful as various approaches to improving Indigenous participation in the clean energy economy are considered. Wabun Tribal

Council operates in Timmins, serving six First Nations. In 2016, the Council developed a policy to improve meaningful engagement with First Nations in mineral resource exploration and development. With several exploration agreements, impact benefit and resource development agreements, the Wabun Model of resource development aims to build meaningful relationships with the mining and development industry. The Council has played a key role in regional planning and policy development.

The Council has signed over 55 Memoranda of Understanding (MOUs) with various mining and resource companies. These agreements are negotiated from a standardized template, in which industry proponents provide a commitment to the First Nations for financial compensation to accommodate for impact, business opportunities, employment and training, creation of a committee of Elders and knowledge holders, support for various studies (archeological, peer review, etc.) if required, commitment to IBA negotiations should a mine develop and funding for the negotiations. Agreements provide a framework for Engagement and Consultation, as well as an opportunity to collaborate on governance process and structures.

As mentioned earlier, Manito Aki Inakonigaawin, or Grand Council Treaty #3's Great Earth Law, is an important bridge between Indigenous inherent rights and responsibilities to Treaty #3 territory and current laws and policies that impact the energy sector in Ontario. Laws such as this have often been developed over a thousand years for both internal and external purposes by Treaty #3 and represent an opportunity for government to work more collaboratively with Indigenous communities to align the interests of First Nations and proponents.

Any creation or establishment of energy planning entities should include Indigenous representation to ensure Indigenous perspectives are meaningfully included across all levels of energy planning. The creation of new planning entities also offers an opportunity to explore collaborative governance approaches with Indigenous communities.

4.11 RECOMMENDATIONS

The Panel has four core recommendations to advance meaningful Indigenous participation and partnerships in the clean energy economy. Several other recommendations throughout this report identify actions to support Indigenous communities and enable effective participation. Please refer to the complete list of recommendations at the end of this report.

Recommendation 19: The government should support meaningful Indigenous participation in the clean energy economy through consistent and larger scale capacity-building initiatives, including:

a. The development and expansion of Indigenous-led and community-driven capacity-building initiatives

b. Stable and flexible capacity funding to facilitate meaningful Indigenous consultation and engagement with the Ministry and proponents on energy planning and project development

c. Expansion of the IESO's Indigenous Energy Support Program (including increasing program budget overall, increasing funding for designated energy champions, wrap-around community supports, and flexible program delivery)

d. Tailored and accessible learning resources to enhance understanding of Ontario's evolving energy system, and improve Indigenous participation in community, regional and provincial energy planning, as well as technical planning discussions

Recommendation 20: The government should advance economic reconciliation through flexible financing models and mechanisms that incentivize Indigenous project ownership across small, medium, and large-scale energy projects. This could include:

a. Expansion of the Aboriginal Loan Guarantee Program and development of other programs, following an assessment of any barriers to program access

b. Opportunities to align funding and cost-sharing agreements, where possible, with the federal government and other provincial governments in Canada, as appropriate

c. Opportunities to pilot emerging, flexible financing instruments/mechanisms, such as the use of Indigenous-value themed bonds

d. Review of current energy agency frameworks, including regulatory and procurement policies, to identify opportunities to improve flexibility and enhance Indigenous project ownership

Recommendation 21: To improve embedded governance participation, the government should amend the enabling statutes of the IESO and OEB to ensure Indigenous representation on the Boards of Directors.

Recommendation 22: The Ministry of Energy should review its current resources to enhance the Ministry's capacity to meet the demand of electrification and the energy transition, including:

a. Appropriate resources to the Indigenous Energy Policy Unit to support proactive relationship-building and increases to the volume of engagement and consultation with Indigenous communities.

b. Continued dedicated policy and legal expertise to support the Ministry's early engagement and consultation work, such as,

    - Responding to and addressing community concerns
    - Understanding the spectrum of engagement and consultation
    - Identifying impacted communities for engagement and consultation
    - Delegating procedural aspects of consultation where appropriate
    - Ensuring that the Ministry has diligently discharged its constitutional obligations under the Duty to Consult

5. PLANNING FOR ELECTRIFICATION AND THE ENERGY TRANSITION

High-level, strategic policy direction is the strongest and most critical contribution government can make to energy planning. Empowered with a mandate to govern and accountable to the electorate, government has both the authority and the responsibility to make strategic decisions and set policy objectives. This responsibility becomes yet more critical in navigating the energy transition. Government must take and execute critical decisions to provide the right environment for alignment of the social and economic forces that will carry out the vast amount of the work necessary to transform the energy system. In Ontario's energy transition, the focus on a commitment to a clean energy economy should act as the common focal point to mobilize and align these forces.

The term 'clean energy economy' has been broadly adopted to advance policy conversations about electrification and the energy transition. It has been used as a guide for policy analysis by organizations like the International Energy Agency (IEA), the Organization for Economic Cooperation and Development (OECD), the United States (U.S.) Department of Energy, the Natural Resources Defense Council and the United Nations, as well as other government and non-governmental organizations around the globe. Despite its broad adoption, there is no single definition of the term.

The Pew Charitable Trust, a leading U.S. think tank with a deep understanding of consumer and public opinion, developed a definition that has subsequently been used by a broad cross-section of energy sector organizations. According to Pew, a clean energy economy "generates jobs, businesses and investments while expanding clean energy production, increasing energy efficiency, reducing greenhouse gas emissions, waste and pollution, and conserving water and other natural resources." The clean energy economy therefore maximizes prosperity and enables economic competitiveness and growth while using resources wisely and developing sustainable supply, delivery and consumption of energy.

Much of the world – including many of Ontario's major trading partners – has committed to achieving economy-wide carbon neutrality by 2050. Net zero pledges now cover 90 percent of global gross domestic product (GDP). In the context of this shift, outlined in more detail in Section 2 above, the Panel recommends that Ontario adopt a strategic approach to economic

and energy policy that contributes to the global climate solution and thereby sets the province up to succeed and prosper in the emerging global clean energy economy.

Throughout its engagements, the Panel heard that the energy sector will require a clear vision to guide long-term planning and decision-making, ensuring that the energy transition is properly coordinated and paced to maintain energy reliability and affordability, enhance economic competitiveness, and prioritize reconciliation with Indigenous communities, as well as meeting other economic and social objectives. Government must play a critical leadership role in the process of coordinating and balancing the significant distribution-level development and demand-side fuel switching with the required bulk, supply-side infrastructure development. Importantly, increases in the demand for electricity must be paced in a way that aligns with the capabilities of the energy delivery system for power and gas. All of this will need to be accomplished in a collaborative manner, including and incorporating the perspectives and participation of Indigenous and non-Indigenous communities and energy sector stakeholders.

5.1 THE IMPORTANCE OF POLICY CLARITY

Government's overarching policy direction must be clear. The Panel heard consistently from a broad range of stakeholders that it is the provincial government's role to establish a roadmap for the energy transition with long-term commitments, clear objectives and targets, and integrated cross-sectoral strategies. Sending a clear policy signal, with specific objectives and future-oriented strategies for achieving them, will provide much-needed certainty to guide energy planning, policy, investment and regulatory decision-making, and enable Ontario's economy to benefit from a supportive and clear investment environment. Investors, buoyed by government's strong commitments and clear policy direction, can have more confidence to make the significant capital investments required to transform the energy system. This is a key action the government can take in lowering the cost of doing business in Ontario and ensuring the province's future prosperity.

The central importance of overarching policy clarity in the management of the energy transition has been advocated by other entities both inside and outside the province. The Independent Electricity System Operator's (IESO's) ***Pathways to Decarbonization*** report, for example, states that "Policy certainty is a must." The report observes that provincial policy has the potential to "govern the direction of industry, business and consumer behaviour." Clear and certain policy direction is thus "vital to enabling investment in infrastructure, conservation and demand management (CDM), next-generation technology and decarbonization" and is "a prerequisite for decarbonization at scale." Similarly, the **Intergovernmental Panel on Climate Change's March**

2023 report states that effective climate action is enabled by political commitment, clear goals, and coordination across multiple policy domains. This clarity is crucial not only for achieving decarbonization goals, but also for maintaining consumer trust and enhancing economic prosperity throughout the energy transition. Clarity and consistency can build confidence and unlock private sector investment and consumer action, both of which will be crucial in constructing a clean energy economy.

5.2 AN ECONOMY-WIDE VISION

Government's overarching policy direction must be holistic and provide an economy-wide vision for the energy transition. A niche approach focusing only on the energy sector would fail to consider the central role energy plays as an enabler of all economic activity and its singular importance in the everyday operations of modern life. The transition to a clean energy economy will therefore require a policy commitment across government.

Recommendation 1: To provide clear direction for Ontario's energy and economic future, the provincial government should develop and communicate a commitment and associated policy principles for achieving a clean energy economy for Ontario by 2050.

This commitment, and policy principles that would define the parameters by which decisions will be made, should be embedded and integrated across all ministries in a manner that ensures policy consistency, alignment of decision-making, and accountability mechanisms.

5.3 ALIGNMENT ACROSS POLICY AREAS

Energy use is affected and shaped by policy decisions in nearly every domain of provincial policy. Economic development, job creation and trade policy may influence the growth of new energy-intensive industry, including when and where new large industrial loads materialize. Housing policy influences how much energy is required in different geographic regions and when expansions of energy infrastructure might be required to support growing communities.

Other areas of policy development may not have a direct and significant impact on energy consumption but nevertheless influence the demands and complexities of an economy-wide energy transition in other ways. Labour, training and skills development policy can affect the availability of the skilled labour required to install critical energy infrastructure and operate technologies necessary for electrification and decarbonization. Policy related to the mining industry may affect both the demand for energy in remote northern Ontario communities and the availability of minerals and materials critical to electrification and energy transition.

In many cases, these policy influences are complex and inter-dependent, linking different policy areas in relation to energy consumption. For example, land-use planning and housing policy affect the density of communities and thus the transportation options for residents, which in turn influences what and how much energy is required to fulfill the community's transportation needs. As a result, energy needs and use patterns differ significantly according to where people live and work and how communities get developed.

These complex policy relations underscore the need for a holistic approach to energy planning that not only integrates different forms of energy but is embedded in cross-governmental operations of policy development. The transition to a clean energy economy requires that government ministries think deeply about the implications of their policies and collaborate to develop policies that are not at cross-purposes. It will require integrated planning and decision-making in the way that we plan communities, build transportation infrastructure, conduct economic development and finance public spending. It is therefore crucial to have collaboration and coordination across ministries and policy areas – not work at cross-purposes. Only then will we be able to align and effectively mobilize the social and economic forces that will make the energy transition happen.

Recommendation 2: The provincial government should convene an internal clean energy economy planning and implementation body, such as an existing committee of Cabinet.

a. This body would be responsible for ensuring alignment across sector strategies (such as industrial and economic development strategies, transportation, building/housing, agriculture, mining, and land use planning, including project development processes such as permitting, siting and funding) and ensuring that sector strategies are evaluated through an energy lens.

b. As part of the shared responsibility across governments to coordinate and contribute to the energy transition, the government should provide all relevant ministries with clear mandates to contribute, in their domains, to a well-coordinated energy transition.

c. Relevant ministries should develop measurable key performance indicators (KPIs) to align their sectoral strategies and policies with the imperatives of the energy transition in Ontario.

5.4 ALIGNMENT WITH PARTNER JURISDICTIONS

This fundamental interdependence also highlights the need for inter-governmental coordination and collaboration. The Panel heard from stakeholders that alignment on broad goals, objectives and key programs would be crucial to ensure that different orders of government are not working at cross-purposes. Inter-governmental alignment provides greater clarity for consumers and businesses on their energy use decisions and for investors to raise capital and facilitate economic growth and the development of new jobs.

Working across governments may also reveal shared objectives and help find the most effective, efficient and mutually beneficial solutions for shared energy challenges. For example, the 2023 federal budget **introduced or expanded five Clean Investment Tax Credits (ITCs)**, including credits for clean electricity generation, storage and transmission, clean technology manufacturing, clean hydrogen, carbon capture, utilization and storage (CCUS) and clean technology. These ITCs – which are expected to total over $60 billion over the coming decade – are intended to incentivize clean economy innovation in the private sector, support economic growth and create jobs. **The Canadian Climate Institute has estimated** that Ontario could be eligible for $7.1 billion in funding from the Clean Electricity ITC alone. As federal-provincial conversations evolve, alignment between the province and the federal government on objectives or on the conditions to be met to receive the credit could help the province attract investments that support the ultimate objective of building a clean energy economy.

Stakeholders generally recommended that Ontario commit to targeting a net zero emissions economy by 2050 and that Ontario policies, planning and regulations align with a 2035 net zero electricity grid to align with commitments made by the federal government and the United States. The Panel heard that such targets would provide policy clarity to investors and businesses and enable further investments in clean energy technologies.

Alignment on strategic priorities may also be beneficial in economic and trade relationships. Three of Ontario's largest U.S. trading partners – Michigan, Illinois and New York – have set strong

targets for emissions reductions. Michigan has an Executive Directive aiming to achieve a 28 per cent reduction below 2005 levels in greenhouse gas emissions by 2025 and economy-wide carbon neutrality no later than 2050. Illinois has committed to achieving net zero greenhouse gas emissions statewide by 2050 and has developed a detailed Climate Action Plan to achieve that objective. New York has a statutory target to reduce economy-wide emissions by a minimum of 85 percent from 1990 levels by 2050. Ontario's three largest interprovincial trade partners have also set a goal of net zero economy wide emissions by 2050. Quebec has set a policy target to achieve carbon neutrality by 2050, British Columbia has committed to achieving net zero carbon pollution by 2050, and Alberta's Emissions Reduction and Energy Development Plan includes an aspiration to reach carbon neutrality by 2050. At the international level, Ontario's largest global trading partners, including the U.S., European Union (EU), and China, have set national emissions reduction targets. The U.S. has committed to a policy target of achieving net zero emissions by 2050. The EU aims to achieve net zero greenhouse gas emissions by 2050 at the latest, with negative emissions thereafter. This target has been enshrined in the EU's Climate Law passed in 2021. China developed a policy commitment to reach carbon neutrality before 2060. These jurisdictions account for the vast majority of Ontario's interprovincial and international trade, and their commitments to decarbonization represent a significant strategic consideration for the future of the province's export growth and economic development.

It is in Ontario's best interest to align with these partner jurisdictions on strategic policy directions related to the clean energy economy. Alignment on strategic objectives creates further opportunities for trade and investment through, for example, the province's Strategic Investment and Procurement Agreements (SIPAs) with U.S. states. For example, Ontario recently reached an agreement to deepen the longstanding economic relationship with Michigan through an Economic Cooperation Memorandum of Understanding that will support trade and investment initiatives in priority areas like electric vehicles and related supply chains. Aligning with partner jurisdictions on a commitment to a clean energy economy thus eases the frictions of cross-border trade and investment, opening up opportunities, bolstering economic prosperity and creating jobs.

Recommendation 3: The provincial government should continue to seek alignment and coordination of clean energy economy objectives, standards and policies with other governments (within and outside Canada) whenever practical and consistent with the province's economic and policy interests.

This alignment and coordination should include, but need not be limited to:

a. Pursuing strategic policy alignment on key priorities for economic and energy development

b. Engagement with the federal government and taking the necessary policy actions to ensure Ontario can access federal funding opportunities (e.g., federal investment tax credits)

c. Coordination and collaboration with the federal government to streamline and provide greater clarity, predictability and timeliness of project approvals and clear delineation of responsibilities

d. Engagement with Canada and neighbouring provinces and states, directly and through agencies, to pursue the mutually beneficial integration of energy systems (including electricity markets and interties) to advance energy transition objectives

e. Pursuing opportunities to enhance cross-jurisdictional coordination and alignment of energy-related codes and standards with the objective of reducing regulatory burden while maintaining a position of leadership in regulatory innovation

f. Engagement with municipalities to ensure they are aligned with and supported in the energy transition, including support for **Comprehensive Local Energy Planning** (see section 5.8) and requiring local utilities and municipalities to engage and collaborate on energy planning matters

5.5 A LONG-TERM VISION FOR THE ENERGY SECTOR

A commitment to constructing a clean energy economy will set the broad, overarching objective and target for Ontario's economy. The energy sector will require a more focused and sector-specific vision for the evolution of Ontario's energy system.

Some jurisdictions have undertaken to develop a "Scoping Plan" or "Master Energy Plan" for government to deliver the energy policy needed to guide electrification and the energy transition. These plans go beyond traditional electricity and natural gas system demand/supply plans and serve as an economy-wide roadmap to decarbonization and economic development in the shift to a global clean energy economy. They articulate broad strategies for energy transition and seek to tie together energy production and consumption across all sectors of the economy, with

consideration for policy goals like affordability, economic development and efficiency. Plans include recommendations such as legislative changes, regulatory policies, fuel switching programs, and affordability and equity programs, as well as funding models.

For example, New Jersey developed a **2019 Energy Master Plan: Pathway to 2050** (EMP). The plan was developed by the state's **Energy Master Plan Committee**. The 2019 EMP represents "an innovative, systematic, and inter-agency approach that, for the first time, holistically considers the complete energy system in New Jersey, including electricity generation, transportation, and buildings, and their associated greenhouse gas emissions." It spans multiple economic sectors and includes rigorous objectives to achieve 100 percent carbon-neutral electricity generation and a maximum electrification of the transportation and building sectors, along with a detailed roadmap with seven main strategies to reach those objectives.

Similarly, New York released a **Scoping Plan** in 2022, developed by the state's **Climate Action Council**. The 2022 plan "recommends actions that advance the requirements of the Climate Act both within and across economic sectors," including transportation, buildings, electricity, industry, agriculture, forestry, and waste, and touches on topics such as land use, local government, adaptation and resilience. It provides both sector-specific and economy-wide recommendations oriented towards objectives of climate change mitigation, justice, economic opportunity and long-term job creation.

In May of 2023, the United Kingdom's Department for Energy Security and Net Zero issued a proposed **Strategy and Policy Statement for Energy Policy in Great Britain** document for consultation. The document "sets out the government's strategic priorities and other main considerations of its energy policy," including the policy outcomes to be achieved and the roles and responsibilities of entities involved in the implementation of that policy. The document also identifies three priority objectives for energy policy: enabling clean energy and net zero infrastructure, ensuring energy security and protecting consumers, and ensuring the energy system is fit for the future.

The Panel sees a critical need for Ontario to develop a comprehensive energy transition policy vision to guide the provincial energy sector toward a clean energy economy. Such a vision would consider the generation, transmission, distribution, consumption and conservation of energy across end-uses in the province. A comprehensive approach is necessary to manage vast changes to provincial energy infrastructure and support a cost-effective energy transition that prioritizes affordability, reliability and economic development. The significant fuel switching at the end-user level and the necessary build-out of the electricity system is a highly complex undertaking that will need to be paced and balanced using a clearly articulated set of values and principles outlined in an energy transition vision.

Such a vision will need to account for uncertainties and learning along the way. New Jersey's 2019 EMP, for example, notes that its planning reports are "designed to be living documents to be continually reassessed, remodeled, and reprioritized as early objectives are achieved and newly emerging pathways mature." As technologies, processes and systems evolve, it will be necessary to review and revise system-wide plans. Ontario's long-term vision will need to be iterative and ongoing, evolving as the sector and its core technologies and processes evolve.

Recommendation 4: To enact the clean energy economy policy commitment, the Ministry of Energy should develop and communicate an energy transition policy vision that is inclusive of Indigenous perspectives and informed by clean energy economy policy principles.

The vision should outline clear strategic priorities, action-oriented objectives, acceptable trade-offs, and policy outcomes for energy production, transmission, distribution, and end-use shifts (such as transportation and buildings) to an electrified and low-carbon economy by 2050.

5.6 INTEGRATED LONG-TERM ENERGY PLANNING

Government's long-term vision for the transformation of the energy sector will need to be operationalized, managed and delivered through a renewed and expanded long-term energy planning process. Throughout its engagements the Panel heard that government needs to lead the way in planning for electrification and the energy transition by setting high-level objectives and providing clear and stable policy direction, while technical energy planning should be carried out independently, with effective oversight and accountability for planning outcomes. Long-term planning must be coordinated and integrated, considering the relationship between electricity, gas and other fuels in a holistic way and examining all the resources available, as well as coordinating with municipal and community energy planning. The process must include meaningful engagement with Indigenous partners at the earliest stages of development, and continued inclusion through the project planning, execution and operations phases. Stakeholders expressed the need for a robust, transparent and accountable planning process that provides policy certainty and prioritizes reliability, affordability and customer choice while ensuring adequate power supply to meet the needs of an electrifying economy.

This section of the report focuses on the key role the government plays in setting the goalposts for integrated planning. Recommendations for how integrated planning should apply to the specific roles of the IESO and the Ontario Energy Board (OEB) and what role electricity and

natural gas distributors play in a better coordinated system are developed in the following Section 6 – Governance and Accountability.

As new opportunities and options emerge through electrification and the energy transition, integrated planning becomes more important and grows in complexity. Coordinating electricity and natural gas system planning, and possibly other fuels, requires expanding communication structures and strategic optionality across the energy system. But the energy transition adds other dimensions in which an integrated perspective is needed. This involves thinking across and understanding the linkages between end-use sectors, such as appliances, transportation, industrial and building heating. Technological advancements have also opened up new opportunities for distributed energy resources and flexible demand (some with the ability to fuel-switch in response to market signals) to play an increasingly important role. As a result, planning will also require better integration and awareness between bulk generation, transmission and distribution levels of the system. Finally, energy planning will require increased integration across levels of government to ensure policy signals are well-aligned to encourage effective private sector action.

Much of the feedback the Panel received echoed input to the Ministry of Energy in its 2021 engagement on the reform of Ontario's long-term energy planning framework, when the Ministry began the process of reviewing the province's long-term energy planning framework to ensure that decision-making aligned with the core principles of effectiveness, transparency, predictability, accountability and ratepayer protection. Stakeholders emphasized the need for clear, high-level government policy direction, the importance of integrated, independent planning that considers all fuels and resources, the importance of planning oversight and accountability, and the need for enhanced stakeholder and public participation. The congruence of stakeholder feedback on these two engagements demonstrates the clear priorities and needs of the sector.

The Panel heard a variety of perspectives regarding which entity should lead long-term energy planning, or indeed whether a new entity should be created for this specific purpose. Some stakeholders expressed interest in expanded roles for existing energy sector players/agencies (Ministry of Energy, OEB and/or the IESO). Some stakeholders argued that a new entity (and/or new process) was required to break down policy and sector siloes, while others believed that the Ministry of Energy, the OEB, and the IESO could undertake this task.

The Panel's jurisdictional review revealed that all jurisdictions recognize the need to undertake integrated planning and have taken a diversity of organizational approaches in that direction. Some are establishing and empowering independent entities of various forms to develop long-term energy plans, while others are building on existing institutional arrangements. Importantly,

there is no model that can yet be classified as successful as all jurisdictions are in the early stages of moving towards integrated planning.

Against this backdrop, the Panel believes that at the current moment, strengthening cross-sector coordination and preparing for electrification and the energy transition is best achieved by carefully modifying the existing institutional framework in which the Ministry of Energy continues to lead energy planning. The OEB and IESO are not equipped, nor should they be expected to undertake, the development of a plan linking all sectors of the economy or to make key directional decisions on broad public policy matters, such as the use of public financing, the future role of the natural gas network in Ontario's energy mix, land use planning, or future building and construction standards. Likewise, the Panel does not believe a new planning entity should be created at this time as it would add to the complexity and time needed to begin undertaking integrated planning in the province.

The Panel believes that the OEB and IESO have crucial roles to play in enabling electrification and the energy transition. However, the OEB's core focus should remain on its economic regulation and consumer protection responsibilities, and the IESO's primary focus should remain on effective management, coordination, technical planning and oversight of Ontario's bulk electricity system and wholesale markets. Government has both the mandate and the responsibility to build public trust in energy policy and balance the vast array of inherently political trade-offs required in developing long-term energy plans.

Recommendation 5: The Ministry should develop and release, on a regular cycle, an integrated long-term energy plan that will guide Ontario's development of technical energy plans, strategies, and actions to support the transition to a resilient and affordable clean energy economy.

The plan should provide actionable and measurable guidance and policy direction, as well as regulatory recommendations and legislative revisions (as needed) across electricity, natural gas and other fuels on the production, transmission, distribution, consumption, and conservation and demand management of energy.

a. The plan can be developed within the existing legislative framework and should allow for broad input, while allowing for timely and effective planning and decision-making.

b. The planning process should include support and alignment for reconciliation with Indigenous peoples.

c. The planning process should encourage good communication on policy alignment and regulatory policy development across the ministry, IESO and OEB, while respecting each organization's distinct roles.

d. Both the integrated long-term energy plan and subsequent technical planning should be undertaken at pace and be based on dynamic and iterative analyses using scenarios.

e. The planning process should be inclusive and support energy consumers of all types, including vulnerable consumers. It should be participatory and deliberative to build a broad support for the energy transition, a focus on economic opportunity and competitiveness, equity and distributional impacts, and environmental and health benefits.

5.7 POLICY DIRECTION ON NATURAL GAS

Natural gas is an important resource fulfilling three main essential and distinct functions in Ontario's energy system today. As a fuel for electrical power generation, natural gas plays a critical role in providing dispatchable balancing and peaking services. As a fuel for space and water heating, natural gas has long been the cheapest option and has been adopted by the vast majority of Ontario households. Finally, as a source of industrial process heat and a feedstock for production in the chemical industry, natural gas plays an important role in supplying cost-competitive energy and material inputs. Today natural gas makes up almost 40 per cent of Ontario's energy mix.

Yet today, Ontario faces a fundamental conundrum with regard to the future of this resource. There are growing indications that it is unlikely that the natural gas grid can be decarbonized while continuing to deliver cost-effective building heat. There is growing doubt that it will be possible to replace the vast quantities of fossil fuel natural gas used today with clean alternatives, such as renewable natural gas (RNG) or hydrogen, in a cost-effective manner. Likewise, it is no longer clear that natural gas is the cheapest way to heat buildings, and customers may begin choosing to disconnect from the natural gas distribution system in the mid-term. This leads to a real risk of economically stranding the rate-regulated distribution assets used for home heating, with significant risk to customers, investors, and public finances.

At the same time, there is mounting concern that increasing electricity demand – whether for building heat or in other parts of the economy (transportation, industry) – will strain the capabilities of the grid to deliver reliable affordable power. For example, in Ontario, replacing the 582 petajoules of natural gas for space and water heating (representing 22 per cent of Ontario's final energy demand, 2021 numbers) with electricity is a substantial undertaking, requiring a large

amount of additional supply, along with the transmission and distribution infrastructure needed to deliver it. This is fundamentally a challenge of pacing: pacing the rate of increase in electricity demand with the rate at which new electricity supply can come on stream. In the years to come, the natural gas delivery system can play a strategic role as a source of affordable reliable energy, whether through hybrid heating or other means of optimizing the electricity and gas delivery systems for the clean energy economy. Which approaches make the most sense from a clean economy perspective will differ from one part of the province to another (region to region, community to community).

Governments and regulators in other jurisdictions have identified this medium to long-term risk and are developing plans for a well-managed long-term transition that would protect customers, provide clear signals to investors and focus natural gas system resources in the most efficient and effective manner. In the long term, this could be balanced with a manageable and realistic amount of hydrogen, RNG or fossil gas with CCUS for such priority areas as electricity generation for reliability and backup purposes and hard to decarbonize industrial applications.

New York, in its ***Scoping Plan***, states that "a well-planned and strategic transition of the gas system will require coordination across multiple sectors" and that "integrated planning will ensure the transition is equitable and cost effective for consumers without compromising reliability, safety, energy affordability, and resiliency." At the same time, New York states that "it is important that the strategic transition to a decarbonized gas system in New York State does not impose undue cost burdens on customers who currently rely on this fuel for home heating, especially those who can least afford cost increases." Similarly, Massachusetts's ***Clean Energy and Climate Plan for 2050*** stated that in 2023 the state will undertake work on "defining long-term policy directions to manage the future of the natural gas distribution system."

It is clear natural gas will continue to play a critical role as a source of energy in the province for the short and medium-term. The medium to long-term future of the cost-effective use of natural gas is less certain. Detailed and iterative analyses, engagement and regulatory policy will be needed to effectively navigate the future role of natural gas. The OEB will play a central role in this process, in both its regulatory policy role and as adjudicator of utility rate applications. Directional policy guidance from government will be needed to enable the OEB to proactively work with utilities to develop a viable plan amid a well-managed transition. As the electricity planning entity, the IESO will play an essential part in advising government on the role of natural gas generation for reliability and peaking power, as well as the pacing of demand and supply to ensure the electricity sector is able to accommodate additional demand from fuel switching.

Recommendation 6: In order to provide clarity to utilities, investors and customers, the Ministry of Energy should provide policy direction on the role of natural gas in Ontario's future energy system as part of its next integrated long-term energy plan. This policy direction should be consistent with the clean energy economy policy commitment and consider the various roles natural gas plays across the energy system.

This policy direction will require thorough technical, policy and regulatory analysis, collaboration among government, sector partners, and provincial agencies and a public engagement process. The outcome should be to manage the system optimization and fuel switching necessary to achieve a clean energy economy at a pace that maintains affordable, reliable and resilient energy service.

Key areas of analysis should include but not be limited to:

a. Maximizing energy efficiency programs, with an emphasis on cost-effective measures that contribute to the long-term success of the energy transition (e.g., building envelope improvements versus appliance upgrades)

b. Updating building and construction codes and standards

c. Evaluating the feasibility of innovative decarbonization solutions for the natural gas system, including renewable natural gas, clean hydrogen, and carbon capture, utilization and storage

d. Opportunities for gas system optimization, including hybrid heating

e. Distributional impacts on Indigenous communities

f. Distributional impacts on labour, the average energy consumer, rural and remote communities, and vulnerable communities

g. Complexities and challenges of industrial fuel switching and implications for economic competitiveness

h. Feasibility of alternatives for dispatchable natural gas as a reliability and peak power resource

i. Opportunities, options for, and consequences of strategic decommissioning or right-sizing of natural gas infrastructure in the long term

5.8 COMPREHENSIVE LOCAL ENERGY PLANNING

Local governments will play a key role in achieving a successful clean energy economy in Ontario. They must be enabled to contribute to and take responsibility for their specific energy objectives. Municipalities, communities, and local businesses must continue to be committed to thinking about their energy needs holistically. As reflected in the input the Panel received, local governments want to play their role in addressing climate change, energy affordability and, by developing local energy sources, build community commitment.

Establishing a strong link between local and municipal planning with regional and distribution sector energy planning has been a long-standing challenge. That said, there is important work underway to strengthen local energy planning and linkages to regional planning:

- The OEB completed its Regional Planning Process Review in August 2023 (**Overview of Outcomes**). As part of the Review, the Regional Planning Process Advisory Group (RPPAG) developed two reports, "**Recommendations to Improve Ontario's Regional Planning Process**" in December 2021 and "**Improving the Electricity Planning Process in Ontario: Enhanced Coordination between Municipalities and Entities in the Electricity Sector**" (December 2022), which emphasized the need for enhanced coordination between local distribution companies (LDCs) and municipalities.
- As the lead entity in regional electricity planning, the IESO regularly coordinates with and engages municipalities, Indigenous communities, individuals, and business groups. IESO also supports First Nation and Métis communities and organizations to develop community energy plans through the **Indigenous Community Energy Plan program**.

Many local governments in Ontario have developed detailed and ambitious strategies to address climate change, transform their municipal energy systems, conserve energy, and reduce both corporate and total greenhouse gas emissions.

Oxford County's **100% Renewable Energy Plan** is a community-wide initiative that lays the groundwork for the county's goal of achieving 100 per cent renewable energy by 2050. The municipality is planning to introduce renewable energy projects across the county and set emissions reduction targets every five years. Similarly, the City of Ottawa's **Climate Change Master Plan** outlines a framework for how Ottawa will transition to a clean, renewable, and resilient city by 2050. **ReCharge Hamilton**, a Community Energy and Emissions Plan from the City of Hamilton, is a major component of the city's long-term plan to decarbonize by 2050. The plan prioritizes innovative actions that increase energy efficiency of industrial processes, transform buildings to be more energy efficient and encourage fuel switching, decarbonize the city's transit

fleet, and promote renewable energy generation. Hamilton Community Enterprises provides building heating and cooling solutions and has proposed "Canada's Thermal Corridor" that could connect heating demand across the Greater Toronto and Hamilton Area with waste heat sources, such as from Hamilton's heavy industry.

TransformTO, the City of Toronto's Net Zero Strategy to reduce community-wide greenhouse gas emissions in Toronto to net-zero by 2040, lays out the groundwork for a community energy planning process that considers energy early in the land-use and infrastructure planning process, and identifies opportunities to integrate local energy solutions at a building or neighbourhood-scale. The City of Toronto is collaborating with Toronto Hydro, which has developed a Climate Action Plan to support the objectives of TransformTO.

Many other municipalities have adopted or developed similar plans, often with assistance from Ontario's Municipal Energy Plan program. These municipal plans emphasize the importance of alignment with provincial and federal governments to promote energy conservation and enable local renewable energy generation. That said, plans are not always fully costed and do not account for electricity or natural gas rate implications. While empowered to shape crucial systems of energy consumption, municipal governments often face challenges, such as limited financial and staff resources, jurisdictional barriers, and conflicts with regulatory requirements. As such, the Ontario government should play a major role in facilitating, resourcing and enabling energy system transformation at the municipal level.

Recommendation 7: To ensure municipalities, communities and local businesses are in the best position to participate in energy decision-making and take responsibility in pursuing their energy transition objectives, the Ministry of Energy should develop a strengthened framework for local energy planning and decision-making and take steps to facilitate its implementation. The goal should be to develop mature Comprehensive Local Energy Planning processes through which communities can effectively contribute to Ontario's energy transition in ways that suit their needs and reflect their local strengths, opportunities, and priorities. Developing Comprehensive Local Energy Plans with transparency on cost implications and rate impacts can help to align community planning with provincial policy objectives.

As part of Comprehensive Local Energy Planning, communities should establish a table for aligning and resolving key policy issues and priorities – e.g., housing, transportation, land use planning and energy – in a way that uses municipalities' leadership role and engages them to take responsibility for their own commitments (e.g., on climate) and within their own domain. The

provincial government should ensure that municipalities have the support, capabilities and resources to carry out this work.

Engagement on Comprehensive Local Energy Planning must involve a broad set of local interests and stakeholders, including electric and gas distribution utilities. The outcome of the process will form an important input into technical electricity and gas distribution planning and IESO-led (regional) planning, respectively. This process would not replace the existing IESO-led Regional Planning process, which is very technical and should remain so, albeit with broader input from gas utilities and other local planning entities.

The Ministry of Energy and the Ministry of Municipal Affairs and Housing should coordinate to ensure that the province and municipalities are aligned on land-use planning as it relates to energy infrastructure, and to determine how to best support municipalities in leveraging support/ incentives from the province/federal government to support economy-wide decarbonization.

5.9 INDIGENOUS PARTICIPATION IN ENERGY PLANNING AND GOVERNANCE

As elaborated in **Section 4** of this report, moving towards a clean energy economy represents an opportunity for government to collaborate with Indigenous partners on shared decision-making and synergetic governance models, including Indigenous participation on boards of directors and joint committees.

Ongoing capacity funding to enable early and meaningful Indigenous participation is critical to address the unique barriers that prevent full Indigenous participation in energy planning and decision-making. While efforts to build capacity can take time to increase communities' technical energy and systems knowledge, government and the sector must create space for Indigenous perspectives throughout energy and technical planning discussions.

Capacity-building also requires a renewed commitment from government and the sector to build their internal capacity, including enhancing Indigenous cultural competency, building greater awareness and understanding of community engagement protocols, governance structures, and the ability to clearly demonstrate how policy development and decision making are informed by Indigenous perspectives.

For a more comprehensive discussion of Indigenous participation in energy planning, please refer to **Section 4** of this report.

Recommendation 19: The government should support meaningful Indigenous participation in the clean energy economy through consistent and larger scale capacity-building initiatives, including:

a. The development and expansion of Indigenous-led and community-driven capacity-building initiatives

b. Stable and flexible capacity funding to facilitate meaningful Indigenous consultation and engagement with the Ministry and proponents on energy planning and project development

c. Expansion of the IESO's Indigenous Energy Support Program (including increasing the program budget overall, increasing funding for designated energy champions, wrap-around community supports, and flexible program delivery)

d. Tailored and accessible learning resources to enhance understanding of Ontario's evolving energy system, and improve Indigenous participation in community, regional and provincial energy planning, as well as technical planning discussions

Recommendation 21: To improve embedded governance participation, the government should amend the enabling statutes of the IESO and OEB to ensure Indigenous representation on the Boards of Directors.

5.10 ONGOING AND TRANSPARENT EXTERNAL ADVICE

As discussed in previous sections, navigating the energy transition over several decades in an effective and efficient way that enables Ontario to prosper and stay competitive requires strategic foresight and adaptation, alignment and coordination across economic sectors and, perhaps most importantly, a long-term perspective to maximize policy clarity in line with long-term investment cycles. Many jurisdictions have established special bodies to keep momentum and overall stability beyond electoral cycles, mitigate policy uncertainty, and ensure energy policy and planning are informed by high quality advice.

Such bodies range significantly in scope, membership, transparency and authority, with some being purely advisory, others having important responsibilities for planning and execution, while

still others play more of an audit and accountability function. For example, the British Columbia government established the Climate Solutions and Clean Growth Advisory Council (now the Climate Solutions Council) in 2017 to provide strategic advice to the government that "supports a steady and committed approach to climate action that drives down emissions, increases economic opportunities and improves community resilience." The Council has fifteen members from the public, for-profit and non-profit sectors, First Nations representation, as well as two ex-officio ministry representatives. It provides advice on the government's plans and programs. The federal government's Net Zero Advisory Body, established in 2021, is similarly structured, but has a wider mandate to engage publicly and provide independent advice on how Canada can "compete and succeed in a net-zero future."

With more permanence and resourcing, the United Kingdom Climate Change Committee was established through legislation as a statutory body in 2008 to advise governments on emissions targets and report to Parliament on progress made. While lacking formal planning or policy authority, it has developed into an important voice on the basis of its high-quality and actionable public advice to government across a wide range of areas, such as buildings, heat pumps and energy efficiency, skills and labour force development, power system decarbonization, and infrastructure resilience. With ten members and about 40 staff, the Committee's 2021-2022 budget was about £4.5 million, of which £1.3 million was spent on research.

Finally, the California Energy Commission (CEC) plays a much more extensive role in planning and developing California's energy system. Established in 1975 in response to the energy crises, the CEC is the lead energy policy agency and works with the California Public Utilities Commission, the California Independent System Operator and the California Air Resources Board to advance comprehensive and integrated energy and climate policy, including energy innovation and efficiency programming. With responsibility for key energy supply, buildings and transportation planning, every two years the CEC develops an Integrated Energy Policy Report, which presents an integrated assessment of major energy trends and issues facing California's electricity, natural gas and transportation fuel sectors. In the development of the Report, the CEC holds several proceedings to engage with relevant stakeholders. The CEC also led the development of California's first three climate change impact and vulnerability assessments between 2006 and 2018.

Against this backdrop, the Panel believes that Ontario would best benefit at this juncture from an external advisory body that pursues research and engages with stakeholders, Indigenous partners and consumer groups to provide strategic advice to government in public on key questions facing Ontario's energy transition. With a multi-decade focus, with members whose background and experience enable them to see gaps and emerging challenges in the energy system and governance as a whole, and by operating transparently and convening open expert discussion, an

Energy Transition Advisory Council would help to navigate the necessary tension between shorter-term political considerations and longer-term policy objectives. Impartial advice from the Advisory Council, informed by the broad-based experience of its members, targeted research and broad engagement, could help set the agenda and enable government to take necessary but sometimes difficult actions. Carrying out these functions would require a core staff and a secure engagement and research budget.

The Panel believes that initially the Council should have advisory functions only. It would have no formal authority, audit, oversight or planning roles. Its influence and standing would therefore depend on its ability to provide high-quality, sage advice to government. Over time, government should evaluate whether a formal coordinating or integrated planning role is needed or whether the Council's advice should carry additional legal or policy heft. Importantly, detailed policy development would continue to be carried out by government ministries, and overarching energy planning would continue to be led by the Ministry of Energy and its entities.

Recommendation 8: To contribute long-term certainty and orientation to Ontario's energy transition, the provincial government should establish an external Energy Transition Advisory Council to provide advice, independent of government and on an ongoing basis, on the overall trajectory of Ontario's energy transition, emerging governance or energy system-level questions and the integration of energy planning and coordination with sectoral strategies.

The Advisory Council should include 10-15 members across industry, Indigenous, consumer/citizen, academic, finance and other pertinent expert representation, predominantly from Ontario, and select Canadian and international jurisdictions. Government staff, IESO, OEB and representatives from other key entities should be included as observers and to contribute technical expertise.

The Advisory Council would have a long-term mandate and be intended to identify gaps in navigating the energy transition, in a purely advisory function and not duplicative of other planning activities:

a. Provide thought leadership on planning and coordination across fuels and economic sectors and respond to government requests for advice

b. Lead transparent engagements on key questions facing Ontario in the energy transition (asked by government or self-initiated)

c. Identify areas where research and further coordination are required and commission research to address key knowledge gaps. This could include advising on the development of future energy pathways studies and helping identify the implications of findings for the province. In subsequent iterations, the Advisory Council could take on additional responsibilities, including commissioning pathways studies on behalf of the government.

d. Advise the government on strategies for educating, informing, and engaging the public on energy choices

e. Issue reports and provide advice on the future evolution of long-term integrated planning, including how Comprehensive Local Energy Planning can effectively contribute to Ontario's energy transition

f. Ensure Indigenous perspectives are adequately reflected in all proceedings and reports

g. Convene sub-committees and working groups as needed (e.g., on transportation, buildings, equity, rural and remote communities, municipalities, skilled workforce development)

h. Provide advice on the long-term human capital and financial resource needs of entities involved in planning and regulating the energy system

i. Issue a progress update on the energy transition in Ontario on a regular basis (e.g., every two years)

j. Provide an annual report on its activities and advice to the government

6. GOVERNANCE AND ACCOUNTABILITY

6.1 INTRODUCTION: DELINEATING RESPONSIBILITIES

Clear policy direction, a commitment to achieving a clean energy economy and integrated, long-term energy planning will illuminate the potential pathways for Ontario's energy future. To operationalize this, the province will require a robust system of governance and accountability that promotes and facilitates alignment among government, social and economic forces required to bring about the energy transition.

Ontario's energy governance entities must show thought leadership and embrace the challenges and opportunities of electrification and the energy transition. The objective should be a system of governance and accountability that unlocks potential, enables innovation, fosters investment and encourages experimentation and reasonable risk-taking. Such a system will enable private actors to make innovative investments that are aligned with the clean energy economy objective, while protecting consumers, maintaining affordability and bolstering reliability.

To support electrification and the energy transition, the province will need to embrace a regulatory framework that encourages innovation and actively supports the project of decarbonization. Ontario will need a technical planning regime that can move independently but is held accountable by effective oversight. It will need to align governance of the natural gas sector with government's clean energy economy policy objectives in a manner that maintains affordability, reliability and protects customers. And it will need to support experimentation and evolution in business models that deliver energy solutions. Bolstering the existing framework of governance and accountability so that it can meet the challenges ahead will be crucial to capturing Ontario's opportunity in this strategic moment.

6.2 ENABLING INNOVATION AND EXPERIMENTATION

Electrification and the energy transition are driving significant innovation in energy technologies and in solutions for their deployment and management. Further innovation is **required** to fully achieve a clean energy economy. This will necessitate a regulatory environment that encourages innovation and experimentation and embraces change.

In many ways, existing energy regulatory regimes are ill-equipped to deal with rapid innovation. They were established and designed to govern highly centralized energy systems. New technologies are challenging these traditional structures and opening up technical possibilities that did not exist when regulatory systems were first established. The advent of bidirectional flow, for example, challenges a regulatory system designed under the assumption that electricity flows only in one direction – from large generators to the consumer. Distributed Energy Resources (DERs) have altered how customers interact with the grid, creating "prosumers" who can both produce and consume electricity and actively provide grid services, not just consume them. Storage and the notion of using Electric Vehicles (EVs) as mobile storage units create new complexities in the management and pricing of energy. These new technical capabilities raise a myriad of challenges concerning not only the physical management of the energy system, but also pricing and the entry of non-traditional market participants. The new era of energy is one in which regulation will need to be flexible, forward-looking and able to cope with technological and market uncertainty.

The Panel heard that there is a need for agency mandates that support greater consideration of and support for innovative technologies and solutions. The frameworks and entities charged with regulating and planning the system can support innovative solutions in many different ways. At base, providing a fair and level playing field for new and emerging solutions to compete with incumbent players can open doors for cost-effective innovations that could accelerate electrification and the energy transition. Not pursuing necessary reforms would deprive Ontario of cost-effective energy supply and management options that have the potential to significantly lower costs, accelerate movement toward the clean energy economy and enable further innovation.

Some stakeholders pointed to the Ontario Energy Board's (OEB's) Innovation Sandbox, which provides regulatory space for testing new activities, services and business models in Ontario's electricity and natural gas sectors, as an excellent model for encouraging innovation and learning, providing fast regulatory feedback and enabling reasonable risk taking by both solution providers and the regulator tasked with protecting customers. Many jurisdictions, primarily in

Europe, have implemented similar programs. Belgium, France, Germany, Italy and the Netherlands have developed innovation sandbox programs for the energy sector to accelerate innovation in technologies, services and business models, particularly those which support decarbonization.

The United Kingdom's (UK's) Office of Gas and Electricity Markets (Ofgem), the energy regulator for Great Britain, developed an internal program known as Innovation Link, which supports innovation and experimentation, particularly in the retail energy market for low carbon products and services that directly benefit consumers. The program does this by guiding innovators through how the regulatory system may impact their proposed project and whether it may face regulatory barriers. Innovation Link can provide temporary derogations from various regulations and codes to support the development and testing of an innovative solution. The program has assisted in the development of energy solutions such as peer-to-peer energy trading, demand response with smart storage heaters and residential solar and storage.

Singapore's Energy Market Authority is similarly empowered to create regulations and apply exemptions to codes of practice, market rules and licensing conditions to support experimentation with innovative energy solutions. This flexible policy tool allows industry proponents to test new products and services while protecting consumers and also provides the regulator with an opportunity to frequently review how existing regulations might constrict emerging solutions.

Recent amendments to the Ontario Energy Board Act have provided the OEB with the power to make orders that temporarily waive certain licensing requirements for innovative pilots or demonstration projects to facilitate innovation in the energy sector. This is the kind of experimentation and reasonable risk-taking that can encourage and kickstart innovative energy solutions and is an encouraging sign that the province is committed to supporting and facilitating innovation.

An innovation sandbox (or similar policy tool) can help remove non-technological barriers to innovation and encourage learning-by-doing while protecting consumers. This in turn can create a more favourable environment for the development and scaling of innovative energy solutions that can support electrification and the energy transition. A review of Ofgem's Innovation Link, for example, demonstrated that start-ups with innovative energy solutions used Innovation Link applications to signal to investors that their innovation faced no regulatory barriers.

Special attention should be given to enabling innovative partnerships and collaboration with Indigenous partners. The government recently increased funding for the Independent Electricity System Operator (IESO) to support Indigenous leadership and capacity in the electricity sector

through the Indigenous Energy Support Programs. Encouraging and supporting innovation with Indigenous partners is an important part of ensuring communities can benefit from the energy transition.

Besides direct regulatory support for experimentation, the Panel heard that innovative market structures, incentives, and utility business models can be enablers of electrification and the energy transition. Stakeholders expressed support for the continued exploration of new business models and the broad diffusion of learning and results, where applicable.

Stakeholders made it clear during the engagements that while pilots are important in providing benefits for the Ontario system and for technology developers wanting to demonstrate their technology for deployment elsewhere, they are only a first step. It is crucial to move beyond pilots to broad adoption in order to unlock the full potential of new technologies and business models. To that end, IESO and OEB should regularly report on how specific pilots can be the basis for broad adoption, what legislative or regulatory changes would be needed, and what regulatory requirements that are sometimes suspended during trials need to be put in place for protecting customers and maintaining a competitive environment.

While supporting these innovative technologies and business models, it is critical that the principal aim of customer protection is maintained. Electrification and the energy transition are likely to require a significant amount of technological change, including alterations and installations at the customer level. Installing electric vehicle chargers, deploying DERs, implementing storage solutions and other alterations will need to be done safely. Licensing, distribution, product safety, electrical code and compliance enforcement play an important role in enabling innovation and in ensuring customer trust and buy-in to new technologies. Safety and technical consistency therefore need to remain a priority

Recommendation 10: To enable the effective evolution of innovative business models in line with clean energy economy goals and to help consumers benefit from electrification and the energy transition, the OEB and IESO should:

a. Continue encouraging experimentation by utilities, innovators, and new market entrants through platforms, such as the Grid Innovation Fund and the Innovation Sandbox program, and ensure appropriate resourcing of these programs

b. Regularly evaluate and build on these initiatives to advance successful projects beyond the pilot stage to broader adoption when appropriate, proactively identify any legislative and regulatory barriers to government, and ensure sustainable business models

c. Review opportunities to help consumers through electrification and the energy transition, including business model innovations that provide new products and services that enable consumers to finance the high up-front capital costs for building retrofits and fuel switching appliances in a fair and affordable manner

Recommendation 11: Safety regulators and technical standards organizations must be included in energy planning and energy sector regulation to enable proactive coordination and the effective deployment of new technical solutions.

For example: The Electrical Safety Authority (ESA) and the Technical Standards and Safety Authority (TSSA) play critical roles in product approvals, reviewing plans for new facilities and installations, customer and industry education regarding electrical safety, and, in particular, monitoring, assessing and responding to any emerging public safety risks from electrification and the energy transition (for example, regarding integration/installation of energy storage and vehicle-to-grid installation into homes and buildings)

6.3 ADAPTABILITY AND FLEXIBILITY FOR THE ENERGY TRANSITION

In the context of the energy transition, energy regulators are increasingly being asked to address a broader range of outcomes beyond price, cost, reliability and quality of service. To bring about alignment with government priorities, many jurisdictions have empowered their regulators with a specific mandate to pursue – or at least consider in decision-making – objectives and targets related to climate change and decarbonization.

The UK's Ofgem, for example, has been specifically mandated by the UK Parliament to work with government, industry and consumer groups "to deliver a net-zero economy, at the lowest cost to consumers" as one of its three core responsibilities. Ofgem's **strategic vision** includes putting the UK's energy system "on track for net-zero" and supporting the development of "an electricity sector able to function without fossil fuels, with a growing share of low-cost renewables, alongside the development and deployment of other sources of low carbon power." California's Public Utilities Commission (CPUC) was **directed by the Governor** to accelerate the state's progress toward its climate goals. New York's **Department of Public Service** has a mandate that includes ensuring the preservation of environmental values and the conservation of natural

resources. Stakeholders also pointed to Maryland, Colorado, Maine, Massachusetts, Washington, Hawaii and Washington D.C. as jurisdictions that have passed legislation mandating consideration of climate change in regulatory decisions. These examples are all slightly different, but they all provide examples of how energy regulators are increasingly incorporating objectives and targets of electrification and energy transition into their mandates and core values. That said, all jurisdictions are still very early on this path and there remains much to learn about how best to incorporate clean economy goals into economic regulation.

Stakeholders agreed that a clean energy economy target and supporting policy direction can help guide regulatory agencies, inform decision-making and goal setting and create forward momentum. Setting parameters for measuring success would be critical in meeting any target. As a corollary, some stakeholders suggested that the OEB's mandate could be expanded to specifically include emissions reduction or net zero objectives to enable the OEB to take a more holistic view of sector regulation when setting "just and reasonable rates" and provide greater clarity and predictability for the sector. Other stakeholders disagreed, arguing that a net zero target is too arbitrary for the OEB to operationalize, and that government should first develop a detailed and comprehensive strategy. Stakeholders suggested that the IESO and the OEB should be required to report regularly on the progress of decarbonization efforts in both the electricity and natural gas sectors.

Indigenous partners raised as an important accountability commitment the need to prioritize long-term relationship building, such as collaborating with Indigenous communities on a definition of success that considers Indigenous partners' immediate, medium and long-term goals. Actions to support greater accountability and transparency throughout the transition include facilitating ongoing dialogue and collaboration with Indigenous partners regarding anticipated costs and impacts of the transition and demonstrating how Indigenous perspectives have informed accountability processes and the development of key performance metrics.

The Alberta Utilities Commission (AUC) produces an **annual report card** that tracks quantitative indicators of progress against government's strategic objectives in the regulation of the energy sector. While the AUC does not track progress on electrification and energy transition targets, it is nevertheless an example of how quantitative measures can support the tracking of movement on strategic objectives in the sector.

The OEB's submission to the Panel highlighted specific amendments that might empower the OEB to be a more proactive agent in advancing electrification and the energy transition. For example, there may be an opportunity to add new language to the OEB's authority related to electricity transmission leave-to-construct applications as a means of clarifying that the OEB can consider government policy related to emissions reduction and the clean energy economy in assessing

whether a transmission project is in the public interest. Additionally, the Panel heard that there may be merit in broadening the OEB's powers with respect to natural gas to ensure it has a broader basis on which to protect natural gas customers during the energy transition.

The Panel feels strongly that the OEB's existing objectives and associated mandate are sufficient for the moment. As electrification and the energy transition progress, it may become necessary to provide the OEB with additional objectives, authority or functions in order to ensure it is able to effectively regulate the evolving energy sector and support the province's clean energy economy goal. Across Canada and internationally, the integration of climate objectives into economic regulation is in its very early stages. A review in the future will also enable learnings from other jurisdictions to be incorporated into potential changes to the OEB. The single clearest imperative is the need for adaptability and flexibility as the energy sector undergoes this significant transformation.

The Boards of Directors of IESO and OEB will have a crucial role in overseeing the energy transition, both in terms of technical and cultural change. The Boards play an important role in risk management particularly, overseeing the pace of the transition for their respective organizations to ensure they are best resourced to meet immediate needs as well as in a position to deploy resources for evolving needs. Ongoing, proactive and appropriate communication between Board members and the Ministry will better ensure risks are identified and managed. Appointments to the Boards of these organizations should be conducted with a view to building the current and emerging skillsets and competencies needed to successfully guide organizations through these changes

Recommendation 12: The OEB should employ all tools within its existing mandate to implement activities consistent with the Province's goals for a clean energy economy and the requirements of the energy transition for Ontario.

The OEB should enhance risk-based approaches to regulatory oversight, consistent with best practice. This would enable more agency resources to be focused on emerging energy areas and economize on traditional regulation.

Recommendation 13: In the years following release of the energy transition policy vision, the province should undertake a review of the OEB's activities in respect of achieving objectives within the policy vision to determine if potential legislative and/or regulatory changes are needed to implement the vision effectively.

These potential changes could include:

a. Updating the OEB's policy, mandate, and/or objectives to reflect the clean energy economy transition, including addressing greenhouse gas ("GHG") emission reductions

b. Including GHG emissions as an additional factor for the OEB to consider in proceedings, such as transmission leave-to construct applications

c. Revising objectives related to the natural gas sector to align with government policy direction on the long-term role of the sector

d. Reviewing other aspects of the OEB's objectives and legislation as it relates to facilitating the clean energy economy, for example, amending the definition of "gas" to include hydrogen blending, if deemed necessary

6.4 INDEPENDENT, AGENCY-LED TECHNICAL PLANNING

The management and development of energy systems requires both high-level policy direction and planning (discussed in **Section 5**) as well technical planning. Technical planning is the ongoing process of evaluating the capability of the energy system to meet demand and determining the appropriate mix of resources and infrastructure required to meet future needs. In Ontario's electricity system, technical planning includes bulk system planning (led by the IESO), regional planning (led by IESO and transmitters with local distribution companies (LDCs)), and distribution sector planning (led by LDCs). The Ministry of Energy has historically provided policy direction to the sector in a number of ways, including prescriptive ministerial and supply mix directives, and broader, higher-level policy plans (Long-Term Energy Plans).

The Panel heard that technical energy planning should be disentangled from political direction as much as possible. Stakeholders generally agreed that while government should provide overall planning direction about policy objectives, design specifics should be left to the IESO. Stakeholders called for the IESO to be empowered with the necessary tools, mandate and independence for reliable clean energy grid planning and procurement, and the flexibility to plan for various electrification scenarios, account for potential demand impacts and procure the required electricity supply. The 2021 Long-Term Energy Planning Reform engagement yielded very similar feedback. Stakeholders noted the IESO's technical expertise and were supportive of its continued role as the 'expert planner.'

The Panel agrees that equipped with broad policy direction, clear policy objectives and guiding principles from government, the technical planning of the electricity system is best conducted by independent agencies. Technical expertise is required to properly evaluate the capabilities of the electricity system, determine the appropriate mix of resources and infrastructure required to meet future needs and execute procurement processes.

The Panel also heard that while efforts to build capacity take time, in order to increase Indigenous communities' technical energy and systems knowledge, government and the sector must create space for Indigenous perspectives throughout energy and technical planning discussions.

The Panel also heard that the OEB is best suited to take a lead role in oversight and review of coordinated energy planning and procurement. Stakeholders called for the OEB to review IESO planning activities to ensure they align with the government's overall direction and are cost-effective. This feedback again echoes that of stakeholders from the Ministry's 2021 Long-Term Energy Planning Reform engagement. On that occasion, stakeholders called for oversight

mechanisms to be established to monitor the development of policy direction for and implementation of energy planning, in the interest of enhancing the transparency and accountability of planning processes and decisions. An OEB review process would be an addition to existing accountability and review mechanisms currently operating in the procurement and planning space. The IESO employs Fairness Advisors tasked with ensuring that it is in compliance with the relevant procurement processes and laws and to ensure that all potential proponents are treated consistently and fairly. The OEB also operates the Market Surveillance Panel, which is tasked with identifying inappropriate or anomalous conduct by market participants, identifying activities of the IESO that may have an impact on market efficiencies or effective competition, and identifying any actual or potential flaws and inefficiencies in the market rules or the structure of the IESO-administered markets.

The Panel feels strongly that OEB review should be a retrospective, post hoc regularized review of the overall planning process to provide guidance on future planning and procurement, not a review of individual procurements. This will ensure timely decisions can be made. It will increase transparency while avoiding uncertainty for project proponents and investors. The focus of such a review should be to improve future planning and procurement and ensure its alignment with the government's stated policy objectives and guiding principles.

Recommendation 14: In line with input received during the 2021 review of Ontario's long-term planning framework, IESO should be empowered, within the broad direction established by government, to independently procure electricity resources and lead bulk-system planning (including potential use of interties) and regional electricity system planning. The OEB should provide regular procedural review of IESO-led planning and procurement, to be set out in legislation.

6.5 TECHNICAL PLANNING FOR NATURAL GAS

One of the core challenges in governing and regulating electrification and the energy transition will be maintaining clear accountability and consumer protection in the natural gas system in the face of shifting customer values and preferences and the overall shift to a clean energy economy. Natural gas has long played an important role in the energy system of Ontario, as a source of power for electricity generation, as a fuel for home heating and cooking and as a feedstock and source of process heat for industry. It is clear that natural gas will continue to play these critical roles in the short- to medium-term. Longer-term prospects, particularly for home heating, are less clear. As discussed in **Section 5**, emerging evidence shows that it is unlikely the natural gas system can be fully decarbonized while continuing to deliver cost-effective building heat. The development of regulatory frameworks and the evolution of natural gas infrastructure will need to align with the province's overarching clean energy economy commitment and protect customers as the role of natural gas changes in the province. A failure to align these regulatory frameworks with government's overarching policy commitments could result in significant cost hazards for customers or threats to overarching government policy commitments and an effective, orderly and well-aligned transition to a clean energy economy.

PROTECTING CUSTOMERS THROUGH THE TRANSITION

There is increasing evidence that electrification of building heating may become the more cost-effective option over time. The speed at which customers would change their heating source is uncertain and dependent on a large number of individual factors, such as equipment age and personal preferences and values, as well as system-level and policy factors, such as cost development, availability of equipment and qualified technicians, and supportive policies and incentives. Nonetheless, this could lead to many customers disconnecting from the natural gas system absent any personal motivation to lower their carbon footprint. As a result, there is a real risk of stranding assets in home heating and the gas distribution grid over the medium to long-term, with significant risk to customers, investors and public finances. As more customers exit the natural gas grid to adopt electric heating, those customers who are least able to afford to electrify could be forced to pay higher and higher proportions of the network cost to keep the system running safely.

Other jurisdictions are also grappling with these difficult policy challenges. A report on **long-term gas utility planning prepared for the Colorado** Energy Office in 2021 highlighted the potential cost hazards posed by traditional cost of service regulation in a future characterized by large-scale defection from natural gas heating. Those customers who can afford the higher upfront

costs of heating electrification will be the first to defect from the gas system, and without regulatory changes, the remaining customers (who will tend to be lower income) could be left to shoulder the cost for the remaining gas system. Similarly, the final report of the **Massachusetts Commission on Clean Heat** highlighted how, as the state transitions to predominantly electrified building heat in the long-term, natural gas rates could go up significantly as fewer households support the system's fixed infrastructure costs. The report highlighted this hazard as an equity concern, noting that Massachusetts needed to ensure that low- and middle-income households are adequately assisted and prioritized such that they do not disproportionately bear remaining gas infrastructure costs.

Perhaps most importantly, both the Colorado and Massachusetts reports highlighted the need to consider the cost hazards of asset depreciation, regulated returns and mass grid defection in planning for natural gas system upgrades and expressions. The Massachusetts Commission on Clean Heat emphasizes that the state should avoid future investments in gas pipeline infrastructure that will disproportionately burden low- and middle-income households. The report for the Colorado Energy Office stated that the hazards of stranded assets and cost recovery should be addressed "at the level of the strategic framework" and that steps should be taken now to optimize gas system investments – using a full accounting of lifetime costs – to mitigate stranded asset risk and cost burden in the future.

Considerations like these are being incorporated into regulatory decision-making. The state of New York's Public Service Commission (PSC) is requiring planning by utilities to align with state climate goals and reflect electrification mandates and the development of scenarios to understand cost developments so that assets can be fully depreciated and are not stranded as the customer base shrinks. The cost hazards of large-scale grid disconnection were highlighted by an **expert intervenor testimony** on a rate application from a large gas utility in 2022. In that case the expert witness testified that the utility's plans would leave billions of dollars of assets at risk of stranding in 2050, when pipeline throughput will be much lower given emissions reduction requirements. Given the state's policy objectives of decarbonization and electrification, and assuming a rate of departure from the natural gas system in line with the Commission's gas planning order, the expert witness' modeling indicated that average annual household gas delivery bills could more than triple by 2050 to support the system and cost recovery. These effects could in turn push more customers to exit the gas grid. As gas rates increase, the economics of electrification become more favourable for customers, and as each additional household electrifies or otherwise substantially reduces their use of pipeline gas, more rate pressure is added on remaining customers, perpetuating a vicious cycle. The witness stated that this risk could be mitigated, and thus costs avoided, by reducing the scope and scale of the pipeline enhancement or by shortening the depreciation lifetimes for new assets to align with their expected utilization timeframes.

Each of these cases is shaped by the unique market and regulatory characteristics of the jurisdiction, but the basic conundrum is a general one. A submission to the (OEB) on behalf of the Industrial Gas Users Association (IGUA) filed in August 2023 identified the same issues and advocated that decisions about the funding, utilization and maintenance of gas system assets be made at a system level in planning frameworks. In the rate case currently before OEB Commissioners, staff submitted that the revenue horizon for an economic feasibility assessment should be shortened from 40 years to 20 years, with implications for higher contributions in aid of capital. Staff also submitted that the natural gas utility should be required to provide more information and analysis on energy transition assumptions in load forecast and include forecast risk and stranded asset risk in its cost-benefit methodology for integrated resource planning. This issue will require careful governance intervention to ensure a well-managed transition that maintains affordability and protects customers.

It is quite possible that customers will withdraw from the natural gas grid at a different and much slower pace than the one outlined above. This alternative scenario could involve a plausible future with a significant emphasis on hybrid heat - using heat pumps and natural gas furnaces and boilers - rather than a full switch to heat pumps. In that case, the volume of gas sent through the natural gas distribution grid would decrease substantially, but the ongoing fixed costs to maintain the grid would continue to be split among a large and largely stable number of customers.

In either case, it is in the interest of the province, for the purpose of customer protection, to ensure that the regulatory mechanisms for the governance of the natural gas grid are aligned with a range of plausible outcomes, notably those that pose the greatest risks to customers. Other contextual risk factors should also be considered, such as societal, economic, or technological trends that may have an impact on future natural gas demand. Careful consideration of asset lifetimes, contingency planning for infrastructure expansion and enhancement proposals and stress-testing cost allocation mechanisms will be crucially important should a high-defection scenario come to pass. And such steps will not threaten the cost-effectiveness of the natural gas system in a scenario of prolonged reliance on the natural gas grid.

It will be critical, in the interest of customer protection, to further develop the province's regulatory framework so that it is prepared for a range of possible outcomes and that in so doing, it can contribute to Ontario's clean energy economy goal. The use of scenarios in the development of corporate strategy as well as regulatory decisions and government policy will enable Ontario to be prepared for a range of possible paths, driven by government policy, technological developments, market realities, and customer actions. Scenario-based analysis can also contribute to an open and transparent debate about opportunities and risks in the energy transition.

A FRAMEWORK FOR GAS-ELECTRIC COORDINATION

In the past, different energy demand applications were fairly closely associated with specific energy sources. The increase in electrification options, not just building heating discussed above but also transportation, steel making and others, means that customers now have options regarding the energy source they want to use to satisfy a certain demand. They can fuel-switch. This is, in fact, a general feature of energy transitions. As a result, shifts in customer consumption patterns regarding one source of energy, whether as a result of social, economic, technical or policy developments, have repercussions for planning and balancing the energy supply and demand of other systems.

The Panel heard consistently that electrification and the energy transition will require greater technical co-ordination for the planning of Ontario's electric and natural gas systems. Natural gas and electric systems are currently planned and regulated separately. Moving forward there is a need for coordination on an aligned vision, and for integrated planning and shared forecasting to understand the effects of fuel switching for infrastructure planning and development, and opportunities for system optimization across the electricity and natural gas delivery systems. Coordination will require sharing data and assumptions, aligning on demand forecasts, developing possible alternative scenarios, analyzing system capabilities to supply demand from fuel switching, integration of electric and natural gas efficiency and demand response programs, and coordination on the timing and location of new infrastructure development and asset refurbishment. Given the interests and tensions inherent in such a process – as well as the potential impacts on agency functions – the OEB and IESO will need to carefully support and maintain involvement.

Such a coordinated approach can not only enhance the efficiency of planning but also reduce the load on future adjudicative hearings. Electricity and natural gas planning coordination thus represents an innovation in anticipatory governance that has the potential to greatly enhance efficiency and expedite the process of energy planning and a cost-effective energy transition.

POLICY-ALIGNED REGULATORY MECHANISMS

With increased ability to fuel-switch comes the need to ensure there is a level playing field between gas and electric regulatory systems and that those funding mechanisms for cost-recovery and up-front capital requirements are aligned with the broader policy commitment for a clean energy economy.

The OEB's Transmission System Code (TSC), which establishes rules for allocating the costs of electricity transmission upgrades, typically places the responsibility for covering the up-front costs of connection upgrades on customers. These costs can be significant and a major determinant in investment decisions that could bring regional economic and environmental benefits.

Proponents have raised concerns over the discrepancy in how up-front capital contributions are assessed and recovered between natural gas connections and electricity connections. In calculating the capital contributions associated with natural gas infrastructure, gas utilities can use an economic evaluation period (known as a revenue horizon) of up to 20 years for large industrial customers, while transmitters use 10-15 years, leaving a relatively higher capital contribution for electricity infrastructure as a proportion of its total costs. Furthermore, gas utilities can collect the capital contribution as a surcharge on gas rates, while transmitters are obligated by the TSC to collect capital contributions upfront. The short-term cost discrepancy of connecting customers and ratepayers could inhibit investments in electrification that have long-term sustainability and economic development benefits. For example, the up-front cost discrepancy might dissuade a residential developer from developing an 'all electric' or low carbon neighbourhood, and persuade them to instead build a traditional, natural gas-connected development to keep upfront costs manageable.

This example highlights the complexities of the natural gas governance framework, and how adjustments may be required to facilitate electrification and the energy transition. Levelling the playing field between electricity and natural gas might encourage developers and other customers to make choices that are more aligned with government's clean energy economy commitment. Given the provincial government's commitment to significantly expedite the construction of new housing and target 1.5 million new homes by 2030, regulatory action could be a significant support and ensure alignment with an overarching clean energy economy commitment.

Recommendation 15: To facilitate development of the clean energy economy, the OEB should conduct reviews of:

a. Cost allocation and recovery policies for natural gas and electricity connections to eliminate discrepancies between how up-front capital contributions are assessed and how they can be collected between the two sources of energy. For example, the review should include, but not be limited to, examining the differences in the economic evaluation period

(known as a revenue horizon) to determine capital contributions as well as the ability to collect the capital contribution as a surcharge on rates versus an upfront contribution

b. How natural gas utility infrastructure and Demand Side Management investments are evaluated to ensure new infrastructure is right sized for forecasted time horizons

Recommendation 16: The Ministry of Energy, working with the OEB, IESO, LDCs, municipalities and gas utilities, should develop a formal and transparent co-ordination framework that sets out the scope and objectives for enhanced planning co-ordination at the bulk, regional, and distribution levels in order to effectively pace and facilitate the fuel switching, system optimization and enhanced levels of energy efficiency required by the clean energy economy.

The framework should ensure that each party's technical expertise is respected and utilized appropriately to achieve the desired policy outcomes. This would include any required directives, regulatory changes, oversight mechanisms, and a clear and agreed upon understanding of specific roles and responsibilities for the entities involved. The framework should include the following:

a. Regulatory requirements via license amendments and codes (for the IESO) and Ministry undertakings or rule making authority under the OEB Act (for Enbridge) to require the IESO and Enbridge to coordinate bulk planning

b. Regulatory requirements via license amendments and codes (for the IESO and LDCs) and Ministry Undertakings or rule making authority under the OEB Act (for Enbridge) to require the IESO, Enbridge, and LDCs to coordinate regional planning

c. Development of standardized approaches to gas/electric coordination and demand forecasting at the distribution level, including coordination between Conservation and Demand Management (for electricity) and Demand Side Management (for natural gas) and with Comprehensive Local Energy Planning

d. OEB adjudicative regulatory processes (e.g., review of system plans, rate cases, and leave to constructs) should require the demonstration of gas/electric planning coordination outlined above via filing requirements on submitted plans and/or applications

6.6 ENABLING THE ELECTRICITY DISTRIBUTION SECTOR TO ACHIEVE ITS FULL POTENTIAL

Technology for the distributed generation and management of electricity is evolving quickly in maturity and cost-competitiveness, with the potential for disruptive change in the distribution sector in the near future. Distributed generation and storage, bi-directional flow, smart appliances, grid-interactive efficient buildings and electric vehicles, among other emerging technologies, present **opportunities** to improve the management of electricity resources, maximize value to customers, and minimize overall system costs. Where they are clean and reliable, DERs can also contribute to emissions reduction while supporting reliability at the local level. These innovations in scalable, often customer-owned energy solutions, have the potential to significantly alter the range and number of energy services delivered at the distribution level. In 2021, the IESO commissioned **Ontario's Distributed Energy Resources Potential Study**, which showed that over a 10-year timeframe (2023–2032), it would be possible to cost-effectively meet all incremental system needs with DER capacity. When considering realistic levels of customer adoption and participation, not just economic potential, it said, "DERs are able to satisfy a material portion of the province's energy needs – from 1.3 to 4.3 GW of peak summer demand by 2032."

To maximize the cost-effective potential of DERs, the market models and regulatory frameworks by which the distribution sector is managed, and the ways in which the bulk electricity system is planned and managed, will need to evolve. The assessment of the achievable potential of DER technologies therefore must be complemented with rigorous analysis to understand how evolving (utility) business models and design of the wholesale market can enable DERs. New ways of organizing distribution system operation and participation, such as non-wire solutions, aggregators, virtual power plants, Distribution System Operators and other local energy markets, hold significant potential. The emerging consensus holds that DERs, while lacking some attributes of economies of scale compared to central grid infrastructure, offer opportunities to stack multiple value streams for the customer (including resilience) and the electricity system (from ancillary services to energy capacity).

The government, OEB and IESO should provide support and space for innovative models. They should work with utilities and DER proponents to enable these business models in a way that incentivizes DER participation to the benefit of the whole system. Some of this work is already underway. The Electricity Network of Ontario (formerly Smart Grid Forum) published several reports, including a concluding report in 2021 on **Distribution System Structures For A High Distributed Energy Resource (DER) Future**. IESO is subsequently developing its **Enabling Resources Program** to expand the electricity system services that these resources will be able to

provide in the renewed IESO-administered wholesale market. The OEB has recently taken several steps to facilitate the prudent and effective integration of DERs, including a Distributed Energy Resources Connections Review (since 2019, with ongoing regulatory policy development) and the Framework for Energy Innovation process, which resulted in the 2023 report, ***Setting a Path Forward for DER Integration*** and additional guidance for electricity distributors. The OEB's Innovation Sandbox acts as a testbed for system innovation in the electricity and natural gas sectors. An OEB-IESO Joint Study of Distributed Energy Resources Incentives is now underway, with results expected in Spring 2024.

Regulatory policy should provide support and space for innovative models of electricity resource management to evolve. This may extend to rethinking the traditional utility business model, that is, what constitutes distribution activity and how rate-regulated utilities earn a return from the services they provide. While re-thinking traditional business models, it will be important for regulatory policy to recognize that LDCs are diverse in their size, capabilities and need for capital investment. Where private sector participation lags and markets fail to adopt or proliferate valuable innovations, LDCs should be empowered to step into the breach, in the interest of enabling the energy transition and protecting customers. The adoption of innovative technologies and business models will vary. The guiding principles should be to ensure that any new and emerging models are supporting energy innovation, maximizing value for and protecting customers and leaving space for a diversity of solutions and market participants to compete.

In this context it is important to recognize that current planning and market rules, and the associated regulatory and business models, were established before DERs and advanced distribution management systems were commercially viable options. As a result, it may be necessary to identify mechanisms to enable DERs and the local distribution system to achieve their full potential contribution to Ontario's future energy system.

There is an urgent need to advance the regulatory environment to enable effective participation of DERs and eliminate barriers. A delay will mean that potentially cost-competitive solutions located at the distribution level cannot effectively compete during a time when Ontario will be investing in the expansion of the electricity grid to satisfy increased demand from electrification. This could lead to the entrenchment of traditional, bulk-level resource investment without effective competition from distribution-level resources and the erosion of the DER business case.

All innovation requires experimentation, which comes with certain commercial, rate, and reliability risks. There is rich opportunity for experimentation at the distribution system level, where technical innovation has been most active and system-level reliability and market competition concerns are significantly lower at current levels of DER penetration. Pilots and other forms of testing DER applications and business models have yielded important insights in Ontario

and elsewhere. However, it is now time to move beyond pilots and develop a clear roadmap to full-scale implementation. Ontario must explore ways that implementation can proceed quickly while other regulatory and market reforms are underway.

It will be important to ensure that the IESO has the required level of visibility of DERs and their operations at the distribution level to maintain bulk system reliability – though careful analysis and discussion with stakeholders is needed to establish how much visibility and control are actually required. The value of visibility goes both ways: hosting capacity and load maps can enable proponents to understand much more quickly where DERs can be connected and what value they may provide. California is requiring utilities to make these available, and in Alberta, distribution utilities ATCO, ENMAX and FortisAlberta have all published hosting capacity maps, in addition to the Alberta Electricity System Operator, for the transmission system.

Recommendation 17: The OEB and IESO must continue to find ways within their existing mandates and in anticipation of the clean energy economy policy statement to provide proactive and transparent thought leadership on regulatory policy. Energy agencies should work to examine where existing rules and practices disadvantage the cost-effective participation of clean energy solutions, and especially how distribution resources can participate across the value chain of the entire energy system.

The goal should be to develop an open investment environment that creates a level playing field in which DERs can provide their full value to customers by effectively competing with one another and with bulk-system resources.

a. To enable distribution-sector innovation, build capacity and encourage reasonable risk-taking to maximize customer and community value, the government, IESO and OEB should work with utilities to develop a vision and clear pathway for system-wide application to realize the maximum capability of the distribution system and DERs.

b. The OEB should support LDC applications in grid modernization, establishing a process and technical threshold to determine which LDCs will be enabled to locally procure and dispatch DERs.

c. LDCs should be required to enhance their capabilities to procure and actively manage DERs as Non-Wires Alternatives to meet distribution level needs.

d. The OEB should continue and enhance the requirement for LDCs to file electrification readiness plans (ERPs). ERPs should demonstrate consideration of Comprehensive Local Energy Plans and processes.

e. The OEB should have a clear and consistent approvals framework for distribution level approaches that can help maximize the value of the distribution sector and reduce barriers to adoption. This should include grid modernization upgrades that enable efficient energy management, such as two-way telemetry, tools for enhanced conservation and demand management (CDM), and non-wires alternatives to traditional distribution infrastructure enhancements. As needed, the OEB should review policies, such as the Affiliates Relationship Code, to enable greater flexibility for LDCs without compromising private sector participation.

f. The IESO should critically assess and report back on the extent to which its systems, including market rules, dual participation model, and interoperability requirements, can be improved to remove barriers to the effective participation of DERs and innovation in business models.

g. Accountability frameworks should be codeveloped by IESO, OEB and LDCs to ensure good coordination and to manage any conflicts, real or perceived. To promote interoperability and increase the value of distributed solutions, all work should be undertaken with a view to developing a common platform, or limited number of platforms, on which LDCs can converge. The IESO can play a key role in facilitating this process.

7. ENERGY INNOVATION AND ECONOMIC DEVELOPMENT

An affordable and reliable supply of energy has been critical for securing investment and propelling growth of Ontario's economy for over a century. Today, Ontario's ability to supply electricity that is among the cleanest in the world presents significant opportunities to enhance Ontario's prosperity. The International Energy Agency (IEA) **estimates** that global decarbonization will require a tripling of annual clean energy investment to around $4 trillion by 2030. Ontario's energy industry and economy are well positioned to take advantage of this global transition and to capture the benefits it will bring for economic development and export growth. By providing abundant clean, affordable and reliable energy, Ontario can attract future-oriented investment and grow its economy while ensuring that people across Ontario have access to the energy they need.

The Panel heard a wide range of perspectives on how to approach economic development, technology and innovation. This included focusing on maximizing value and cost efficiency, economic and decarbonization potential, supported by Indigenous partnerships and community acceptance. Respondents also highlighted the need for regulatory and policy framework improvements, as well as the challenges and opportunities for markets to support electrification and energy transition. Overall stakeholders told the Panel that a technology-agnostic approach is important, with a focus on the clean energy economy objective.

Engagement participants also made clear the need for meaningful collaboration and partnership with Indigenous communities. As mentioned throughout this report, building a clean energy economy requires development on traditional territories. Strong relationships with Indigenous partners will be necessary to achieve long-term business, sustainability and collective goals, in addition to advancing reconciliation.

The Panel also heard that labour supply questions were of critical importance to almost every sector and industry during this period of transition. Specific labour supply questions are outside the scope of the Panel's work and therefore, the Panel does not offer detailed recommendations in this regard. But it will be crucial to develop an adequate supply of skilled labour to electrify energy services at pace and scale and achieve a clean energy economy. The Panel urges the government, utilities and the whole sector to work together on a long-term strategy for labour amid electrification and the energy transition. The proposed Energy Transition Advisory Council could facilitate these deliberations with engagements and targeted research.

7.1 FACILITATING ECONOMIC GROWTH

Ontario's energy sector will play a critical role in the move to a clean energy economy. A primary focus of the energy sector must be to help attract future-oriented investment by providing clean, affordable and reliable energy. The energy sector can thus become a catalyst for expanding prosperity and building a dynamic economy. It can also link the social and economic objectives of economic development with the imperative for meaningful reconciliation with Indigenous communities. Partnerships and collaboration with Indigenous partners will be critical to facilitating province-wide economic growth and can contribute to an integrated view of economic development that maximizes not only competitiveness but also the long-term socio-economic health and well-being of people across Ontario.

At the same time, there are significant opportunities for the energy sector itself to be an engine of economic growth in the province. Achieving Ontario's clean energy economy goals is estimated to require at least a doubling of total electricity generation capacity. The necessary build-out of infrastructure implied by such capacity expansion, as well as the space for innovative solutions in a decarbonizing economy, present opportunities for large-scale investment and economic development. Ontario has an opportunity to position itself as a leader in established and emerging technologies like conventional and small modular nuclear reactors, energy storage, hydrogen, carbon capture, utilization and storage (CCUS), grid modernization and other solutions that will be critical to global decarbonization.

BUILDING ON A LEGACY OF AFFORDABILITY AND RELIABILITY

Electricity affordability and reliability are long-standing, widely acknowledged determinants of economic competitiveness. Businesses need to know that they can count on an abundant supply of electricity at a reasonable price. Uncertainty on this critical business input poses a major threat to investment and growth, particularly in the energy-intensive manufacturing and industrial sectors. Affordability and reliability are key pillars of energy sector development that will continue to be crucial. Particularly as the end-use delivery of critical transportation and heating services is electrified, and with the proliferation of digital smart devices mediating how Ontarians live, work, and play, reliability of electrical service is more important than ever. In the face of increasing extreme weather events as a result of a changing climate, the energy sector must ensure that reliability is maintained and energy resilience strengthened.

A key factor in attracting investment and enabling economic development is access to energy where and when it is needed. In the move toward a clean energy economy, the risk-return balance

between proactive build-out of energy infrastructure and reactive energy planning has shifted. Energy planning must work proactively to ensure that adequate, affordable, and reliable supply is available in a timely manner to support economic development projects and secure investments. This can be achieved by enhancing and expanding existing mechanisms for active coordination between energy and economic development ministries to anticipate when and where new energy demand is likely to materialize and to actively steer new investment to suitable sites that allow for timely and cost-effective connections.

It also means enhancing the efficiency of planning, permitting and approvals processes for clean energy projects. Many jurisdictions across North America and the world are currently grappling with the challenges of streamlining and expediting the development and delivery of energy infrastructure. In a recently released **study** the IEA demonstrates the critical importance of electricity grid upgrades and expansion in achieving emissions targets and ensuring energy security and cost-effective energy transition. Ontario is no exception. The Panel heard that lack of clarity, predictability and timeliness of regulatory permitting issues create significant uncertainty for investors. The engagements underscored the need for greater streamlining of permitting processes, along with clearer delineation and alignment between federal and provincial rules to avoid duplication and lengthy processes. The Independent Electricity System Operator's (IESO's) Pathways to Decarbonization **report** identified the imperative to streamline and appropriately resource regulatory and approval processes to enable faster planning, permitting and siting of new energy infrastructure. Expediting these processes was identified as a clear need to support decarbonization. Proactively planning energy infrastructure development, clarity and predictability of regulatory requirements and executing approvals in a timely fashion will be critical to ensuring that reliable and affordable clean energy is available for potential investment opportunities.

TOWARDS A CLEAN, SUSTAINABLE ENERGY SYSTEM THAT STRENGTHENS COMPETITIVENESS

In addition to affordability and reliability, the sustainability of energy supply is emerging as an important factor in economic competitiveness. Companies across all sectors are worried about continuity of business in a world threatened by the physical impacts of a changing climate. Clean electricity and a clear roadmap for a clean and resilient energy economy are emerging as additional competitiveness factors for businesses and key arguments for attracting new investment.

Companies are paying closer attention to the embedded emissions associated with their production processes, especially in highly competitive, emerging global green markets like clean

hydrogen, green steel and aluminum, and zero-emission vehicles and batteries, among others. For example, German auto manufacturer Volkswagen cited Ontario's abundant and affordable clean electricity as a key factor for selecting the province as the site for its $7-billion electric vehicle battery factory.

Stakeholders – especially from heavy industry – told the Panel that in addition to affordable natural gas, an abundant supply of affordable clean electricity is becoming critically important for decarbonization, retaining industry and remaining competitive amid the rapid emergence of environmental, social and governance (ESG) measures.

The United States (U.S.) and the European Union (EU), two of Ontario's major trading partners, are moving toward stricter corporate sustainability disclosure regulations, requiring corporations to disclose their exposure to climate-related risks and the implications for their financial metrics. The U.S., the EU and the Canadian federal government are also implementing or exploring Carbon Border Adjustment mechanisms, which compensate for carbon pricing differentials by imposing a price on the embedded carbon emissions generated in the production of imported goods.

In a future environment of Carbon Border Adjustments and strict corporate sustainability disclosure requirements, the prospect of reducing the emissions intensity of manufacturing processes by providing abundant clean electricity will be a crucial competitive advantage. By ensuring that Ontario has an abundant supply of clean electricity, delivered with timely and proactive planning, the energy sector can facilitate the economic growth of the future.

Finally, there is clear alignment between Indigenous interests and ESG perspectives. As the influence of ESG on corporate decision-making increases, Indigenous perspectives should be considered and included across ESG pillars. As described in Section 4, the government can advance economic reconciliation through flexible financing models and mechanisms that incentivize Indigenous project ownership.

Recommendation 23: Recognizing the key role that clean, affordable and reliable energy will play in the development of globally competitive and future-oriented industries, the ministry should:

a. Reflect in planning, policy-making and direction to IESO and OEB that in the rapid shift to electrification and the transformation toward a clean energy economy the risk-return

balance between proactive build-out of energy infrastructure and reactive planning has shifted

b. Ensure that planning, permitting and approvals processes are clear, predictable, effective and efficient and lead to timely decisions and project development that has the support of local and Indigenous communities. Engage with other levels of government as appropriate to pursue this objective, as referenced in Recommendation 3

c. Identify key clean energy value chains, encourage local energy sectoral depth, and strategically kickstart energy innovation.

Recommendation 20: The government should advance economic reconciliation through flexible financing models and mechanisms that incentivize Indigenous project ownership across small, medium, and large-scale projects. This could include:

a. Expansion of the Aboriginal Loan Guarantee Program and development of other programs, following an assessment of any barriers to program access

b. Opportunities to align funding and cost-sharing agreements, where possible, with the federal government and other provincial governments in Canada, as appropriate

c. Opportunities to pilot emerging, flexible financing instruments/mechanisms, such as the use of Indigenous-value themed bonds

d. Review of current agency frameworks, including regulatory and procurement policies, to identify opportunities to improve flexibility and enhance Indigenous project ownership

7.2 INNOVATION AND STRATEGIC OPPORTUNITIES

The Panel believes that the energy sector has the potential to do more than just facilitate economic growth. The energy sector can act as a catalyst that propels the transformation toward a clean economy in a way that maximizes prosperity for Ontario. The province has an opportunity to kickstart innovation and growth by providing support for the development of clean energy technologies. Strategic support for innovative energy technologies can build on Ontario's existing strengths and help scale innovative businesses to position the province in key clean economy value chains and attract future-oriented investment.

Effecting an economic transition of such scale requires strategic focus, and the government's clean energy economy objective can provide the overarching policy target. In seeking to achieve similarly ambitious policy goals, other jurisdictions have employed mission-oriented policy to align actors around a common challenge or objective. The U.S. Apollo Program and the Alberta government's Energy Breakthrough project of the 1970s to develop the technology for in-situ oil sands extraction are examples that reached their core mission and had significant technical and economic spin-off effects.

Mission-oriented industrial policy uses the mission, here to build the clean energy economy, to stimulate private sector activity, creating the conditions for new growth by directing business expectations toward where future growth opportunities may lie. Under such an approach, government creates value by coordinating resources, actors and institutions around an objective and thus accelerating alignments that are otherwise too slow and uncoordinated to achieve given the speed and intensity of technological global economic change.

The Panel heard from stakeholders that Ontario is well positioned to capitalize on several economic and industrial opportunities related to the energy sector, including:

- Opportunities to expand the clean energy grid via nuclear and hydro, distributed energy resources (DERs) and energy storage
- Opportunities to build out wind and solar industries/supply chains, create conditions for economies-of-scale and reduce reliance on imports
- Opportunities to harness mineral deposits in the north and northwest by working with Indigenous partners and developing a robust electricity supply to the region through connections to the bulk grid and development of renewables
- Production of biofuels and renewable fuels to meet domestic requirements and to reduce fuel security and employment risks
- Opportunity to demonstrate/deploy technologies to help activate capital and develop industrial opportunities, for example, through the establishment of hydrogen hubs in regions such as Sarnia-Lambton, Hamilton and Durham Region, or CCUS in hard to abate sectors

The innovations necessary for global decarbonization will include both safe bets and wild cards in technology development and application. According to the Canadian Climate Institute's 2021 report, **Canada's Net Zero Future**, safe bets are solutions that rely on commercially available technology, face no major barriers to scaling, and have a "reasonable expectation of continued cost declines." On the other hand, wild cards are those solutions that may play an important role

in achieving goals but may be unproven because they are still in the early stages of development. Achieving a clean energy economy will require both safe bets and wild cards. This provides Ontario with opportunities to capitalize on both incremental and radical innovations in clean energy solutions.

The Panel is not positioned to recommend which of these opportunities is the most advantageous for the province nor which should receive targeted government support. Government, with the help of rigorous, forward-looking analysis, is best positioned to parse the economic, social, environmental and political dimensions of these opportunities.

The Panel believes that strategically targeting growth opportunities in the energy sector as a catalyst for attracting future-oriented investments presents the best opportunity to maximize the benefits of a transition to a clean energy economy. A common vision for strategic sector development helps build alignment for industrial strategy, empowering Ontario – as a small economy in a global economic system – to find strategic niches and pursue them. Much of this work should build on existing strengths, while carefully developing new areas of capability.

A good example is the province's ongoing support for the development of Small Modular Reactor (SMR) technology. Supporting the development of SMRs provides opportunities for Ontario companies to develop business opportunities in providing nuclear equipment and servicing nuclear power assets. This business development in turn catalyzes further investments to expand operations and serve the growing SMR market, both in Canada and abroad. In this way, strategic support for specific economic and industrial opportunities can help Ontario stake a position in the global clean economy.

Ontario can strengthen these opportunities further through, for example, Ontario's recently signed new Economic Cooperation Memorandum of Understanding (MOU) with Michigan to support joint initiatives in priority areas, such as electric vehicles and related supply chains; and its broader trade engagement strategy of pursuing Strategic Investment and Procurement Agreements (SIPAs) with U.S. states.

Other jurisdictions are identifying priority areas for technology and innovation funding to support the growth of the clean energy economy. The **United Kingdom's Net Zero Innovation Portfolio**, **British Columbia's Net Zero Innovation Network** and the California Energy Commission's **California Testbed Initiative** are examples of programs designed to strategically support the development and commercialization of clean energy technologies.

The Panel heard concerns from stakeholders that trade-exposed industries could be subject to significant shifts if Canada and Ontario do not keep pace with other jurisdictions in incentivizing clean energy technological and economic development. Stakeholders specifically cited the **US Inflation Reduction Act (IRA)**, which leverages tax credits, loan guarantees and grants to kickstart the development of green manufacturing industries and scale green innovations.

The long-standing critique of this kind of industrial policy is that it amounts to governments "picking winners and losers." Ill-conceived government interventions in the private market can certainly produce inefficient outcomes and perverse incentives. But this should not stifle the pursuit of critical strategic thinking and investments required to meet the current global moment. Future-oriented industrial strategy, with an integrated, long-term view to the development of future markets, is crucial to building the kinds of deep sectoral strengths and mature value chains that will position Ontario to prosper in the emerging global clean economy.

In the energy sector especially, Ontario has an opportunity to support innovations that can build on existing strengths and regional assets and position the province as a key player in select global clean economy value chains. Ontario will need to take a measured and realistic approach that focusses on areas in which the province has already built expertise and enjoys long-term competitive advantages relative to other jurisdictions, such as nuclear technology, grid modernization and digitalization.

This strategic focus will be critical. The Smart Prosperity Institute, the Transition Accelerator and the Pacific Institute for Climate Solutions have produced **research** on the crucial role of strategy and future-oriented thinking for succeeding in the clean energy economy. As a relatively small, trade-oriented economy, Ontario has limited ability to drive change in mature global value chains, particularly those dominated by big economic players. Even in emerging industries, maintaining competitive advantage can be difficult with technologies and products that have mass global market potential. To compete in the future clean energy economy, Ontario will need to be intentional in targeting growth sectors that present opportunities for long-term competitive advantage, often based on existing strengths. Without that strategic focus, the province runs the risk of uncoordinated capital spending and investment that fails to produce any true sectoral strengths.

In their analysis of Canada's strategic opportunities for green economic growth, the Smart Prosperity Institute and collaborators identify core characteristics for assessing opportunities in the future clean energy economy. These include the possibility of developing and maintaining long-term cost advantages from availability of natural resources or upstream inputs, the likelihood of building advantages through innovation and the market potential of the product in a

decarbonizing world. Maintaining this strategic focus will allow Ontario to better target sectors of potential growth, building on areas where the province has existing strengths.

This strategic focus will require Ontario to undertake careful analysis to determine what specific investments offer the greatest opportunities to enhance the province's competitiveness in the clean energy economy. Executing on such a strategy will also require pursuing policy alignment on key priorities of economic and energy development and collaboration with the federal government and other provinces, as referenced in Section 5.

Recommendation 24: With the commitment to a clean energy economy as the guidepost, the government should consider a mission-oriented approach to economy-wide industrial strategy. Such a strategic approach can provide the necessary focus to align government efforts and mobilize private actors, including finance, in order to develop and scale the key economic sectors that will support a future clean energy economy in a way that uses resources wisely. It would leverage regional clusters and build on various industrial sector strengths and can position Ontario as a key player in select global clean economy value chains.

In the energy sector, the government should consider which existing and emerging technologies and sub-sectors are likely to play a critical role in a future clean energy economy and where Ontario can maintain or develop long-term competitive advantages. This will require realistic assessments of existing and emerging strengths, as well as technological and economic potential. The province's current Cost-Effective Energy Pathways Study can help inform these assessments.

7.3 FUNDING MECHANISMS FOR THE ENERGY TRANSITION

The Panel heard that a variety of diverse funding mechanisms – including tax incentives, subsidies, the rate base and private financing – are required to finance the investments needed to build a clean energy economy.

The Panel believes that ratepayers cannot and should not be expected to be the sole funders of the energy transition in Ontario. A clean energy economy is a collective goal that carries significant social, environmental and economic benefits, not just for electricity customers but for all Ontarians. The transformation will require investments that do not solely, or even primarily, benefit ratepayers, and the scale of investments required will often dwarf the capacity of the rate base to support it. This is particularly true in cases where energy sector investments are made to support economic development and decarbonization.

One example is the proposed expansions of transmission infrastructure to support electrification of steelmaking and the mining of critical minerals in northern Ontario. Such projects are crucial to support economic development in strategically important clean energy economy sectors, as well as contributing to regional economic development, decarbonization and economic reconciliation with Indigenous communities. Their benefits are also social and economic, justifying a potential shift of some costs from the rate base to the tax base.

Recommendation 25: The government should clearly set out a policy vision for how electrification and the energy transition will be funded, including a realistic assessment of the distributional impacts of funding choices on different groups. A comprehensive range of funding options and mechanisms should be considered and used, including taxpayer funding, ratepayer funding, investment subsidies, investment tax credits, as well as leveraging and/or requiring private funding whenever possible. Opportunities to leverage funding from federal and municipal sources should also be pursued to the greatest extent possible.

The key guiding principle should be that the beneficiary pays, with the understanding that the definition of who the beneficiary is in the energy transition is broader. If the developments and investments associated with electrification and energy transition will benefit only the electricity system and those who pay electricity rates, then the costs should be borne by ratepayers. But if electrification and energy transition are expected to carry significant and broad economic, transition and social benefits for the province, then the province should consider shifting some of the cost to the tax base and provide clarity to sector entities on how to consider this in planning and decision-making.

The province should develop its policy vision with a rigorous and transparent accounting of expected costs, benefits and distributional impacts.

8. CONSUMER, CITIZEN AND COMMUNITY PERSPECTIVES

8.1 THE IMPORTANCE OF PUBLIC SUPPORT

Energy helps fulfill the most basic and critical needs in our daily lives, from keeping our homes heated and cooled, to cooking our food, to getting us where we need to go. Energy is also a vital input for economic productivity, an enabler of critical infrastructure systems and a strong determinant of economic competitiveness. While most people do not think much about energy most of the time, an understanding of the functions that energy performs in modern life and our economy will be critical to building public support for electrification and managing the energy transition. So will ensuring energy remains reliable, affordable and resilient in the years to come.

Decarbonization policies have triggered backlash and discontent in other jurisdictions when they ignore the needs, preferences and vulnerabilities of customers. Electrification and energy transition policies that threaten system reliability, cause blackouts, limit customer choices, or drive-up prices can lead to public backlash or be exploited politically, putting in jeopardy long-term rational strategy and policy. The energy transition involves significant technical, economic, political and social change, spread out over decades. It is therefore critical to engage with households and businesses to build an understanding and buy-in about the benefits, costs and implications of the energy transition. It will be important to maintain transparency and to include the interests of people and communities in policymaking. Governments can play a key role in helping to prepare people for the transformative changes to come in the years ahead.

In doing this, it is important to understand that peoples' preferences, perceptions and interests are shaped by different aspects of their identities that are not always aligned. Specifically, people engage with energy services and policy as consumers, as citizens and as community members. As a customer, someone may be most interested in having affordable and reliable service and some choice to meet their needs. As a citizen that same person may be committed to Ontario and Canada taking decisive action on climate change, including favouring policies that would make some energy choices more expensive. Finally, as the member of a community, that person may engage with others to develop energy solutions and ownership – or oppose energy projects they see as disruptive to their way of life, cost, ease of participation, or comfort. The diversity of imperatives – ranging from affordability to consumer choice to infrastructure siting to sustainability – underline the need to meaningfully engage with and support Ontarians to be

included and respected in the process of energy transition. The Panel heard that the public wants and needs to understand why clean energy economy targets are being pursued, what policies are being implemented to achieve them, how they can have a voice in decisions, how policies will impact their lives, and how much they will cost. This transparency and inclusion will help to ensure that the province has ongoing public support to pursue its vision for a clean energy economy.

Importantly, as the process of electrification and energy transition shifts from citizen advocacy for climate action towards active implementation, Ontarians will increasingly be called on as consumers and community members. As consumers, their choices regarding energy sources, consumption habits and how they access energy wield substantial influence in shaping the trajectory of the energy transition. Just as important are their roles as active community members, providing or withholding support for the development of new and sustainable infrastructure in their communities. It is crucial for the energy sector and governments to understand this shift in engagement with the public. To enable a successful energy transition, policy and decision-making must adopt an integrated approach that considers and prioritizes the multiple and evolving roles of the public.

Over the last several decades, Ontario has learned difficult lessons about energy policy decisions. The province has seen several high-profile energy policy reversals and jarring changes sometimes involving large price increases. Customers have, at times, felt unprotected by government and regulators, and communities have felt excluded from and inadequately consulted on important planning and infrastructure decisions, such as siting and energy resource choices. In some cases, the result was a dramatic erosion of the public's faith in the government of the day's ability to make prudent energy policy decisions. In other cases, it led to significant project delays or outright cancellation of projects due to community opposition.

As discussed in **Section 4**, prior to the 1970s there was no legal or political system recognized by the Canadian government that required governments, energy developers, or corporations to consult with Indigenous communities on energy projects or energy planning. Across Canada, rivers and land were flooded by hydro dams and development projects were advanced without notice, adversely impacting or outright destroying traditional hunting and fishing areas, travel routes, and burial and sacred sites. Failing to meaningfully engage and consult with Indigenous communities across Ontario has and can contribute to significant negative impacts on local economies and affect the safety, security and success of Indigenous communities.

Such failures of communication, consultation, engagement and relationship-building threaten to undermine achievement of the necessary pace and scale of the energy transition and can have lasting socio-economic consequences on communities across Ontario, particularly those

customers and communities who disproportionately experience inequality. Inclusive and accessible engagement is required to ensure that groups who have been historically excluded from energy decision making, are thoughtfully collaborated with throughout the transition.

Stakeholders and Indigenous partners identified five key principles for communication and engagement that will underpin the success of long-term energy policies:

1. **Transparent communication and public education** about the true costs of energy and transition, opportunities and challenges related to electrification and energy transition (including safety considerations for emerging technologies and education regarding cleaner appliance alternatives), and the direct and indirect costs and risks of climate change (including the costs of inaction).
2. **Customer participation** is necessary to create a needed sense of responsibility and ownership over the success of the energy transition and allows for optionality that reflects consumers' needs.
3. **Consistent, meaningful and accessible engagement in province-wide energy planning** is important from the beginning through to the end of any energy planning process; accessible engagement processes consider reliable internet access and distance as part of any virtual and/or in person engagement process.
4. **Community-level engagement and empowerment** to make clean energy and culturally appropriate local/community energy planning decisions reflective of local circumstances.
5. **Meaningful participation in siting processes** for energy infrastructure, including new generation, transmission, and distribution infrastructure.

Both stakeholders and Indigenous partners emphasized that early and transparent collaboration and engagement with Indigenous communities, supported by adequate and appropriate capacity funding, will help to support meaningful Indigenous participation and long-term relationships. As the energy transition proceeds, more engagement and consultation with Indigenous partners will be required, in ways that fulfill and go beyond government's duty to consult and accommodate. The Panel heard from respondents across groups and organizations that this is foundational to advancing reconciliation and ensure the benefits of transition are fairly distributed to everyone across Ontario. It is also necessary to allow project development to keep the pace required to meet the needs of electrification and the energy transition.

Effective communication and engagement alone will not guarantee full customer, citizen or community member satisfaction throughout the energy transition, but they are a solid first step in

ensuring that Ontarians feel included, heard and respected in energy decision-making processes. The next steps entail delivering policy action that meaningfully addresses the core concerns of Ontarians as energy customers, community members and citizens.

Recommendation 26: The government, Independent Electricity System Operator (IESO) and Ontario Energy Board (OEB) should play a key role in engaging with the public and Indigenous partners to ensure transparent access to high-quality information and meaningful opportunities to participate in decision-making in order to build greater support and involvement in the energy transition. As part of other processes or on their own this work should include but not be limited to:

a. Helping customers, citizens and community members to see themselves in the transition to a clean energy economy and to understand the operational realities of large-scale changes to the energy system for their daily lives (e.g., shifting to different energy sources and ways of consuming energy, the need for new energy infrastructure in their communities, etc.)

b. Preparing the public for the transformations ahead by providing transparent, ongoing, and comprehensive information about the genuine choices, costs, opportunities and challenges associated with electrification and the energy transition

c. Strengthening mechanisms for community input and involvement in energy planning and decision-making for new infrastructure. This includes prioritizing public consultations and transparently incorporating community feedback into decision-making processes

d. Education initiatives that address the benefits, risks and costs associated with new and emerging technologies, climate action versus inaction, and empowering customers to make well-informed decisions

e. Fostering community-level engagement and empowering local communities to make informed energy planning decisions in support of new energy projects and technologies that best suit their local energy needs

8.2 MAINTAINING AFFORDABILITY

Affordability has long been a contentious and defining issue in Ontario's energy sector. Recent inflationary pressures and cost-of-living increases have further sharpened the focus on energy affordability. Stakeholders and Indigenous partners told the Panel that affordability of the energy system will be one of the most important priorities for customers through the energy transition. That said, over time there are opportunities for customers to save costs as they switch energy use to electricity for electric vehicle charging and home heating. While such a customer's total electricity bill would almost certainly go up, their combined household energy costs, which had been spread across electricity, natural gas and gasoline bills, may go down.

The costs associated with energy transition will be significant at the bulk electricity and distribution system levels. Investments in transmission, distribution and behind-the-meter technologies, fuel switching technologies, industrial decarbonization and energy efficiency measures will all be necessary to meet increased electricity demand and build a clean energy economy. Additional investments in resiliency will be necessitated by the increased frequency and intensity of heat waves, storms and other extreme weather events that threaten the physical integrity of the energy system. As such, consumers may see an increase in their energy bills in the short term. If the costs of these critical investments are not properly paced and mitigated, they could have harmful impacts on the ability of many Ontario households and businesses to afford their energy needs. However, **modelling** by the Canadian Climate Institute suggests a promising future trajectory may be possible. As electrification and the energy transition progress, the total of household energy bills could decrease in the long term. Greater efficiency, renewable energy integration and advancements in technology are anticipated to drive down costs over time. Transparency and public awareness remain paramount in order to ensure customers understand their options and a successful, community-driven transition.

The Panel heard that Ontarians will not give government a 'blank cheque' to finance the energy transition. **Innovative Research Group**, a Canadian public opinion research and consultation firm, has surveyed Canadians to better understand their perspectives on energy transition. As of May 2023, almost 9 in 10 Canadians (86 per cent) believe that climate change is occurring, and nearly 7 in 10 are concerned about it. But a quarter of Canadians oppose efforts to reduce greenhouse gas emissions if they result in higher energy prices. About half of Canadians (48 per cent) are willing to pay more to fund energy transition, but that number declines as proposed costs rise. The clear picture is that public support for energy transition is strongly linked to costs, both real and perceived. Keeping costs low and any increases predictable will be crucial to maintaining public support for electrification and energy transition policies.

Energy affordability is especially critical to low-income and rural households. According to the Financial Accountability Office, Ontario households in the lowest income quintile spend a much higher proportion – nearly triple – of their pre-tax income on home energy than households in the highest income quintile. Households in rural areas of Ontario have much higher home energy costs than their urban counterparts, largely due to less access to natural gas, which to this point has been the most cost-effective energy source for home heating, and the high cost of distributing electricity and fuels in rural areas. Some of these cost discrepancies are mitigated by provincial electricity subsidies, but energy affordability is still an issue that disproportionately affects the most vulnerable households in the province. To maintain affordability, the province should focus support on those who need it most. This could free up resources to help reduce barriers for all customers to invest effectively in the solutions that help manage their own energy bills and support the energy transition system-wide.

Importantly, energy affordability is about more than just the number on the bill. The Panel heard concerns about the affordability of energy system changes associated with transportation, building envelope and heat fuel switching. Vulnerable households could be excluded from enjoying the full benefits of the shift to a clean energy economy if they are not able to make the upfront investments needed to leverage technologies that reduce their costs and support decarbonization. As the federal carbon price rises, energy affordability can only be maintained if vulnerable households are able to switch to cleaner energy sources the policy is meant to incent.

This risk is more pronounced for remote and rural communities. In particular, the Panel heard that fuel switching in transportation (from gasoline to electricity) could have unintended economic consequences for remote, rural and Indigenous Communities. For example, many Indigenous communities rely on gas-powered boats, snowmobiles, and all-terrain vehicles to hunt, fish and practice culture and treaty rights. Moreover, retail gas stations, either wholly owned by or operating within an Indigenous community, are often an integral part of the community's economy. Large-scale transportation fuel switching could threaten the economic health of communities that already face huge barriers to participation. Distributional impacts related to fuel switching must be identified and addressed as part of the support provided to vulnerable households and communities, rather than viewed merely through the lens of on-bill prices.

Other household circumstances also result in fundamental differences with regards to willingness and ability to pay. Increased costs of living, from mortgage rates to rent, present significant barriers for all households. Renters are an example of customers who may bear the costs of electrification while having little to no control over their household energy decisions. Homeowners dealing with increasing mortgage payments may struggle to support investments to enable electrification from an affordability perspective. Meanwhile, older homeowners, even if they are mortgage-free and have the means, may have a lower desire to invest in a shift to cleaner

energy sources if payback periods are long. This is where short-term incentives can play a key role. Thus, it is important to consider how different people's housing status influences their ability and willingness to make household level energy investments. Policy strategies should ensure that all customers can participate in and benefit from the energy transition regardless of their housing circumstances.

Government will need to explore policy mechanisms to foster adoption of fuel switching technologies and help Ontarians, especially low-income households, make the necessary investments. Any government support should be thoroughly assessed for cost-effectiveness.

Recommendation 27: The provincial government should explore mechanisms to support broad adoption of fuel switching, decarbonization and supportive technologies such as electric vehicles, storage and heat pumps to support its clean energy economy objectives, foster change at the needed pace and scale, and to ensure that all customers can benefit effectively from the energy transition. This should include active engagement and communication so that customers understand the opportunities, benefits, challenges and risks of decarbonization technologies and can make informed choices. Importantly, the government should also consider mechanisms to help customers manage up-front costs.

a. Any mechanisms adopted by the government should be rigorously analyzed for cost-effectiveness and must transparently consider both costs and benefits to individual customers and to the overall system, for example peak electricity demand impacts.

b. The government should co-ordinate with the federal government to seek alignment on these objectives, to understand where federal programs can support provincial targets and where collaboration can maximize value.

c. The Energy Transition Advisory Council should monitor progress on cost-effective and beneficial fuel switching, identify obstacles and make recommendations.

Energy affordability is also critical for Ontario businesses. Energy in all its forms is a crucial business input for all kinds of small, medium and large businesses across the province, though its importance as a factor in total cost differs dramatically across industries. According to the Canadian Survey on Business Conditions (Q3 2023), rising cost of inputs, including energy costs, are the second most commonly expected obstacle to successful operations for Ontario

businesses of all sizes, ranking just behind inflation. According to the Canadian Federation of Independent Business, energy costs continue to rank as a top cost constraint for Ontario small businesses. Unaffordable energy pricing thus threatens business competitiveness by increasing operating expenses, decreasing profitability and potentially increasing prices of goods and services.

Lack of affordable energy can also threaten opportunities for further investment and growth. For large industrial consumers in particular, long-term certainty on electricity supply and pricing can be a key component in investment decision-making, including as a hedge against other fuel prices, which can be much more volatile in response to global economic and security developments. Importantly, natural gas may continue to be an important source of affordable energy for industrial heat processes, including for trade exposed industries. Businesses need to know that they will have access to the energy they need – at an affordable price – before they can commit to investing in the province. As noted in the previous section of this report, uncertainties ultimately reduce the province's growth potential by undermining business confidence. Energy affordability is thus crucial to maintaining Ontario's business competitiveness.

RATE MITIGATION PROGRAMS

Ontario residential and small business customers benefit from a number of rate mitigation programs designed to lower the on-bill cost of electricity. Programs for residential customers include the Ontario Electricity Rebate, which is applied to all ratepayers, and other programs that are targeted to low-income customers or to customers in specific geographic regions that face higher electricity costs. These programs are funded through the tax base and are expected to cost approximately $6.5 billion in 2023-24.

The Panel heard that available income-tested programs – such as the Ontario Electricity Support Program – can be complex and burdensome for many individuals to access. The Ontario Electricity Support Program (OESP) provides a direct on-bill credit ranging from $35 to $113 per month – depending on household size and income -- for eligible low-income households. The accessibility of income-tested programs could be improved by extending access to renters who do not receive an electricity bill in their name or by simplifying program intake or making it automatic. Government and the Ontario Energy Board (OEB) are conducting reviews of OESP and the related Low-Income Energy Assistance Program, which provides emergency reliefs for eligible households who are in arrears on their bills.

The Panel also heard that programs that are not income-tested could potentially become unsustainable as needed investments are made to support a clean energy economy. The Ontario Electricity Rebate (OER) was specifically identified as requiring re-focusing. The OER provides an

on-bill rebate to Ontario households, small businesses, farms and long-term care homes, and averaged 19 percent of pre-tax electricity bills in 2021. The rebate percentage is adjusted each year to limit the increase in residential electricity bills to two percent. The OER accounts for roughly one-third of total energy and electricity subsidy support.

Most of the OER's subsidies go to households, including high- and medium-income households who likely are not struggling to pay their electricity bills. While those households may appreciate having their electricity bill lowered, those same households will eventually pay those costs either through their taxes or through future electricity bill charges. Indeed, on average, households with higher incomes receive much larger subsidies. According to the Ontario Energy Association's 2020 report ***Help those Who Need Help***, "On average, the higher the income, the larger the electricity consumption. Home size is also correlated with income – wealthier households generally live in larger homes. Therefore, the net effect of current Ontario subsidy programs is to provide larger subsidies to higher income households, and huge subsidies to very wealthy households." The report shows that in 2020, a household with an 800 square foot apartment could expect $203 in annual tax-funded electricity subsidy. A single detached house with 1800 square feet could expect $415, while a mansion of 10,000 square feet would receive $1,750 in electricity subsidies.

In short, based on the current rate mitigation program design, a disproportionately large share of the OER is going to high-income households who likely do not need the help on their electricity bills. Because the OER is paid for through the tax base, its current organization and delivery represents a transfer of public dollars to households with higher-than-average incomes. The Panel believes that refocusing the OER could enable the province to deliver more help to the low-income households who need it most, and thus better and more equitably mitigate the potential cost increases associated with the energy transition.

Given the potential costs associated with necessary energy transition investments, the Panel believes that rate mitigation programs will continue to be an important tool for maintaining energy affordability. However, the Panel concludes that these programs should be made more accessible and better targeted towards those who need support the most.

Recommendation 28: Existing electricity rate mitigation and affordability programs should be redesigned to better target support to those who need it most, and to streamline program application and enrollment processes for increased accessibility.

Any new or redesigned programs should be developed with full participation and collaboration of representatives from remote and rural communities, both Indigenous and non-Indigenous, as well as vulnerable urban households and communities that the programs are meant to serve.

8.3 RELIABILITY, RESILIENCE AND ENVIRONMENT

As discussed earlier, the electricity sector is a critical enabler for daily household functions, business activity and essential infrastructure systems like telecommunications and healthcare. When power outages occur, in addition to the direct costs associated with restoring power and repairing damage, there can be indirect social and economic costs that oftentimes dwarf direct costs to utilities. A widespread and long-duration outage can have interconnected effects on crucial systems of food security, water safety, health, transportation, telecommunications and economic activity. As a result, the reliability and resilience of the electric grid has long been a core concern of energy consumers and a primary focus for utilities and system operators. The Panel heard this repeatedly throughout its engagements.

The importance of electricity grid resilience and reliability will increase as more Ontarians electrify end-uses by investing in electric vehicles or switching to electric heat pumps. This increased reliance on electricity will result in increased sensitivity to outages and service interruptions. At the same time, the accelerating and intensifying effects of climate change are drawing more attention to the resilience and reliability of electric grids. Climate change is already having **significant impacts** on the province of Ontario, and those impacts are likely to intensify in the years and decades to come. Increases in average temperatures already locked in by past greenhouse gas emissions are expected to cause increases in the frequency and intensity of extreme weather events such as extreme precipitation and extreme heat, and an exacerbation of conditions that catalyze drought, wildfires, thunderstorms, floods, tornados and ice storms. These weather effects pose a threat to the physical integrity of electricity infrastructure, which threatens to undermine the reliability and resilience of the grid.

A good deal of collaboration and knowledge sharing is already underway in the sector, from climate change vulnerability assessments undertaken by utilities to resource sharing and mutual aid agreements, and more comprehensive company and industry-wide work to integrate climate impacts into business planning. Initiated by the Ministry of Energy, the OEB is undertaking work on **Distribution Reliability, Resilience and Cost Effectiveness**. There is a need for continuous learning and refinement of approaches and policies as knowledge of the localized impacts of climate change on the energy system evolves. It will also be important to ensure collaboration

with municipalities and other organizations at the local level, and this could be supported through Comprehensive Local Energy Planning, discussed in Section 5.

As discussed in Section 4, Indigenous communities, and particularly northern and remote communities, experience disproportionate impacts of climate change, with adverse impacts through damage to critical infrastructure, evacuations and further displacement from traditional territories, impacts to hunting and harvesting rights and other socio-economic inequities. Building resilience across Ontario, and particularly in Indigenous, northern, and remote communities, will be essential to a successful transition.

Recommendation 29: The government, IESO and OEB should support capacity-building for utilities and communities to conduct assessments of climate change impacts to energy infrastructure and to support effective climate resilience efforts and adaptation planning/implementation. Any costs borne from investments in adaptation should not unfairly impact on low-income consumers, consumers in specific geographic regions that face higher electricity costs, consumers that rely on medical device(s) requiring a lot of electricity or other vulnerable consumers.

The movement towards a clean energy economy will have a positive impact on Ontario's public and environmental health. Studies for both the United States and Canada show that the transition to a clean energy economy will have particularly significant benefits for local air pollution. Ontario has already reduced this risk by eliminating coal-fired generators, but as more decarbonization occurs, we should see greater benefits to public health. Research undertaken by Navius for the Canadian Association of Physicians for the Environment estimates avoided health costs across Canada of $30 to 100 billion by 2050. Estimates for the U.S. show reductions of 50,000 premature deaths per year and $608 billion in the health care costs as a result of eliminating energy-related emissions. It will be important to consider these benefits in decision-making and communicate them clearly to the public.

8.4 PRIORITIZING CUSTOMER CHOICE

Empowering customers with choices is integral. The Panel heard that Ontario's pursuit of energy transition should focus on empowering customers rather than limiting their ability to make

choices. Stakeholders emphasized that customers should be allowed to choose, for example, to offset emissions from their energy use, to use low-carbon and renewable fuel options and to take advantage of the benefits presented by distributed energy resources. Providing customers with a range of options for energy sources and services encourages participation in the energy transition, by empowering them to decide how they will decarbonize their energy consumption, rather than imposing decisions, technologies or methods on them. Well-regulated competitive markets can significantly advance customer choice and should be combined with convenient and accessible information about options, including up-front and operating costs.

9. FINAL REFLECTIONS

The Panel concludes its work with a true sense of optimism that electrification and the energy transition will drive positive economic, environmental and social change to create a prosperous future for Ontario. The objective of building a clean energy economy is a formidable challenge, but as we have shown here, it is also an unprecedented opportunity. The tectonic shifts in the global energy landscape and the mounting public and private sector commitments to decarbonization are opening up a generational opportunity for investment and economic development. Ontario has a unique opportunity to harness that momentum and take positions in key clean economy value chains that can maximize our prosperity while minimizing environmental damage.

Climate action and the transformation of our economy have the purpose of renewing our prosperity and defending the material, economic and social foundations of our society. Finding a broad and lasting consensus on energy transition contributes to securing our democracy in the long-term.

Ontario's energy sector is well positioned to seize these opportunities. Our largely emissions-free supply of electricity opens possibilities for widespread and beneficial electrification of energy services. Our innovative and robust energy sector is ready and poised to contribute meaningfully to the transition. And our strong governance frameworks are well suited to manage the complex questions and tensions inherent in an economy-wide transformation.

There are certainly challenges ahead. But we see a solid alignment across the energy sector on the wealth of opportunities before us, and a strong desire to cooperate on the necessary policy, regulatory and governance changes required to capitalize on them. The sector expressed great optimism for the future and an eagerness to contribute to the innovation and adaptation required to effect change. There is broad alignment across the sector on the need for policy clarity, strategic vision and regulatory effectiveness.

There is also strong alignment on the need for an orderly and well-managed energy transition that accelerates decarbonization while maintaining an affordable, reliable and resilient energy system. An inclusive and customer-centred transition presents the opportunity to engage energy customers in the project of decarbonization and deliver a system that better meets all our diverse needs.

Importantly, there is broad optimism that the transition to a clean energy economy provides rich opportunities for economic reconciliation with Indigenous communities. Meaningful collaboration on projects to expand infrastructure, enhance the grid and deliver reliable and affordable energy can create opportunities for investment in Indigenous-led ventures, provide revenue, build capacity and create jobs. Ontario's energy sector is committed to moving forward to a clean energy economy on the basis of mutual benefit and maximizing prosperity with Indigenous partners.

It is clear to the Panel that electrification and energy transition are not unfolding uniformly across Ontario. Different regions, communities and organizations face unique challenges and opportunities. Historically marginalized and disadvantaged communities risk getting left behind without careful and deliberate consideration and support.

Finally, it is not possible to predict the precise trajectory of a transition of this scale and complexity. It will be shaped by the decisions of countless consumers and other market actors. It will be affected by global economic, social and geopolitical forces that we are unable to anticipate. It will be influenced by the evolving views of citizens and communities within and beyond Ontario. And it will be shaped by an unprecedented pace of technological change. This uncertainty calls for ongoing research, collaboration, innovation, experimentation learning and adaptability. The core focus of our collective efforts should be to approach transformation of our energy system and broader economy with an open mind.

We hope that the recommendations and guiding principles outlined in this report provide a starting point for Ontario to successfully manage and prosper from the coming transformations. The process of evaluating the state of the energy sector and the institutions that govern it must be ongoing and iterative. It will require continuous support from government to align economic and social forces around a common vision and purpose. It will require a deep understanding of the social bases of our energy system and the need to bring people along as citizens, customers and community members. It will necessitate an ongoing dedication to building and maintaining partnerships with stakeholders and Indigenous communities to develop our energy system based on shared values. And it will demand a spirit of innovation and constant learning, a willingness to engage in frequent re-evaluation and making adjustments along the way. The Panel is confident Ontario is up to the challenge.

10. COMPLETE LIST OF RECOMMENDATIONS

10.1 PLANNING FOR ELECTRIFICATION AND THE ENERGY TRANSITION

Recommendation 1: To provide clear direction for Ontario's energy and economic future, the provincial government should develop and communicate a commitment and associated policy principles for achieving a clean energy economy for Ontario by 2050.

This commitment, and policy principles that would define the parameters by which decisions will be made, should be embedded and integrated across all ministries in a manner that ensures policy consistency, alignment of decision-making, and accountability mechanisms.

Recommendation 2: The provincial government should convene an internal clean energy economy planning and implementation body, such as an existing committee of Cabinet.

a. This body would be responsible for ensuring alignment across sector strategies (such as industrial and economic development strategies, transportation, building/housing, agriculture, mining, and land use planning, including project development processes such as permitting, siting and funding) and ensuring that sector strategies are evaluated through an energy lens.

b. As part of the shared responsibility across governments to coordinate and contribute to the energy transition, the government should provide all relevant ministries with clear mandates to contribute, in their domains, to a well-coordinated energy transition.

c. Relevant ministries should develop measurable key performance indicators (KPIs) to align their sectoral strategies and policies with the imperatives of the energy transition in Ontario.

Recommendation 3: The provincial government should continue to seek alignment and coordination of clean energy economy objectives, standards and policies with other governments

(within and outside Canada) whenever practical and consistent with the province's economic and policy interests.

This alignment and coordination should include, but need not be limited to:

a. Pursuing strategic policy alignment on key priorities for economic and energy development

b. Engagement with the federal government and taking the necessary policy actions to ensure Ontario can access federal funding opportunities (e.g., federal investment tax credits)

c. Coordination and collaboration with the federal government to streamline and provide greater clarity, predictability and timeliness of project approvals and clear delineation of responsibilities

d. Engagement with Canada and neighbouring provinces and states, directly and through agencies, to pursue the mutually beneficial integration of energy systems (including electricity markets and interties) to advance energy transition objectives

e. Pursuing opportunities to enhance cross-jurisdictional coordination and alignment of energy-related codes and standards with the objective of reducing regulatory burden while maintaining a position of leadership in regulatory innovation

f. Engagement with municipalities to ensure they are aligned with and supported in the energy transition, including support for Comprehensive Local Energy Planning and requiring local utilities and municipalities to engage and collaborate on energy planning matters

Recommendation 4: To enact the clean energy economy policy commitment, the Ministry of Energy should develop and communicate an energy transition policy vision that is inclusive of Indigenous perspectives and informed by clean energy economy policy principles.

The vision should outline clear strategic priorities, action-oriented objectives, acceptable trade-offs, and policy outcomes for energy production, transmission, distribution, and end-use shifts (such as transportation and buildings) to an electrified and low-carbon economy by 2050.

Recommendation 5: The Ministry should develop and release, on a regular cycle, an integrated long-term energy plan that will guide Ontario's development of technical energy plans, strategies, and actions to support the transition to a resilient and affordable clean energy economy.

The plan should provide actionable and measurable guidance and policy direction, as well as regulatory recommendations and legislative revisions (as needed) across electricity, natural gas and other fuels on the production, transmission, distribution, consumption, and conservation and demand management of energy.

a. The plan can be developed within the existing legislative framework and should allow for broad input, while allowing for timely and effective planning and decision-making.

b. The planning process should include support and alignment for reconciliation with Indigenous peoples.

c. The planning process should encourage good communication on policy alignment and regulatory policy development across the ministry, IESO and OEB, while respecting each organization's distinct roles.

d. Both the integrated long-term energy plan and subsequent technical planning should be undertaken at pace and be based on dynamic and iterative analyses using scenarios.

e. The planning process should be inclusive and support energy consumers of all types, including vulnerable consumers. It should be participatory and deliberative to build a broad support for the energy transition, a focus on economic opportunity and competitiveness, equity and distributional impacts, and environmental and health benefits.

Recommendation 6: In order to provide clarity to utilities, investors and customers, the Ministry of Energy should provide policy direction on the role of natural gas in Ontario's future energy system as part of its next integrated long-term energy plan. This policy direction should be consistent with the clean energy economy policy commitment and consider the various roles natural gas plays across the energy system.

This policy direction will require thorough technical, policy and regulatory analysis, collaboration among government, sector partners, and provincial agencies and a public engagement process. The outcome should be to manage the system optimization and fuel switching necessary to achieve a clean energy economy at a pace that maintains affordable, reliable and resilient energy service.

Key areas of analysis should include but not be limited to:

a. Maximizing energy efficiency programs, with an emphasis on cost-effective measures that contribute to the long-term success of the energy transition (e.g., building envelope improvements versus appliance upgrades)

b. Updating building and construction codes and standards

c. Evaluating the feasibility of innovative decarbonization solutions for the natural gas system, including renewable natural gas, clean hydrogen, and carbon capture, utilization and storage

d. Opportunities for gas system optimization, including hybrid heating

e. Distributional impacts on Indigenous communities

f. Distributional impacts on labour, the average energy consumer, rural and remote communities, and vulnerable communities

g. Complexities and challenges of industrial fuel switching and implications for economic competitiveness

h. Feasibility of alternatives for dispatchable natural gas as a reliability and peak power resource

i. Opportunities, options for, and consequences of strategic decommissioning or right-sizing of natural gas infrastructure in the long term

Recommendation 7: To ensure municipalities, communities and local businesses are in the best position to participate in energy decision-making and take responsibility in pursuing their energy transition objectives, the Ministry of Energy should develop a strengthened framework for local energy planning and decision-making and take steps to facilitate its implementation. The goal should be to develop mature Comprehensive Local Energy Planning processes through which communities can effectively contribute to Ontario's energy transition in ways that suit their needs and reflect their local strengths, opportunities, and priorities. Developing Comprehensive Local Energy Plans with transparency on cost implications and rate impacts can help to align community planning with provincial policy objectives.

As part of Comprehensive Local Energy Planning, communities should establish a table for aligning and resolving key policy issues and priorities – e.g., housing, transportation, land use planning and energy – in a way that uses municipalities' leadership role and engages them to take responsibility for their own commitments (e.g., on climate) and within their own domain. The provincial government should ensure that municipalities have the support, capabilities and resources to carry out this work.

Engagement on Comprehensive Local Energy Planning must involve a broad set of local interests and stakeholders, including electric and gas distribution utilities. The outcome of the process will form an important input into technical electricity and gas distribution planning and IESO-led (regional) planning, respectively. This process would not replace the existing IESO-led Regional Planning process, which is very technical and should remain so, albeit with broader input from gas utilities and other local planning entities.

The Ministry of Energy and the Ministry of Municipal Affairs and Housing should coordinate to ensure that the province and municipalities are aligned on land-use planning as it relates to energy infrastructure, and to determine how to best support municipalities in leveraging support/incentives from the province/federal government to support economy-wide decarbonization.

Recommendation 8: To contribute long-term certainty and orientation to Ontario's energy transition, the provincial government should establish an external Energy Transition Advisory Council to provide advice, independent of government and on an ongoing basis, on the overall trajectory of Ontario's energy transition, emerging governance or energy system-level questions and the integration of energy planning and coordination with sectoral strategies.

The Advisory Council should include 10-15 members across industry, Indigenous, consumer/citizen, academic, finance and other pertinent expert representation, predominantly from Ontario, and select Canadian and international jurisdictions. Government staff, IESO, OEB and representatives from other key entities should be included as observers and to contribute technical expertise.

The Advisory Council would have a long-term mandate and be intended to identify gaps in navigating the energy transition, in a purely advisory function and not duplicative of other planning activities:

a. Provide thought leadership on planning and coordination across fuels and economic sectors and respond to government requests for advice

b. Lead transparent engagements, on key questions facing Ontario in the energy transition (asked by government or self-initiated)

c. Identify areas where research and further coordination are required and commission research to address key knowledge gaps. This could include advising on the development of future energy pathways studies and helping identify the implications of findings for the province. In subsequent iterations, the Advisory Council could take on additional responsibilities, including commissioning pathways studies on behalf of the government.

d. Advise the government on strategies for educating, informing, and engaging the public on energy choices

e. Issue reports and provide advice on the future evolution of long-term integrated planning, including how Comprehensive Local Energy Planning can effectively contribute to Ontario's energy transition

f. Ensure Indigenous perspectives are adequately reflected in all proceedings and reports

g. Convene sub-committees and working groups as needed (e.g., on transportation, buildings, equity, rural and remote communities, municipalities, skilled workforce development)

h. Provide advice on the long-term human capital and financial resource needs of entities involved in planning and regulating the energy system

i. Issue a progress update on the energy transition in Ontario on a regular basis (e.g., every two years)

j. Provide an annual report on its activities and advice to the government

Recommendation 9: To ensure energy planning and policy development are supported by the best evidence available, the government should fund, on an ongoing basis, independent whole economy energy pathways studies, in a way that allows for iterative improvement of modelling and assumptions, transparency on costs, and with meaningful input from relevant stakeholders and Indigenous communities.

10.2 GOVERNANCE AND ACCOUNTABILITY

Recommendation 10: To enable the effective evolution of innovative business models in line with clean energy economy goals and to help consumers benefit from electrification and the energy transition, the OEB and IESO should:

a. Continue encouraging experimentation by utilities, innovators, and new market entrants through platforms, such as the Grid Innovation Fund and the Innovation Sandbox program, and ensure appropriate resourcing of these programs

b. Regularly evaluate and build on these initiatives to advance successful projects beyond the pilot stage to broader adoption when appropriate, proactively identify any legislative and regulatory barriers to government, and ensure sustainable business models

c. Review opportunities to help consumers through electrification and the energy transition, including business model innovations that provide new products and services that enable consumers to finance the high up-front capital costs for building retrofits and fuel switching appliances in a fair and affordable manner

Recommendation 11: Safety regulators and technical standards organizations must be included in energy planning and energy sector regulation to enable proactive coordination and the effective deployment of new technical solution.

For example, the Electrical Safety Authority (ESA) and the Technical Standards and Safety Authority (TSSA) play critical roles in product approvals, reviewing plans for new facilities and installations, customer and industry education regarding electrical safety, and, in particular, monitoring, assessing and responding to any emerging public safety risks from electrification and the energy transition (for example, regarding integration/installation of energy storage and vehicle-to-grid installation into homes and buildings).

Recommendation 12: The OEB should employ all tools within its existing mandate to implement activities consistent with the Province's goals for a clean energy economy and the requirements of the energy transition for Ontario.

The OEB should enhance risk-based approaches to regulatory oversight, consistent with best practice. This would enable more agency resources to be focused on emerging energy areas and economize on traditional regulation.

Recommendation 13: In the years following release of the energy transition policy vision, the province should undertake a review of the OEB's activities in respect of achieving objectives within the policy vision to determine if potential legislative and/or regulatory changes are needed to implement the vision effectively. These potential changes could include:

a. Updating the OEB's policy, mandate, and/or objectives to reflect the clean energy economy transition, including addressing greenhouse gas ("GHG") emission reductions

b. Including GHG emissions as an additional factor for the OEB to consider in proceedings, such as transmission leave-to construct applications

c. Revising objectives related to the natural gas sector to align with government policy direction on the long-term role of the sector

d. Reviewing other aspects of the OEB's objectives and legislation as it relates to facilitating the clean energy economy, for example, amending the definition of "gas" to include hydrogen blending, if deemed necessary

Recommendation 14: In line with input received during the 2021 review of Ontario's long-term planning framework, IESO should be empowered, within the broad direction established by government, to independently procure electricity resources and lead bulk-system planning (including potential use of interties) and regional electricity system planning. The OEB should provide regular procedural review of IESO-led planning and procurement, to be set out in legislation.

Recommendation 15: To facilitate development of the clean energy economy, the OEB should conduct reviews of:

a. Cost allocation and recovery policies for natural gas and electricity connections to eliminate discrepancies between how up-front capital contributions are assessed and how they can be collected between the two sources of energy. For example, the review should include, but not be limited to, examining the differences in the economic evaluation period (known as a revenue horizon) to determine capital contributions as well as the ability to collect the capital contribution as a surcharge on rates versus an upfront contribution

b. How natural gas utility infrastructure and Demand Side Management investments are evaluated to ensure new infrastructure is right sized for forecasted time horizons

Recommendation 16: The Ministry of Energy, working with the OEB, IESO, LDCs, municipalities and gas utilities, should develop a formal and transparent co-ordination framework that sets out the scope and objectives for enhanced planning co-ordination at the bulk, regional, and distribution levels in order to effectively pace and facilitate the fuel switching, system optimization and enhanced levels of energy efficiency required by the clean energy economy.

The framework should ensure that each party's technical expertise is respected and utilized appropriately to achieve the desired policy outcomes. This would include any required directives, regulatory changes, oversight mechanisms, and a clear and agreed upon understanding of specific roles and responsibilities for the entities involved. The framework should include the following:

a. Regulatory requirements via license amendments and codes (for the IESO) and Ministry undertakings or rule making authority under the OEB Act (for Enbridge) to require the IESO and Enbridge to coordinate bulk planning

b. Regulatory requirements via license amendments and codes (for the IESO and LDCs) and Ministry Undertakings or rule making authority under the OEB Act (for Enbridge) to require the IESO, Enbridge, and LDCs to coordinate regional planning

c. Development of standardized approaches to gas/electric coordination and demand forecasting at the distribution level, including coordination between Conservation and Demand Management (for electricity) and Demand Side Management (for natural gas) and with Comprehensive Local Energy Planning

d. OEB adjudicative regulatory processes (e.g., review of system plans, rate cases, and leave to constructs) should require the demonstration of gas/electric planning coordination outlined above via filing requirements on submitted plans and/or applications

Recommendation 17: The OEB and IESO must continue to find ways within their existing mandates and in anticipation of the clean energy economy policy statement to provide proactive and transparent thought leadership on regulatory policy. Energy agencies should work to examine where existing rules and practices disadvantage the cost-effective participation of clean energy solutions, and especially how distribution resources can participate across the value chain of the entire energy system.

The goal should be to develop an open investment environment that creates a level playing field in which DERs can provide their full value to customers by effectively competing with one another and with bulk-system resources.

a. To enable distribution-sector innovation, build capacity and encourage reasonable risk-taking to maximize customer and community value, the government, IESO and OEB should work with utilities to develop a vision and clear pathway for system-wide application to realize the maximum capability of the distribution system and DERs.

b. The OEB should support LDC applications in grid modernization, establishing a process and technical threshold to determine which LDCs will be enabled to locally procure and dispatch DERs.

c. LDCs should be required to enhance their capabilities to procure and actively manage DERs as Non-Wires Alternatives to meet distribution level needs.

d. The OEB should continue and enhance the requirement for LDCs to file electrification readiness plans (ERPs). ERPs should demonstrate consideration of Comprehensive Local Energy Plans and processes.

e. The OEB should have a clear and consistent approvals framework for distribution level approaches that can help maximize the value of the distribution sector and reduce barriers to adoption. This should include grid modernization upgrades that enable efficient energy management, such as two-way telemetry, tools for enhanced conservation and demand management (CDM), and non-wires alternatives to traditional distribution infrastructure enhancements. As needed, the OEB should review policies, such as the Affiliates

Relationship Code, to enable greater flexibility for LDCs without compromising private sector participation.

f. The IESO should critically assess and report back on the extent to which its systems, including market rules, dual participation model, and interoperability requirements, can be improved to remove barriers to the effective participation of DERs and innovation in business models.

g. Accountability frameworks should be codeveloped by IESO, OEB and LDCs to ensure good coordination and to manage any conflicts, real or perceived. To promote interoperability and increase the value of distributed solutions, all work should be undertaken with a view to developing a common platform, or limited number of platforms, on which LDCs can converge. The IESO can play a key role in facilitating this process.

Recommendation 18: The government should regularly assess the need for resources (skills, staff, other supportive resources) across ministries and agencies to steer energy planning and decision-making competently and effectively through the energy transition, and ensure required resources are provided. Agencies should continue to actively forecast their long-term resource needs and communicate those via existing business plan development and approval processes.

10.3 TRUE PARTNERSHIPS WITH INDIGENOUS PARTNERS

(Note: There are several other recommendations across the report referencing Indigenous partners and recommending actions to support meaningful Indigenous participation in the clean energy economy.)

Recommendation 19: The government should support meaningful Indigenous participation in the clean energy economy through consistent and larger scale capacity-building initiatives, including:

a. The development and expansion of Indigenous-led and community-driven capacity-building initiatives

b. Stable and flexible capacity funding to facilitate meaningful Indigenous consultation and engagement with the Ministry and proponents on energy planning and project development

c. Expansion of the IESO's Indigenous Energy Support Program (including increase program budget overall, increase funding for designated energy champions, wrap-around community supports, and flexible program delivery)

d. Tailored and accessible learning resources to enhance understanding of Ontario's evolving energy system, and improve Indigenous participation in community, regional and provincial energy planning, as well as technical planning discussions

Recommendation 20: The government should advance economic reconciliation through flexible financing models and mechanisms that incentivize Indigenous project ownership across small, medium, and large-scale energy projects. This could include:

a. Expansion of the Aboriginal Loan Guarantee Program and development of other programs, following an assessment of any barriers to program access

b. Opportunities to align funding and cost-sharing agreements, where possible, with the federal government and other provincial governments in Canada, as appropriate

c. Opportunities to pilot emerging, flexible financing instruments/mechanisms, such as the use of Indigenous-value themed bonds

d. Review of current energy agency frameworks, including regulatory and procurement policies, to identify opportunities to improve flexibility and enhance Indigenous project ownership

Recommendation 21: To improve embedded governance participation, the government should amend the enabling statutes of the IESO and OEB to ensure Indigenous representation on the Boards of Directors.

Recommendation 22: The Ministry of Energy should review its current resources to enhance the Ministry's capacity to meet the demand of electrification and the energy transition, including:

a. Appropriate resources to the Indigenous Energy Policy Unit to support proactive relationship-building and increases to the volume of engagement and consultation with Indigenous communities.

b. Continued dedicated policy and legal expertise to support the Ministry's early engagement and consultation work, such as,

    - Responding to and addressing community concerns
    - Understanding the spectrum of engagement and consultation
    - Identifying impacted communities for engagement and consultation
    - Delegating procedural aspects of consultation where appropriate
    - Ensuring that the Ministry has diligently discharged its constitutional obligations under the Duty to Consult

10.4 INNOVATION AND ECONOMIC DEVELOPMENT

Recommendation 23: Recognizing the key role that clean, affordable and reliable energy will play in the development of globally competitive and future-oriented industries, the ministry should:

a. Reflect in planning, policy-making and direction to IESO and OEB that in the rapid shift to electrification and the transformation toward a clean energy economy the risk-return balance between proactive build-out of energy infrastructure and reactive planning has shifted

b. Ensure that planning, permitting and approvals processes are clear, predictable, effective and efficient and lead to timely decisions and project development that has the support of local and Indigenous communities. Engage with other levels of government as appropriate to pursue this objective, as referenced in Recommendation 3

c. Identify key clean energy value chains, encourage local energy sectoral depth, and strategically kickstart energy innovation.

Recommendation 24: With the commitment to a clean energy economy as the guidepost, the government should consider a mission-oriented approach to economy-wide industrial strategy. Such a strategic approach can provide the necessary focus to align government efforts and mobilize private actors, including finance, in order to develop and scale the key economic sectors that will support a future clean energy economy in a way that uses resources wisely. It would leverage regional clusters and build on various industrial sector strengths and can position Ontario as a key player in select global clean economy value chains.

In the energy sector, the government should consider which existing and emerging technologies and sub-sectors are likely to play a critical role in a future clean energy economy and where Ontario can maintain or develop long-term competitive advantages. This will require realistic assessments of existing and emerging strengths, as well as technological and economic potential. The province's current Cost-Effective Energy Pathways Study can help inform these assessments.

Recommendation 25: The government should clearly set out a policy vision for how electrification and the energy transition will be funded, including a realistic assessment of the distributional impacts of funding choices on different groups. A comprehensive range of funding options and mechanisms should be considered and used, including taxpayer funding, ratepayer funding, investment subsidies, investment tax credits, as well as leveraging and/or requiring private funding whenever possible. Opportunities to leverage funding from federal and municipal sources should also be pursued to the greatest extent possible.

The key guiding principle should be that the beneficiary pays, with the understanding that the definition of who the beneficiary is in the energy transition is broader. If the developments and investments associated with electrification and energy transition will benefit only the electricity system and those who pay electricity rates, then the costs should be borne by ratepayers. But if electrification and energy transition are expected to carry significant and broad economic, transition and social benefits for the province, then the province should consider shifting some of the cost to the tax base and provide clarity to sector entities on how to consider this in planning and decision-making.

The province should develop its policy vision with a rigorous and transparent accounting of expected costs, benefits and distributional impacts.

10.5 CONSUMER, CITIZEN AND COMMUNITY PERSPECTIVES

Recommendation 26: The government, IESO and OEB should play a key role in engaging with the public and Indigenous partners to ensure transparent access to high-quality information and meaningful opportunities to participate in decision-making in order to build greater support and involvement in the energy transition. As part of other processes or on their own this work should include but not be limited to:

a. Helping customers, citizens and community members to see themselves in the transition to a clean energy economy and to understand the operational realities of large-scale changes to the energy system for their daily lives (e.g., shifting to different energy sources and ways of consuming energy, the need for new energy infrastructure in their communities, etc.)

b. Preparing the public for the transformations ahead by providing transparent, ongoing, and comprehensive information about the genuine choices, costs, opportunities and challenges associated with electrification and the energy transition

c. Strengthening mechanisms for community input and involvement in energy planning and decision-making for new infrastructure. This includes prioritizing public consultations and transparently incorporating community feedback into decision-making processes

d. Education initiatives that address the benefits, risks and costs associated with new and emerging technologies, climate action versus inaction, and empowering customers to make well-informed decisions

e. Fostering community-level engagement and empowering local communities to make informed energy planning decisions in support of new energy projects and technologies that best suit their local energy needs

Recommendation 27: The provincial government should explore mechanisms to support broad adoption of fuel switching, decarbonization and supportive technologies such as electric vehicles, storage and heat pumps to support its clean energy economy objectives, foster change

at the needed pace and scale, and to ensure that all customers can benefit effectively from the energy transition. This should include active engagement and communication so that customers understand the opportunities, benefits, challenges and risks of decarbonization technologies and can make informed choices. Importantly, the government should also consider mechanisms to help customers manage up-front costs.

- Any mechanisms adopted by the government should be rigorously analyzed for cost-effectiveness and must transparently consider both costs and benefits to individual customers and to the overall system, for example peak electricity demand impacts.
- The government should co-ordinate with the federal government to seek alignment on these objectives, to understand where federal programs can support provincial targets and where collaboration can maximize value.
- The Energy Transition Advisory Council should monitor progress on cost-effective and beneficial fuel switching, identify obstacles and make recommendations.

Recommendation 28: Existing electricity rate mitigation and affordability programs should be redesigned to better target support to those who need it most, and to streamline program application and enrollment processes for increased accessibility.

Any new or redesigned programs should be developed with full participation and collaboration of representatives from remote and rural communities, both Indigenous and non-Indigenous, as well as vulnerable urban households and communities that the programs are meant to serve.

Recommendation 29: The government, IESO and OEB should support capacity-building for utilities and communities to conduct assessments of climate change impacts to energy infrastructure and to support effective climate resilience efforts and adaptation planning/implementation. Any costs borne from investments in adaptation should not unfairly impact on low-income consumers, consumers in specific geographic regions that face higher electricity costs, consumers that rely on medical device(s) requiring a lot of electricity or other vulnerable consumers.

EETP

ELECTRIFICATION AND
ENERGY TRANSITION PANEL

INTERIM REPORT

WHAT WE HEARD

SEPTEMBER 2023

CONTENTS

CONTENTS

CONTENTS

OVERVIEW

The Electrification and Energy Transition Panel (the Panel) was established in April 2022. The Panel, comprised of Mr. David Collie, as Chair, Professor Monica Gattinger from the University of Ottawa, and Chief Emerita Emily Whetung, former Chief of Curve Lake First Nation, was set up to provide independent advice to government on short-, medium- and long-term opportunities for the energy sector to support Ontario's economy to prepare for electrification and the energy transition.

The Panel was tasked with identifying opportunities to improve the province's long-term energy planning framework, including opportunities to integrate planning between electricity and natural gas systems, as well as opportunities and challenges related to energy sector governance, emerging technologies, affordability, investment and job creation and climate objectives.

From March to July 2023, the Panel conducted one-on-one, group and roundtable virtual engagement sessions and sent out an open call for written feedback with support from a dedicated team within the Ministry of Energy, the Panel Secretariat. More than 200 stakeholders, Indigenous partners and communities, federal, provincial and municipal government departments and agencies, and members of the public provided their input to the Panel. This 'What We Heard' report captures the key themes the Panel heard across all its engagements.

EXECUTIVE SUMMARY: KEY TAKEAWAYS ACROSS THEMES

The Panel engaged with stakeholders, Indigenous partners, federal, provincial and municipal departments and agencies and members of the general public on six key themes – Indigenous Energy Matters; Energy Planning, Governance & Accountability; Established and Emerging Technologies; Community & Customer Perspectives, Affordability, and Energy Sector Objectives; and Facilitating Economic Growth. Each of the key themes was informed by the Panel's Terms of Reference.

This document provides summaries of feedback received across each of the six key themes. Key takeaways across the themes can be found below:

KEY THEME ONE: INDIGENOUS ENERGY MATTERS

- It is crucial to foster meaningful Indigenous participation and partnerships in clean energy projects, including energy infrastructure and energy efficiency, conservation and demand management initiatives.

- Capacity-building in Indigenous communities, including stable capacity funding, is required to support meaningful Indigenous engagement, consultation, participation and partnerships.

- Indigenous participation should take place at the earliest stages of energy planning at community, regional, and provincial planning levels.

KEY THEME TWO: ENERGY PLANNING

- Long-term energy planning should be led by government and must consider the relationship between natural gas, other fuels, and electricity in a more holistic and integrated way.

- 'Net zero' greenhouse gas emissions by 2050 should be the goal for Ontario.

- Certainty and predictability in long-term energy plans, regulatory frameworks and energy pricing are vital for achieving decarbonization targets and economic success.

- Distributed energy resources (DERs) have the potential to play a pivotal role in decarbonization and reduce the need for new large-scale generation, distribution and transmission infrastructure as electrification accelerates.

KEY THEME THREE: GOVERNANCE AND ACCOUNTABILITY

- There are opportunities within existing agency mandates to support more coordination between natural gas and electricity planning.
- There are opportunities for new agency mandates to support greater consideration of innovative technologies and solutions, and objectives that support 'net zero' by 2050.
- Performance metrics are required to measure progress toward electrification and energy transition objectives. Metrics should be flexible, not prescriptive, and stakeholders and Indigenous partners should be engaged in developing them.

KEY THEME FOUR: ESTABLISHED AND EMERGING TECHNOLOGIES

- Regulatory frameworks should be outcomes-based, flexible, streamlined and consistent to accommodate efficient market entry of new and established technologies.
- Electrification of end uses and reduction in energy demand for buildings/homes require pathways that make energy-efficient technologies affordable and accessible.
- Electrification of transportation requires a comprehensive approach to meeting charging needs, including greater coordination between local distribution companies (LDCs) and electric vehicle (EV) stakeholders.
- Canada and Ontario should work collaboratively to de-risk low carbon technologies, such as hydrogen.

KEY THEME FIVE: COMMUNITY AND CUSTOMER PERSPECTIVES, AFFORDABILITY AND ENERGY SECTOR OBJECTIVES

- Ongoing community, customer and citizen support are required for successful electrification and energy transition.
- Proper pacing of energy transition is needed to keep costs low for residential, small business, industrial and commercial consumers.
- Consumer choice, including the variety of options to ensure reliability in remote/off-grid communities, will be important in ensuring consumer needs are met.
- Transparent communication, public education, and meaningful and accessible engagement is important for energy planning and to bring consumers along in the transition.

KEY THEME SIX: FACILITATING ECONOMIC GROWTH

- A clean baseload electricity supply is necessary for industries to be competitive amid evolving environmental, social and governance (ESG) measures.
- Government needs to create an environment where industries can invest in energy efficient equipment to reduce energy consumption and be cost competitive.
- Government should reduce the burden of the transition for private companies and support industry growth like the U.S. Inflation Reduction Act, including collaboration and alignment of funding opportunities with the federal government.

OVERVIEW OF THE ENGAGEMENT PROCESS

The Panel led four streams of engagement, all of which are captured by this What We Heard report. The first three steams were virtual engagements and the fourth stream was an open call for written submissions. A description of each of the engagement streams can be found below. The full list of stakeholders and Indigenous partners engaged over the course of each engagement stream can be found in Appendix A.

The Panel Secretariat staff systematically analyzed feedback, both key messages and explicit recommendations, from virtual engagements and written submissions to the Panel. Staff clustered ideas and recommendations in this What We Heard Report, emphasizing feedback that was raised multiple times. Staff took a comprehensive approach to capturing the diverse input received throughout the Panel's engagements.

STREAM ONE: ONE-ON-ONE AND GROUP-STYLE STAKEHOLDER ENGAGEMENTS

From March to May 2023, the Panel, with support from Ministry of Energy staff, engaged directly with 58 stakeholders in a series of one-on-one or group-style engagements. The Panel heard from stakeholders, in an open format, regarding their organization's priorities related to electrification and energy transition, including challenges and opportunities.

STREAM TWO: ONE-ON-ONE AND GROUP-STYLE INDIGENOUS ENGAGEMENTS

From April to August 2023, the Panel, with support from Ministry of Energy staff, engaged with 14 Indigenous partners in a series of one-on-one and group-style engagements where Indigenous-focused energy policy challenges, opportunities and priorities were discussed.

STREAM THREE: ROUNDTABLE ENGAGEMENTS WITH STAKEHOLDERS AND INDIGENOUS PARTNERS

From May to June 2023, the Panel engaged with approximately 117 stakeholders and Indigenous partners over 13 roundtable engagements. These roundtable engagements were facilitated by the Policy Innovation Hub within Cabinet Office (Government of Ontario), with support from Ministry of Energy staff.

Each roundtable session explored discussion questions under one of five of the Panel's key themes related to the energy transition and electrification. The full list of discussion questions explored in roundtable engagements can be found in Appendix B. Topics related to Indigenous

Energy Matters (key theme one) were explored via roundtable discussions on each of the other five key themes (key themes two to six).

Some of the discussion questions were supplemented by polls conducted during the roundtable engagement sessions to help stimulate conversation amongst attendees. Key poll results are presented in this document.

STREAM FOUR: OPEN CALL FOR WRITTEN SUBMISSIONS

An open call for written submissions was launched to solicit written feedback from stakeholders, Indigenous partners and the public. The discussion guides used for the roundtable engagements were shared as part of the open call invitation package for written responses. A total of 85 written submissions were made to the Panel.

KEY THEME ONE: INDIGENOUS ENERGY MATTERS

CONTEXT

As described above, the Panel engaged with 14 Indigenous partners in a series of one-on-one and group style engagements. Most partners noted that it is important to clearly distinguish relationships with Indigenous partners, from those with non-Indigenous stakeholders. The term "Indigenous partners" is used to distinguish between Indigenous partners and non-Indigenous stakeholders and includes First Nations and independent communities, Indigenous energy organizations and entities, Political-Territorial-Organizations (PTOs) and Métis governance organizations.

It should be noted that the Panel did not meet with every Indigenous nation or community across Ontario and as such, the feedback may not fully capture all Indigenous perspectives in the province.

During the engagements (engagement stream 2), Indigenous partners emphasized that they want to be included more and collaborate with government and the sector on energy planning, energy projects, policy development, and decision-making to achieve a successful transition across Ontario.

While Indigenous partners were invited to participate in roundtable engagements (engagement stream 3), most organizations that participated in the roundtable engagements were non-Indigenous stakeholder organizations with varying levels of understanding of, and direct involvement with, Indigenous communities.

Although there was broad recognition from non-Indigenous participants of the importance of including Indigenous partners in energy planning, project development and throughout electrification and the energy transition, roundtable participants tended to defer to Indigenous partners on questions regarding opportunities to enhance communities' role in energy decision-making, planning, etc.

KEY CONSIDERATIONS AND ALIGNMENTS

Shared priorities were identified between Indigenous and non-Indigenous participants relating to safety, reliability, affordability, and transparency. Many participants (both Indigenous and non-Indigenous) emphasized the importance of climate change mitigation and adaptation and building resiliency in Indigenous and non-Indigenous communities throughout electrification and the energy transition.

Indigenous partners emphasized the importance of protecting Aboriginal and Treaty rights throughout the transition and raised questions with respect to how government and the energy sector will collaborate with Indigenous communities to ensure that the benefits of electrification and the energy transition are evenly distributed across Ontario. This was raised repeatedly within the context of fuel-switching (switching from high-carbon to low- or no-carbon alternatives) and it was noted that many Indigenous communities rely on gas-powered boats, snowmobiles and all-terrain-vehicles to hunt, fish and practice Culture and Treaty rights. Indigenous partners identified the need for more stable and flexible funding to install and maintain equipment that enables fuel switching.

Participants identified gas stations, either wholly owned by, or operating within an Indigenous community, as integral to communities' local economy, given that both Indigenous and non-Indigenous people purchase gasoline and other goods including locally made products, at gas stations. Concerns were raised over potential impacts to local Indigenous economies as more electric vehicle (EV) charging stations are installed across Ontario and the use of gasoline declines.

Both Indigenous and non-Indigenous participants across engagements highlighted that lower income households experience barriers related to affording energy equipment and installation expenses to address their homes' energy needs, improving their homes' energy efficiency and/or installing electrical safety features. In many Indigenous communities, the inability to overcome these financial barriers can lead to a higher number of structural fires and/or the reliance on alternative energy sources, including wood-burning stoves, propane and diesel fuel.

A widespread switch to electricity presents unique challenges for tenants and low-income households who may not have the option or be able to afford to switch to lower-carbon home energy systems and will be unable to access the benefits of electrification.

Additionally, Indigenous partners and non-Indigenous participants emphasized the opportunity to improve Indigenous participation and partnerships through renewable and clean energy projects, as well as energy efficiency, conservation and demand management initiatives.

The following sections capture in more detail and organize into themes what the Panel heard from Indigenous partners and communities.

CAPACITY BUILDING

Indigenous partners noted that capacity-building within Indigenous communities is required to support their meaningful participation in all stages of energy planning at community, regional and provincial planning levels. Future long-term energy planning should take a regional perspective, recognizing the different opportunities and challenges faced by different areas of the province. Representation from northern and remote communities is critical to address unique energy needs and interests across Ontario. It is also important to consider traditional territories that overlap with current borders, including communities with traditional territories that extend beyond Ontario.

Providing stable capacity funding to Indigenous communities was identified as critical for enabling meaningful and coordinated engagement with Indigenous communities. Indigenous partners flagged the high volume of engagement and consultation requests they receive for both energy and non-energy related projects and that they often lack the appropriate resources to meaningfully provide input into engagements. Stable capacity funding would enable communities to hire designated staff with technical energy knowledge and expertise to ensure Indigenous perspectives are included in planning discussions and engagements.

Other capacity building needs include educational resources that enhance communities' understanding of the Ontario energy system and support informed community conversations on energy needs and interests. Skills development and training was also mentioned to improve Indigenous participation in energy projects and planning discussions.

The suite of supports available through the Independent Electricity System Operator's (IESO) Indigenous Energy Support Programs was highlighted as a good example of current capacity building initiatives, including the Community Energy Champion program and Community Energy Plan program. Participants identified opportunities to expand these programs to provide longer-term funding to better support Community Energy Champions and ensure consistent usage and maintenance of community energy plans.

The Indigenous Clean Energy Inc.'s 20/20 Catalyst Program and the First Nations Major Projects Coalition (FNMPC) were referenced by Indigenous partners as some examples of positive initiatives that support Indigenous-led capacity building efforts. Participants appreciate that the 20/20 Catalyst program provides practical and applied learning about renewable energy projects, community energy planning, energy efficiency and conservation, business management and advanced energy systems, and the business capacity support that FNMPC provides. In addition, the program supports participants to move clean energy projects forward on the ground and enhances Indigenous participation in various energy projects.

Increasing capacity for procurement by Indigenous entities and businesses was also highlighted in engagements as a strategy to improve Indigenous participation and inclusion across infrastructure and energy development projects.

MEANINGFUL INCLUSION AND GOVERNANCE

Engagement at the earliest opportunity and on an ongoing basis is key to building trust, enabling true partnerships, supporting meaningful consultation and improving long-term outcomes. Impacts to Indigenous communities that should be considered in the energy

planning process include Treaty rights, harvesting rights, hunting rights, access to clean water and stewardship of the environment.

Indigenous partners also emphasized the importance of understanding communities and nations' governance structures, as well as engagement preferences and protocols for supporting more meaningful and coordinated engagement.

Some Indigenous partners identified toolkits that they have developed, which are available online, that outline how government should engage with a particular nation or community. For example, Grand Council Treaty #3 highlighted their toolkit on Manito Aki Inakonigaawin, their nation's Great Earth Law, and discussed the importance of enhanced governance collaboration between Indigenous partners and government.

Improving Indigenous representation in existing provincial governance structures, or the creation of any new governance structure was also discussed by Indigenous partners.

Indigenous representation and meaningful inclusion of Indigenous perspectives on agencies' executive boards and across all planning efforts is required to support full Indigenous inclusion.

HOLISTIC AND INTEGRATIVE APPROACHES

Meaningful engagement and consultation with Indigenous partners is critical to supporting more holistic and integrative approaches to energy planning and to ensure that various energy needs and interests are considered.

Indigenous partners emphasized the importance of addressing the cumulative impacts of energy projects on communities and discussed the opportunity that electrification and the energy transition represent towards full Indigenous inclusion and participation.

Indigenous partners discussed the linkage between energy and community health and well-being and spoke of the various benefits of energy projects and planning that

meaningfully include Indigenous perspectives. For example, the Wataynikaneyap Transmission Power project set mandatory requirements for Indigenous employment, training and skills development throughout the project phases, and mandated restrictions on the use of pesticides that could adversely impact the health of the community and the land. The project guarantees long-term mutual economic benefits for project partners and helps to increase communities' connection to more safe, reliable and affordable energy. The project was highlighted by Indigenous and non-Indigenous partners as an example of an industry partnership that improves Indigenous participation in project development and in supporting overall community health and well-being. Flexibility, collaboration and public support from government, agencies and industry partners were cited as some critical ingredients to ensure success.

However, Indigenous partners noted opportunities for improving and strengthening integrative and holistic approaches to partnerships and project development. For example, they noted that projects can better assess and consider environmental and cultural impacts in addition to bottom line project costs. Indigenous communities are often responding to overlapping crises, including mental health and addictions, chronic poverty, and intergenerational traumas due to the legacy of colonialism. Additional time and resources are required to ensure that Indigenous perspectives are meaningfully included and inform project development and planning.

In addition, improving coordination and alignment across jurisdictions, where possible, and particularly between Ontario and the federal government, could help to better coordinate Indigenous feedback, develop and implement responsive policies and programs and align funding to strengthen Indigenous participation and inclusion in the energy transition.

INNOVATION AND ECONOMIC RECONCILIATION

Indigenous partners noted that there is an opportunity to increase Indigenous participation where there are alignments between economic development project goals and the objectives of Indigenous communities. Indigenous partners emphasized the co-

benefits of Indigenous and industry partnerships and Indigenous project ownership, including improved energy access, community and broader economic growth, employment and improved community health and well-being.

Indigenous partners identified communities' lack of access to financing as a key barrier to partnerships and Indigenous participation in energy projects. The Aboriginal Loan Guarantee Program administered by the Ontario Financing Authority was repeatedly identified as having positive impacts on improving access to capital and increasing project partnerships and Indigenous participation. Strong support and recommendations to expand the program, and others like it, was expressed.

Impact Benefit Agreements (IBAs) between communities and project proponents were noted as an alternative to partnership in the absence of specific commercial interests in Indigenous ownership and equity. However, it was also noted that in the energy sector (and other sectors), there has been a shift away from IBAs towards equity partnerships with long-term benefits for Indigenous communities. Overall, government must prioritize economic reconciliation with Indigenous communities to support long-term benefits.

ACCOUNTABILITY AND TRANSPARENCY

Finally, Indigenous partners emphasized the importance of accountability and transparency to trust and relationship building with Indigenous communities.

Communities want a better understanding of the current energy landscape in Ontario, including clear and ongoing information related to the energy transition and early, coordinated engagement to discuss the potential impacts on Indigenous communities and ratepayers within those communities.

Indigenous partners expressed the need for greater accountability to Indigenous communities, particularly, for government to demonstrate how policy development and decision making is informed by the feedback received from Indigenous communities. Indigenous partners emphasized that repeated engagement with Indigenous

communities, without demonstrating how their feedback is integrated into government decision making, erodes trust and meaningful relationships.

Changes to agency roles, responsibilities, and mandates was mentioned by both Indigenous and non-Indigenous participants throughout the engagements. Suggested changes include: a review of current processes to ensure early engagement with Indigenous people regarding planning, development and procurement; ensuring Indigenous representation on advisory committees and boards and demonstrating how Indigenous perspectives are reflected in and inform organizational efforts, policy development and decision-making.

KEY THEME TWO: ENERGY PLANNING

CONTEXT

Throughout the engagements, the Panel explored opportunities to enhance long-term, integrated energy planning by coordinating resources for electricity and fuels. This includes topics such as the roles and responsibilities of provincial energy agencies and identifying strategies to optimize energy demand while decarbonizing the energy supply.

IDENTIFYING PLANNING ROLES AND ENTITIES

ROLES AND RESPONSIBILITIES FOR LONG-TERM ENERGY PLANNING

A major focus of the engagements was who should be responsible for long-term integrated energy planning and what roles they should play in this process. Participants shared that government should have a central role in planning for the energy transition and providing clear and stable policy direction; however, there was no clear consensus on which entity should be responsible for long-term energy planning. Several options and considerations were raised, including the potential establishment of a new entity or expanded roles for existing energy sector players/agencies (Ministry of Energy, Ontario Energy Board (OEB) and/or the IESO). A recurring theme of the discussion; however, was that accountability will be crucial for whichever entity is responsible for leading the energy planning process.

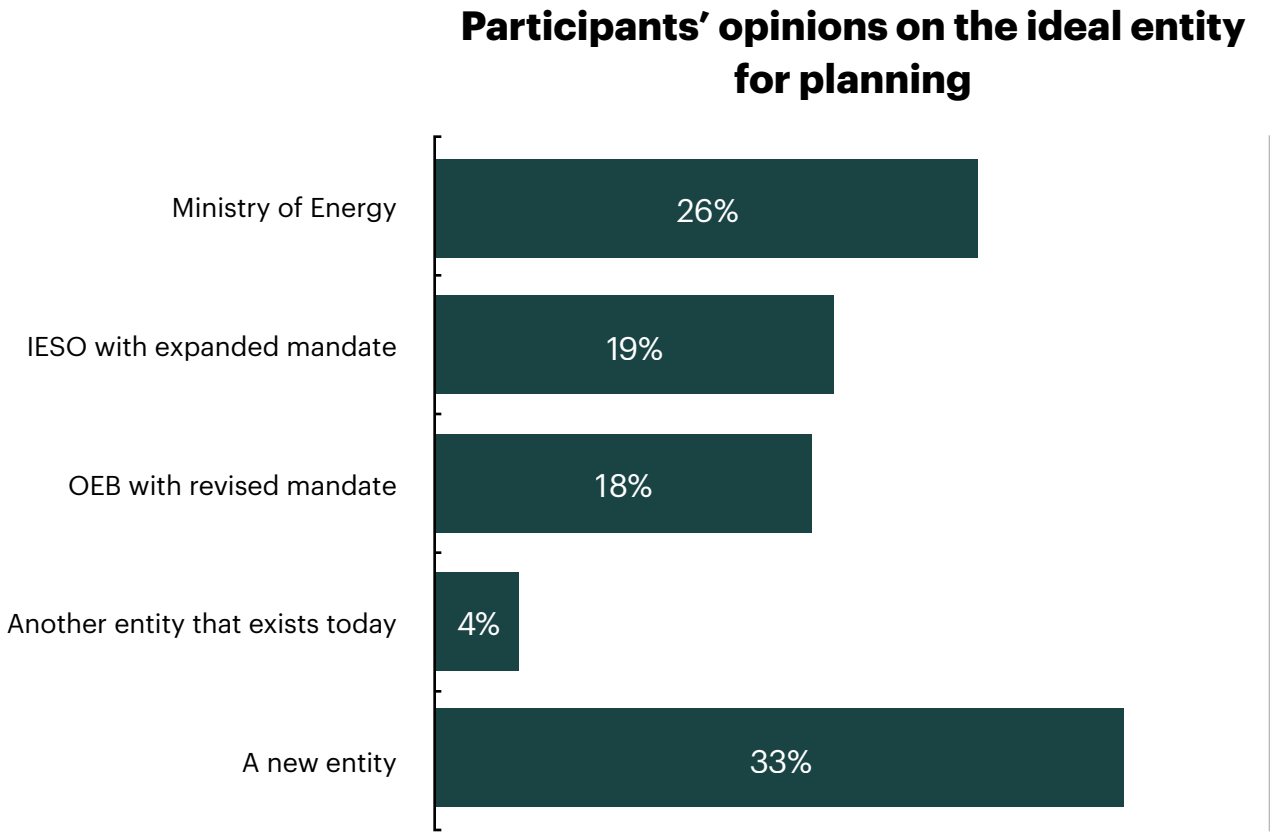

Figure 1. Energy planning roundtable participants were asked to "nominate the entity best suited to lead long-term planning" via a poll. Response options were 'Ministry of Energy, IESO with an expanded mandate, OEB with an expanded mandate, another entity that already exists, and a new entity.' Poll respondents could only select one option. Results were shared back to the group, to stimulate dialogue. Of the 78 poll respondents across all energy planning round tables, most thought that one of the existing entities (Ministry of Energy, OEB, IESO) is best suited to be responsible for long-term energy planning while approximately one third of poll respondents indicated that a new entity would be best suited to be responsible for long-term energy planning.

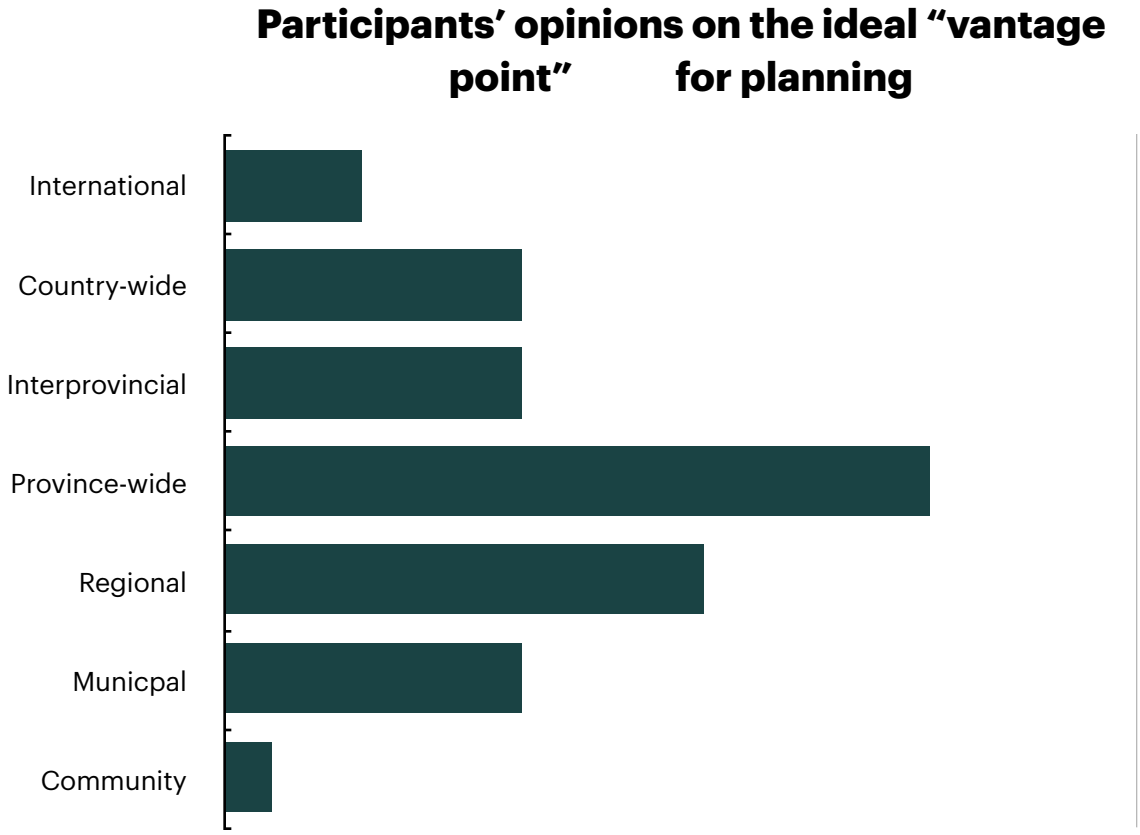

Figure 2. Energy planning roundtable participants were asked to share perspectives on the most critical planning vantage point starting with the following poll-based question "when it comes to Ontario's long-term energy planning, what are the three (3) most important levels to coordinate plans. Response options were 'International Plan, Country-wide Plan, Interprovincial Plan, Province-wide Plan, Municipal Plan, and Community Plan.' Results were shared back with the group to stimulate dialogue. A total of 217 poll responses were received from 76 respondents. Across all energy planning roundtables, the provincial-level and regional-level were selected as being the ideal vantage point for planning.

While participants questioned if long-term energy planning is an inherently political process, they generally agreed that technical planning should be shielded from politics as much as possible. In one roundtable group, participants agreed that the OEB is not the right body to conduct long-term planning due to its role in reviewing and "pressure testing" other entities' work through rate regulation. It was clear to participants that the government's ability to issue directives to the OEB and IESO must be considered;

however, some participants felt that government directives interfere with independent agency processes.

Overall, roundtable participants agreed that a new long-term energy planning process is needed, but there was disagreement about whether a new entity is required to implement that process effectively. As one participant put it, "evolution, not revolution" may be the best route for long-term energy planning, by expanding mandates rather than creating a new entity. One proposed solution was that the province could identify the required mechanisms, functions and tasks in the planning process and use them to inform the design of an entity and review of existing entities' mandates.

Written submissions generally agreed that any planning entity must have a broad mandate to incorporate the concerns of a wide array of stakeholders. Meaningful engagement at the earliest stages of development – as well as during project planning, execution and operations – would support timely execution of energy infrastructure projects. It was noted that Ontario currently lacks a single organization to coordinate stakeholders and develop an integrated plan for a net zero energy system.

Participants generally agreed that any entity conducting long-term planning must be able to independently "connect the dots" across complex systems and consider the relationship between gas, other fuels and electricity in a more holistic way. Coordinating long-term energy planning will require a comprehensive approach that considers the structure and resources available to the planning entity and the integrated planning processes that bring key stakeholders together. Further, the culture of the staff working on long-term energy planning must permit long-term, integrative, and connective thinking to tackle the challenge at hand – and have the appropriate funding and resources to be successful and "think outside of the box" where needed to achieve key objectives.

With respect to specific responsibilities and entities, participants expressed varying opinions:

- Respondents generally agreed that the **government should establish high-level policy objectives** related to integrated energy planning, defining a pathway to

achieving net zero emissions, and balancing objectives of reliability and affordability. These objectives must be long-term and enduring to avoid drastic changes in direction from government. Planning and execution should be left to other entities.

- Most respondents called for the **IESO to take on an expanded mandate for integrated and regional planning and to play a bigger role in** aggregation of DERs to maximize benefits and diminish need for new infrastructure.

- Most respondents generally agreed that the **OEB should retain its role in setting rates and regulating the energy sector in a way that serves the public interest and that it should play a stronger role in enabling the integration of DERs**. Respondents also expressed support for the OEB to enable distributors to plan locally and be involved in the DER procurement process.

- Written submissions called for **LDCs to be further empowered** to play a leading role in the development of their own network, create programs to meet local needs, and act as key parties contributing to broader cross-sector plans.

- Many respondents highlighted the need to **involve municipalities more directly in local-energy planning and siting of new projects**. Some written submissions described a need to develop integrated localized energy systems planning jointly between municipalities, utilities and the IESO. Better communication between municipalities and LDCs on system needs and infrastructure planning was identified as a priority.

ENERGY PLANNING PRIORITIES

Written submissions emphasized the need for an energy system that is reliable, affordable, and sustainable, ensuring adequate power supply to meet the needs of an electrifying economy while preserving customer choice. The planning process should be robust, transparency and accountable by providing policy certainty and early identification of needs to enable expedient development of long-lead assets.

Participants across the engagements repeatedly stated that Ontario's energy sector needs more clarity and certainty:

- Clear provincial direction with respect to an economy-wide integrated energy policy.
- Provincial alignment with federal and municipal policies that interact with the energy sector and other sectors (e.g., Canada's Zero-Emission Vehicle (ZEV) mandate, municipal housing strategies, strategies for northern development and critical minerals).
- More guidance from the OEB on its regulatory policies and decision-making processes so that utilities (electricity and natural gas) are better able to prepare and anticipate outcomes of applications that are brought to Board for approval.

Written submissions placed a strong emphasis on policy clarity including a clearly articulated emissions reduction target. Respondents recommended committing Ontario to targeting a net zero emissions economy by 2050, or sooner, which would provide a solid foundation to enable energy planning decisions that promote greater electrification and more sources of clean energy supply. Written submissions also recommended that Ontario policies, planning, and regulations align with a 2035 net zero electricity grid target, to align with commitments made by Canada and the United States. Such a target would provide policy clarity to investors and businesses and enable investments in clean energy technologies.

Feedback from one-on-one engagements suggested that this policy clarity should guide energy planning processes, electricity procurement and natural gas infrastructure decisions frameworks, and energy infrastructure investment/development.

PROCUREMENT

Written submissions generally agreed that the government should provide overall direction regarding procurement (established policy objectives) but leave design specifics and plans to the IESO, with the OEB reviewing plans to ensure they meet the government's overall direction and are cost-effective. Respondents called for the IESO to

be empowered with the necessary tools, mandate and independence for reliable, emissions-free grid planning and procurement, and the flexibility to plan for various electrification scenarios, account for potential demand impacts, and procure the required electricity supply. Within this framework, a guiding premise of long-term energy plans should be to continue to rely on competitive procurement whenever feasible to ensure the most cost-effective projects are selected.

IMPROVING THE PLANNING PROCESS AND OUTCOMES

Roundtable participants considered how to improve the planning process and its outcomes. Predictability, flexibility and transparency were recurring themes in this discussion. One participant suggested that a principled approach to energy planning, rather than a prescriptive one, will maintain flexibility as conditions change. In addition, transparency will help to create buy-in, especially regarding 'no-regrets' choices which participants noted, would help Ontario find the balance between over- or under-building the province's energy system while working to keep ratepayer costs low. Some participants indicated that while we can learn from other jurisdictions, there should be caution over direct comparisons when developing long-term energy plans due to the uniqueness of Ontario's system. It is generally clear that there needs to be a framework or strategy from government to indicate where the province is going.

Participants shared that while affordability will be a real concern throughout the transition, other measures of success (like reliable energy for all people in Ontario) should also be considered. For instance, what "no-regrets" choices can we make today and how do we make and encourage the types of decisions that will last decades?

Furthermore, roundtable participants noted that more collaborative practices such as integrating energy planning with land use and labour planning are critical for the overall success of the transition. This was echoed by feedback from written submissions which emphasized the benefits of a cross-sectoral approach, arguing that energy, economic development, and climate policy can no longer be viewed as separate planning

processes. Rather, an all-of-government approach is required, working with other key ministries and stakeholders in other key sectors.

PATHWAYS STUDIES

Participants considered that the complexity of the energy transition will require frequent long-term energy plans and economy-wide energy pathway assessments, including information from various sectors. Scenario-based planning will be important, participants noted, as weather-related events become more frequent and as technological advancements outpace market structures. For these reasons, frequent pathways studies (e.g., every three to five years) will be needed to keep up with the pace of change. Scenario-based planning might also consider social and economic changes in the customer base that could become significant consumers of energy in the future. Further, sub-sector pathways, as well as regional studies, were identified as important, given that each sector will have its own challenges and opportunities related to the timing and speed of the transition to clean energy. Some participants provided examples of entities that the province could look to support them in this kind of work and suggested that there should be direction to iterate on work started by the Ministry's current Cost-Effective Energy Pathways Study.

OUTCOMES-ORIENTED ENERGY PLANNING

Participants largely considered the planning process to be more important than the plan itself. As previously noted, participants stated that clarity, certainty and a predictable long-term energy plan would be vital for achieving provincial decarbonization targets or goals. Planning should include more milestones and market mechanisms, where appropriate. By balancing regulation and markets appropriately, the government should be able to indicate what needs to happen and enable system actors to make it happen.

Some submissions to the open call suggested that long-term energy planning should support Ontario's decarbonization objectives, and that direct long-term investment should be complemented by short-term planning to meet immediate needs.

Suggested Planning Outcome	Number of Responses	Percentage
Supports net zero/decarbonization goals (e.g., GHG emission reductions)	52	57.1 %
Predictable long-term energy policies	36	39.6 %
Reliable and resilient energy supply that consider electricity and fuels	36	39.6 %
Flexible to adapt to changing circumstances including new technologies	35	38.5 %
Affordable energy bills for residential and industrial consumers	33	36.3 %
Enables economically competitive industry (e.g., investment attraction)	25	27.5 %
Transparent policy and program development and implementation	17	18.7 %
Enables effective decision-making	16	17.6 %
Supports climate change adaptation	14	15.4 %
Enables access to financing to enable the energy transition	12	13.2 %

Figure 3. Energy planning roundtable participants were asked to help prioritize critical outcomes for long-term energy planning starting with the following poll-based ask "help [the Panel] consider the balance [between secure & reliable energy, clean & sustainable energy, and accessible & affordable energy] and other desired outcomes of long-term energy planning, by choosing three (3) outcomes Results were shared back to the group, to stimulate dialogue. Response options were, 'Supports net zero/decarbonization goals (e.g., GHG emission reductions), Predictable long-term energy policies , Reliable and resilient energy supply that consider electricity and fuels, Flexible to adapt to changing circumstances including new technologies, Affordable energy bills for residential and industrial consumers, Enables economically competitive industry (e.g., investment attraction), Transparent policy and program development and implementation, Enables effective decision-making, Supports climate change adaptation, and Enables access to financing to enable the energy transition.' A total of 276 responses were received from 91 poll respondents. Across all energy planning roundtables net zero / decarbonization goals was the top choice for planning outcomes followed by predictable long-term energy policies, and reliable & resilient energy supply that consider electricity and fuels.

A new planning process must find a careful balance between centralization and decentralization, but also horizontal and vertical planning. There was some concern

among participants about how recent long-term energy plans have focused on least-cost solutions, thereby picking winners in a way that ignores other benefits. Some participants felt this approach was too narrow. Many participants in the roundtables and one-on-one engagements suggested that provincial priorities such as decarbonization, Made-in-Ontario, Indigenous Reconciliation, low-cost energy and local circumstances, could form a broader umbrella under which technology types and solutions are evaluated. To support this analysis, respondents suggested that the IESO and the OEB should be required to report regularly on the progress of decarbonization efforts in both the electricity and natural gas sectors. Open call respondents also pointed to the importance of considering broader benefits such as avoided damage from climate change related events, better health outcomes and regional job impacts as benefits in the energy transition. Some suggested that enabling planning agencies to consider broader economic and environmental benefits would allow for a more holistic view of the merits of different projects.

Broader socioeconomic factors may need to be included in the analysis and may go so far as life-cycle analysis. Some participants held the view that local planning and solving specific local problems (e.g., rural versus urban) may reduce the need to expand bulk generation. Participants also agreed that Indigenous values should be embedded in planning or guide planning.

Multiple respondents to the open call for submissions emphasized the need for energy planning to consider the impacts of climate change on electricity supply, and to proactively implement climate adaptation measures to ensure that assets and infrastructure are protected against climate hazards.

ENABLING REGULATION

Written submissions emphasized that regulatory barriers are inhibiting the effective and efficient planning and execution of clean energy projects. Respondents noted that approval timelines are too long to meet 2050 net zero targets, and that the province should streamline regulatory processes (including environmental and regulatory approval and oversight) to support timely build-out. Additionally, submissions suggested

that government should work to enable mechanisms for cost recovery of early investments, including siting.

COORDINATING RESOURCES FOR ENERGY SUPPLY, INCLUDING ELECTRICITY AND FUELS

ENERGY SOURCES

Participants discussed broadly what fuel and electricity types could be best suited to meet future needs and indicated that a more in-depth understanding of economic growth in Ontario would better identify supply needs and necessary coordination between resources. Some participants in the roundtables and one-on-one engagements agreed that decisions related to fuels and other energy sources, such as nuclear or renewables, must also be accompanied by accessible information about their impacts on near and long-term energy costs and environmental objectives so that customers can better understand the energy transition and their individual choices.

There were concerns about the potential use of new fuel types to meet energy needs instead of prioritizing using existing resources more efficiently. There was agreement among many participants that use of existing energy infrastructure and energy solutions (e.g., energy efficiency, demand side management, conservation, and natural gas infrastructure) should be optimized before any major investments in new infrastructure are made.

Fuels*	Number of Responses	Percentage
Hydrogen	60	77.9 %
Renewable natural gas	49	63.6 %
Natural gas	37	48.1 %
Biofuels	26	33.8 %
Wood and biomass	20	26.0 %
Others	13	16.9 %
Oil products	4	5.2 %
Propane	3	3.9 %

*Participants were able to select more than one option

Figure 4. Energy planning roundtable participants were asked to select three (3) fuels that have the most potential to be integrated into a long-term energy planning framework. Results shared back to the group, to stimulate dialogue. Response options were "Biofuels, Hydrogen, Natural Gas, Oil products, Propane, Renewable Natural Gas, Wood & Biomass, Others". A total of 212 responses were received from 77 poll respondents. Across all energy planning roundtables Hydrogen, followed by renewable natural gas and natural gas, were the most highly rated for their potential to be integrated into a long-term planning framework.

Written submissions noted that fuels and electricity demand and supply side alternative options (including emerging technologies) must be fully considered and evaluated, with valuation of generation options applying a full cost accounting. Respondents advised that long-term energy planning must account for the impact of transitioning away from natural gas as a primary stored form of energy for heating use. It was suggested that current energy planning lacks specific considerations for developing low-carbon capacity for building heating.

There was consensus that distributed energy resources (DERs) can play a vital role in decarbonization and reduce the need for new builds as electrification accelerates. Participants noted that, among other services, DERs can be used behind or in-front of the meter to provide capacity and voltage support and can help with capacity shortfalls in long-term procurements, thereby resulting in bulk system benefits in the form of deferred or avoided transmission and generation investments. However, to leverage DERs to achieve these outcomes, greater visibility into all assets was identified as a pre-requisite, including larger roles for local distribution companies (LDCs) in DER deployment. Through one-on-one engagements, some stakeholders mentioned that LDCs could

provide localized DER solutions if the regulatory environment was more flexible or permissible either under existing business models or a new distribution system operator (DSO) type of model. LDCs were identified as a key potential coordinator of local energy markets because their visibility into many DER assets connected to local distribution systems enables LDCs to load match nearby supply resources.

Many participants agreed that there is currently a lack of regulatory and system flexibility to integrate and maximize the potential of DERs and emphasized the need for more flexible market mechanisms. For example, open call respondents suggested that regulatory solutions to create space for DER aggregators to provide energy and ancillary services could help manage demand and promote the use of DERs. Others suggested that "distribution activity" definitions be expanded to allow LDCs to become DSOs and load serving entities. Facilitating greater data sharing and communication between DERs, LDCs, and the IESO, either directly or indirectly, was identified as a priority. It was suggested that other jurisdictions be looked to for lessons learned about the strategic deployment of DERs to ensure a cost-effective outcome.

STRANDED ASSETS

In the roundtable discussions, participants noted that a fear of stranded assets and significant costs should not delay bringing new assets online. Long lead times mean that proactively incurring some upfront costs on projects may be necessary to create the affordable system Ontario needs in the long term. Many noted that much more coordination and integration will be required for long-term planning of the energy transition to avoid stranding assets.

KNOWLEDGE SHARING AND COMMUNITY CONSIDERATIONS FOR PLANNING, INCLUDING INDIGENOUS PERSPECTIVES.

Overall, participants flagged the need for more and earlier engagement and consultation on energy planning. Participants particularly stressed the need for more and earlier

engagement and consultation with Indigenous partners. If long-term energy plans are to be successful, Indigenous people should be part of the plan, not just respondents. Accessible communications strategies will be required to educate customers about the costs of different energy sources, energy and financial savings opportunities and rationale for short- and long-term decisions (such as natural gas for peaking capacity and new nuclear to support bulk system reliability longer term). Knowledge sharing and engagement approaches that effectively communicate the risks and opportunities of the energy transition in plain language, and embrace diversity and inclusion, will help to ensure that public perception helps drive informed change. Early and frequent engagement will also help to reduce project lead times and expedite projects in the medium-term and long-term. There were also unique suggestions for how actors could better work with government. One participant suggested that the province set up a concierge service to help projects move through approvals, as is done in some U.S. states.

Involvement from Indigenous communities was identified as imperative to the transition. One suggestion that came up repeatedly from participants is that Indigenous partners should lead and fully participate in energy projects and project planning. This may include equity partnership models, with participants acknowledging that under current arrangements Indigenous partners may not receive returns on investment until the project has achieved completion years out.

PLANNING FOR EFFICIENCY AND CONSERVATION

The Panel heard recurring feedback that energy efficiency and conservation are crucial parts of the long-term energy planning discussion. One broadly shared opinion was that "we should be investing in all cost-effective efficiency opportunities before investing in new generation" and that we first need to focus on "getting energy efficiency and demand side management (DSM) right." Demand-side management was seen by some respondents as critical to help reduce peak demand, minimize the need for additional generation capacity and enhance overall system efficiency.

Respondents called for the province to speed up and expand energy efficiency, conservation, and demand management (CDM) programs, and to ensure that such programs and measures are included in long-term plans for decarbonization. Ambitious but realistic targets for energy conservation should be developed with sector stakeholders considering technical feasibility, cost-effectiveness and market dynamics. It was suggested that future studies and a dedicated innovation stream should focus on opportunities to enhance and accelerate energy efficiency efforts. Furthermore, respondents said that natural gas DSM and electricity CDM programs should be coordinated to optimize energy savings and emissions reductions.

Open call respondents also suggested the need for a LDC-centric CDM framework and suggested that LDCs are best positioned to deliver timely, targeted programs that align with system needs and optimize energy savings. Respondents called for expansion of CDM programs to include efficient electrification and fuel switching and emphasized the need for a "simple, certain and enduring funding model" to support such activities.

There were concerns that a focus on conservation could lower quality of life for some households, but participants largely saw conservation as a positive way to reducing energy waste.

INTER-JURISDICTIONAL CONTINUUM OF PLANNING (LOCAL AND REGIONAL TO PROVINCIAL AND FEDERAL)

Regarding the inter-jurisdictional continuum of planning, participants noted that policies can change or differ rapidly from government to government and between orders of government, which creates uncertainties for stakeholders in planning for the long term. A commonly expressed view was that plans must consider policies of all levels of government. Cooperation and alignment of targets will be critical to attract worldwide investment to Canadian jurisdictions. As a result, open call respondents suggested that Provincial officials should be actively engaged with their federal counterparts in the development and rollout of programs to ensure alignment on energy transition goals.

Open call respondents called for more direct involvement of LDCs and other local and regional stakeholders in planning and emphasized a need to develop integrated local energy system planning involving municipalities. They suggested that Ontario would benefit from a planning framework that leveraged bottom-up solutions to meet top-down targets set by provincial energy policy. Many municipalities have an interest in and recognize the importance of transitioning to a decarbonized future, but some do not have the capacity or resources (financial and non-financial) to succeed.

Indeed, through one-on-one engagements, the Panel heard that municipalities have a key role to play in the energy transition since they are one of the important communication links between business, industry, LDCs and the public. For this reason, some one-on-one participants suggested that municipalities be included in planning and development from the early stages. Furthermore, we heard that greater collaboration among municipalities would provide opportunities to share best practices, identify synergies, and become more economically competitive. Finally, there was interest in community level planning, including providing procurement powers to LDCs and cooperative enterprises as a model, for devolved and localized planning.

Interties with other jurisdictions and energy trading – importing and exporting – were raised by numerous participants. Some participants shared the view that interties could create more stability and opportunity in the system. They emphasized the importance of inter-jurisdictional collaboration between multiple orders of government to coordinate the development of energy infrastructure corridors and better integrate electricity systems. Others disagreed with this view, saying that this approach could lead to costly overbuilding with uncertain financing, as well as risks to supply, and concern about Ontario's ability to export surplus electricity at a profit.

KEY THEME THREE: GOVERNANCE AND ACCOUNTABILITY

Throughout the engagements, the Panel explored opportunities and challenges to improve energy sector governance and accountability. This included topics such as potential changes to agency mandates and regulatory frameworks, and new performance metrics for the province and energy agencies to support successful electrification and energy transition.

ADJUSTING MANDATES

ROLE FOR GOVERNMENT

Participants across all streams of engagements generally agreed that government has one of the most influential roles to play to support electrification and energy transition. Overall, participants shared the belief that analysis and future visioning is required to "connect the dots" for decarbonization. Government should have ultimate responsibility by setting clear policy direction, establishing goals and objectives and assuming responsibility for outcomes. However, participants across engagements generally agreed that government should not interfere in planning, procurement, or day-to-day operations. We heard that government should commit to not introducing legislation or issue directives without attaching a cost-benefit analysis and demonstrating that alternative approaches have been quantitatively and qualitatively considered.

Careful analysis is required to identify politically palatable options, disproportionate impacts, the potential for stranded assets, and unintended consequences. A clear vision will help guide short-, medium- and long-term actions.

Open call submissions stressed the importance of improving regulatory coordination between different orders of government to streamline project assessment and approval. It was suggested that aligning mandates between Canada, Ontario and provincial energy

agencies could remove duplication and expedite infrastructure development. Another suggestion from open call submissions was that governance frameworks should be adjusted to enable more local solutions and empower communities to implement them. Flexibility towards local solutions would respect local challenges, opportunities, interests, and cultures.

Some open call submissions suggested that the government needs to properly empower agencies to support the energy transition. One open call submission suggested that the government needed to provide the OEB with more appropriate tools to protect ratepayers through the transition.

MANDATE ENHANCEMENTS

When discussing agency mandates, numerous participants shared the view that increased line of sight into, and coordination within, existing agency mandates is needed. There were several comments about the need to future-proof mandates so that they do not require reactive pauses or redesigns. It was also suggested that more alignment is required across ministries as well as between the federal and provincial governments and agencies. Some participants were concerned that there is no regulatory body that deals with policy objectives other than reliability and affordability and suggested creating mandates to cover other sets of decisions (such as climate goals).

OEB MANDATE ENHANCEMENTS

Dual mandates for the OEB (sector regulation plus planning) were discussed with caution, as participants felt that regulators with dual mandates are generally less effective than those with single mandates. Instead, some participants recommended that clearer legislation and less backstop reliance on Ministerial directives would help agencies best achieve mandated objectives.

Participants' level of agreement on the following statement: the OEB's mandate is sufficient to meet future needs

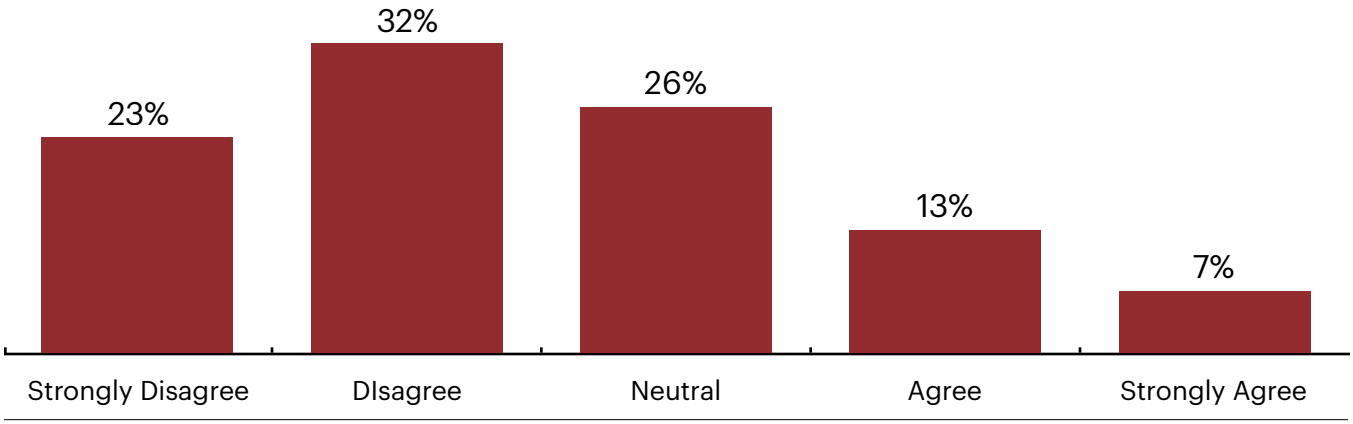

Figure 5. Governance and accountability roundtable participants were asked to consider the potential aims of the OEB including innovation, economic development, coordination and integration between electricity and natural gas systems, climate change mitigation, and Indigenous ownership and participation in energy projects. They were then asked to rate whether "the OEB's mandate is suitable for these aims and does not require changes." Poll respondents could only choose one option. Results were shared back to the group, to stimulate dialogue. Of the 29 respondents across both governance and accountability roundtables, most thought that the OEB's current mandate was not suitable for these aims while approximately one fifth of poll respondents indicated that the OEB is suitable for these aims.

As noted in the energy planning section, participants agreed that there is a need for mandates that support greater consideration of innovative technologies and solutions. Some pointed to the OEB Sandbox and other similar activities as examples of frontline innovation that are necessary to encourage fast feedback to let agencies "interpret the business they should be in." One participant suggested that mandates for information sharing be created so that market participants can be more informed when making business decisions. Roundtable participants felt that technology forecasts should be transparent for all system actors.

Various stakeholders' written submissions recommended broadening the OEB's mandate to include a review of electricity generation planning and procurement. Elements of this

broadened mandate also included expanding the regulatory oversight of the OEB to include hydrogen (supply, transport and storage), incorporating GHG emissions reductions as a core objective, meaningful Indigenous participation, as well as broader factors such as social and economic development.

One written submission emphasized the importance of the OEB ensuring that it has the authority to regulate the conduct of those who interact directly with traditional end use customers (e.g., contract rules, cancellation fees) where appropriate. This may be through new codes or amendments to the Energy Consumer Protection Act, 2010. Similarly, some participants suggested that the OEB should have more appropriate tools to act as the protector of ratepayers.

IESO MANDATE ENHANCEMENTS

Open-call respondents generally recommended expanding the IESO's mandate to also include emission reductions, as this would allow the IESO to consider decarbonization in conjunction with reliability and affordability. Indigenous ownership and equity participation in energy projects was also proposed as a mandate enhancement for the IESO. Stakeholders emphasized streamlining the IESO's regulatory, approval and permitting processes to reduce red tape and costs.

NEW ENTITY

The feedback pertaining to creating a new entity to lead the energy transition was decidedly split.

Some roundtable participants called for a separation between the development and oversight of long-term plans, but also shared the concern that a new planning entity could complicate the energy transition. Some participants felt that creating a new entity would lead to another layer of bureaucracy, red tape and it would take too much time to set up. Further, others felt that current agencies are adequate to support a transition and a new entity is not required.

On the other hand, participants highlighted that a new entity with more capacity to think about the world differently might be needed given the institutional memory and legacy of

existing agencies that might pose a barrier to this new kind of thinking. Yet others felt there is an opportunity to leverage pre-existing institutional arrangements with altered mandates.

A few written submissions from stakeholders called for the creation of a new entity to lead integrated energy planning. This entity's mandate was suggested to encompass electricity, space heating and cooling, transportation and community energy plans. A new entity could, in their view, ensure holistic, collaborative planning that includes all forms of energy.

Participants stressed the centrality of consultation in agency mandates and in government policy development. Participants felt that the most realistic level for engagement is the strategic level, when policy direction is being set but that the regulatory level, which can be quite technical, must have engagement as well. Overall, discussions emphasized the need for and importance of two-way dialogue, inclusion of diverse perspectives in consultation efforts, and adequate preparation for stakeholders and Indigenous partners to ensure meaningful participation.

OPPORTUNITIES WITHIN EXISTING MANDATES

Participants generally agreed, however, that there could be opportunities within existing OEB and IESO mandates to do more coordination between gas and electricity planning. It was suggested that greater coordination could occur between the IESO, natural gas companies and LDCs, as applicable, throughout all planning processes – bulk, regional and within distribution system planning.

EXISTING OEB MANDATES

It was noted that the OEB might be the best suited to take on a lead role in oversight of coordinated energy planning. In this example, participants also emphasized the need for more clarity and policy direction to help ensure planning consistency between the different organizations and their organizational cultures.

Participants' level of agreement on the following statement: the IESO's mandate is sufficient to meet future needs

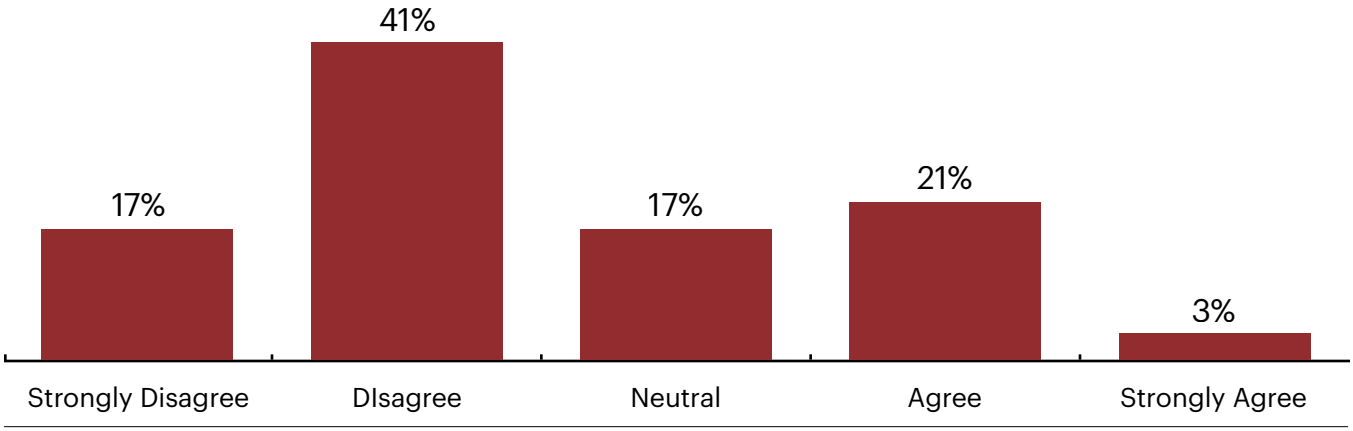

Figure 6. Governance and accountability roundtable participants were asked to consider the potential aims of the IESO including innovation, economic development, coordination and integration between electricity and natural gas systems, climate change mitigation, and Indigenous ownership and participation in energy projects. They were then asked to rate whether "the IESO's mandate is suitable for these aims and does not require changes." Poll respondents could only choose one option. Results were shared back to the group, to stimulate dialogue. Of the 29 respondents across both governance and accountability roundtables, most thought that the IESO's current mandate was not suitable for these aims while approximately one quarter of poll respondents indicated that the IESO is suitable for these aims.

One-on-one engagement participants also highlighted that they perceived a disconnect between policy objectives and regulatory implementation at the adjudicative level resulting in poor predictability regarding OEB decisions in some cases. Streamlining of the OEB's mandate with government policy direction was indicated as being an important solution and component of electrification and energy transition. Overall, clarity, accountability and transparency of direction were identified as crucial to enhancing the effectiveness of energy sector governance.

While most stakeholders recommended changes to the IESO's mandate, some submissions pointed out that the IESO (under the guidance of the Ministry of Energy) could play a larger role in planning and operationalizing the resources required for the

province's electricity needs, so long as the government sets forth clear policy objectives/ parameters for the IESO.

EXISTING LDC ROLES AND RESPONSIBILITIES

Engagement participants expressed different views concerning the role of LDCs in a decarbonizing energy system. Many respondents, across multiple avenues of engagement, expressed support for an expansion of the role of LDCs in the energy system.

In one-on-one engagements, multiple participants recommended that the province expand the role of LDCs to act as Distribution System Operators (DSOs). It was suggested that such a model would minimize customer energy costs, maximize the value of DERs and improve grid resiliency, while enabling customer participation. Another one-on-one engagement participant agreed that the DSO model provided significant benefits, adding that constructing local electricity markets and encouraging third-party competition to secure and dispatch DERs could decrease the need for major capital investments.

One open call submission suggested that the Ontario Energy Board Act, 1998 should be reformed to expand the role of LDCs in the system, creating more regulatory flexibility to conduct business activities aside from that of electricity distribution. On the other hand, some open call submissions suggested that the role of LDCs should not be expanded as this would give them an unfair market advantage, harming competition and increasing costs.

Open call respondents suggested that if the role of LDCs is expanded, then the framework for LDC remuneration needs to pivot toward a more incentive-based or outcome-based structure. LDCs, it was suggested, should be rewarded for delivering services at lower costs, not penalized through rates of return or revenue reduction. It was also suggested in one open call submission that LDCs required greater flexibility to make investments to maintain and enhance reliability for customers. Participants also noted that decisions concerning local infrastructure choices could be considered within specific regional plans, incorporating input from municipalities, LDCs, and other stakeholders.

CLIMATE TARGETS AND COMMITMENTS

Participants discussed climate targets and commitments. There was general agreement that GHG emission targets and supporting policy direction can help guide agencies and industry, inform decision making and goal setting and create forward momentum.

Many participants saw net zero by 2050 as inevitable and expressed that this target should be integrated into the energy planning process. Participants shared views that whole economy targets could constrain overall economic activity, but sector specific outcomes are still needed as they help to build accountability and provide guidance for technical planning.

Many participants believed that once the "bigger picture" and longer-term outlook for the transition was generally agreed upon, agencies and the private sector could make or clarify their business plans to operationalize the targets. Given the economy wide impacts of climate change, it was suggested that cross sector governance, manifesting in a central organizing document, could help to instill accountability and simplify tracking in the pursuit of net zero policies. Further, there was agreement that sector specific goals can drive incentives and encourage the private sector to reach targets. Participants stressed that businesses like to know how, where and when to invest based on a target and conduct their own planning accordingly.

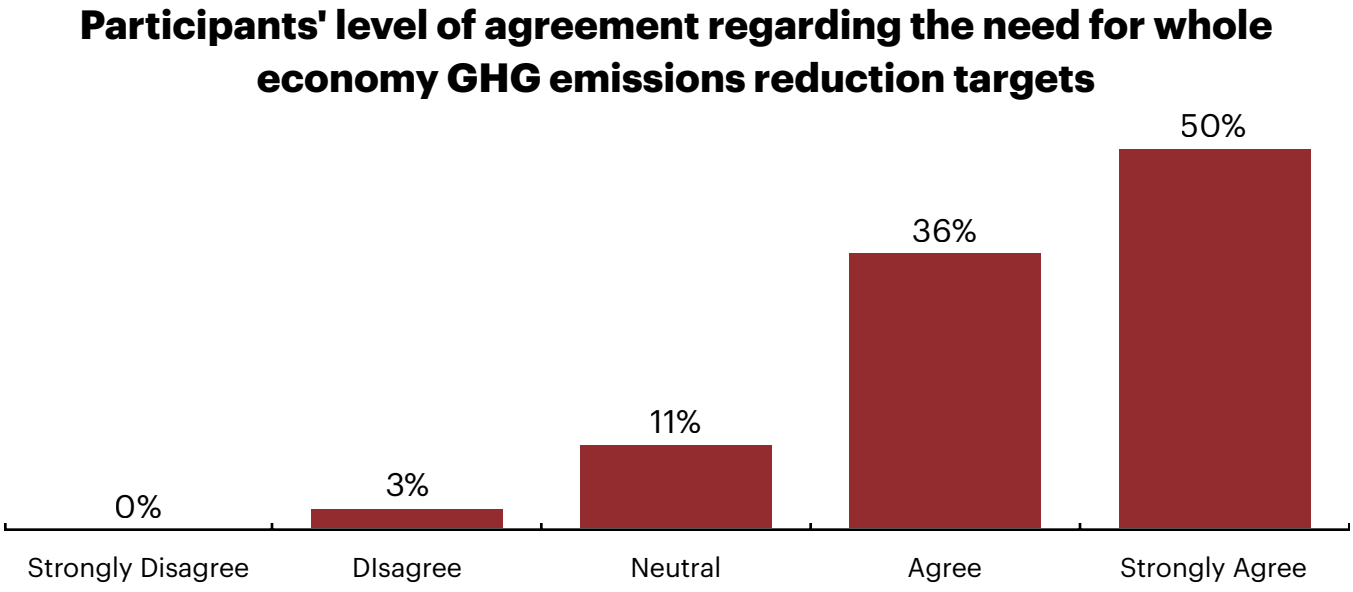

Figure 7. Governance and accountability roundtable participants were asked "[Whether GHG emissions targets] have a role to play in long-term energy planning." More specifically, participants were asked to rank the extent to which they agree or disagree whole economy GHG targets have a role to play in planning. Poll respondents could only choose one option. Results were shared back to the group, to stimulate dialogue. Of the 36 poll respondents across the governance and accountability roundtables, the majority thought there should be whole economy GHG targets.

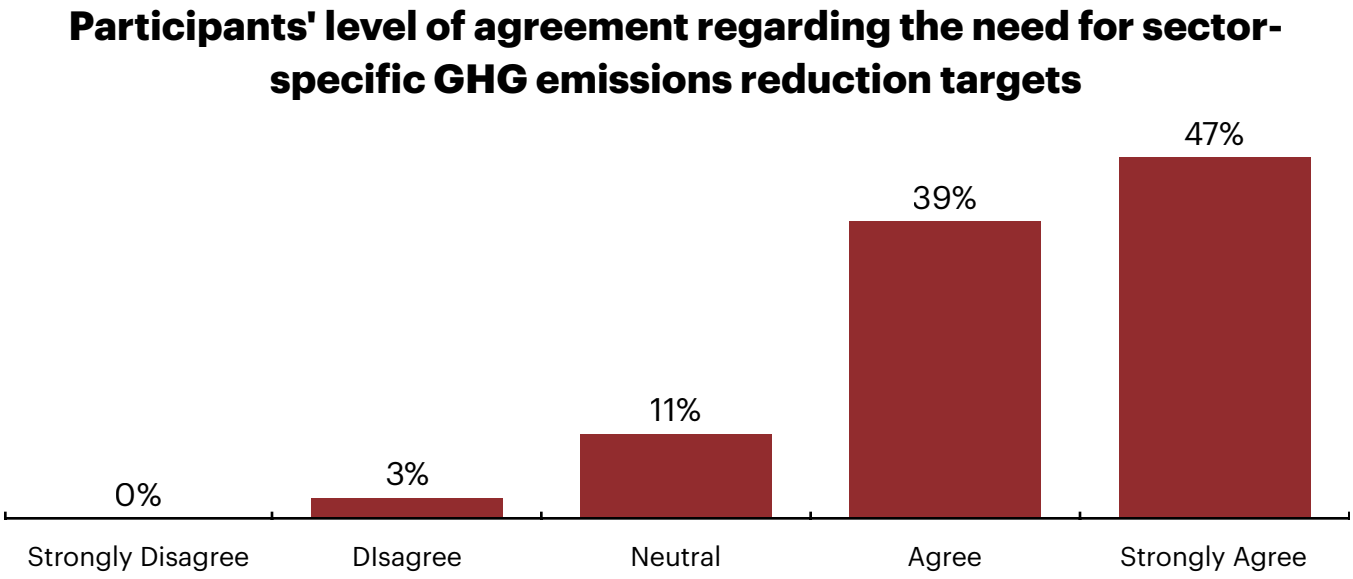

Figure 8. Governance and accountability roundtable participants were asked "[Whether GHG emissions targets] have a role to play in long-term energy planning." More specifically, participants were asked to rank the extent to which they agree or disagree sector specific GHG targets have a role to play in planning. Poll respondents could only choose one option. Results were shared back to the group, to stimulate dialogue. Of the 36 poll respondents across the governance and accountability roundtables, the majority thought there should be sector-specific economy GHG targets.

Some participants cautioned that it is the responsibility of the government to ensure that emitters outside of the electricity grid are included in target setting. Some participants said that targets must be outcome based and realistic, perhaps focusing on buildings, vehicles, the electricity grid and other key areas of focus. Roundtable participants were hopeful that clarity of targets, sooner rather than later, may reduce risk of stranded assets and create regulatory paths forward for new innovations.

To support the achievement of climate objectives, some one-on-on engagement participants noted that the OEB's mandate could be expanded to include GHG emission reduction or net zero objectives. It was suggested that this would enable the OEB to take

a more holistic view of sector regulation when setting "just and reasonable rates." Open call submissions also suggested adjusting the OEB's mandate to include specific references to reducing GHG emissions, arguing that this could "provide greater clarity and predictability" for the sector.

Some stakeholders cautioned against expanding the OEB's mandate to include emissions reductions, citing that the net-zero by 2050 goal is arbitrary or too aggressive, and that the government should avoid rushing to set targets without first developing a detailed, comprehensive strategy. In this regard, some written submissions suggested that climate change considerations (such as GHG emissions reduction targets) should be integrated into long-term energy planning and to use robust modeling/scenario analysis to help address uncertainties related to the energy system.

Participants also stressed the importance of alignment between provincial and federal targets, citing that targets are being established by both levels of government without clear indication of alignment and co-operation.

PERFORMANCE METRICS

Roundtable participants were generally of the opinion that "what gets measured gets done." There was consensus that parameters for measuring success were critical alongside targets. Some suggested metrics included affordability, sustainability and reliability. Other metrics discussed during roundtables included energy productivity, demand side management, stranded asset risk, counter factual scenarios and levelized lifetime cost in lifecycle analysis.

Open call submission and roundtable participants stressed the importance of affordability, reliability and sustainability in assessing the phase-out of natural gas. Respondents also highlighted the importance of transparency and publicly reporting performance metrics. Stakeholders suggested that there should be a process to confirm whether performance metrics are reasonable and achievable, with some suggesting periodic review cycles and revisions occurring every few years to ensure continued alignment with the changing landscape of the energy transition.

Some open call respondents expressed interest in the establishment of DER targets with a clearly defined implementation process for incremental capacity in Ontario's supply mix.

A submission noted that while metrics can clearly be used to measure the progress of government and agencies, a lot of the energy transition will be driven by the private sector and private capital, whose performance will be difficult to measure. This is particularly the case given that factors such as time, costs, regulatory efficiency and certainty impact the extent to which investment is attracted to the province. Multiple participants across engagements shared the idea that energy costs and/or incentives can be more competitive elsewhere, causing industry to leave or avoid entering Ontario. This line of thinking affirms the importance of the energy transition to Ontario's economy and its competitiveness compared to other economies.

COMPARABLE JURISDICTIONS

Participants generally agreed that governance approaches should consider best practices and lessons learned from comparable jurisdictions. These best practices include the importance of coordination, collaboration, and alignment between various stakeholders.

Open call respondents pointed to various jurisdictions related to their mandates and approach to climate target commitments. Jurisdictions that were mentioned to have passed legislation mandating climate change considerations in regulatory decisions included: Maryland, Colorado, Maine, Massachusetts, Washington, Hawaii and Washington D.C.

Open call respondents also pointed to jurisdictions such as New York, California, Michigan, Vermont and Quebec for policies and programs to approach a clean energy economy. Models from Australia, Minnesota and Sweden were mentioned as examples of jurisdictions that coordinated responses to energy system changes and achieving government targets.

One open-call submission cited British Columbia's legal recognition of Indigenous rights through a policy framework that prioritizes Indigenous involvement and leadership in the province's renewable energy economy and suggests that Ontario follows suit.

Some stakeholders pointed to European jurisdictions (such as Germany) utilizing the DSO model and suggest that LDC equivalents in said jurisdictions are not as heavily regulated, allowing them to integrate renewable energy and grid modernization.

ROLE FOR STAKEHOLDERS AND INDIGENOUS PARTNERS

The importance of having stakeholders at the table to determine what metrics are relevant was discussed. Overall, participants felt that metrics should be less prescriptive and more flexible – an "open" rather than "closed" list – to account for changes in future needs. A variety of participants stated that it is important to become more educated on the role of Indigenous community metrics and the role they can play in this process. One participant raised the need to embrace systemic thinking from an Indigenous perspective.

KEY THEME FOUR: ESTABLISHED AND EMERGING TECHNOLOGIES

Throughout the engagements, the Panel considered opportunities to improve frameworks, regulatory or otherwise, and address barriers to enable core energy technologies and fuel types in energy and other sectors such as buildings/housing and transportation. The Panel also explored topics such as how to address barriers to low-carbon fuels, distributed energy resources and hybrid-heating solutions.

TECHNOLOGY AND SECTOR SPECIFIC FEEDBACK

Participants across all streams of engagements gave a variety of suggestions for maximizing value and cost efficiency. Participants suggested that the complete carbon footprint, including the full life cycle and supply chain, in addition to cost-effectiveness of technologies, should be evaluated when making decisions about deployment. This can be done with the help of technology roadmaps to find synergies and efficiencies between technologies and to control ongoing costs in development and after deployment . Submissions stressed that frameworks for the deployment of emerging technology are critical for building investor confidence and technology adoption costs should be reduced.

LOCAL DISTRIBUTION COMPANIES (LDCS)

Participants acknowledged that transformation at the energy distribution utility level is critical to enable the transition (electricity and natural gas) given that utilities have direct relationships with most energy consumers. This included suggestions for the OEB to consider more innovative approaches to cost recovery to enable LDCs to make just and reasonable investments. Another frequent suggestion was that a distribution system operator (DSO) model could help to enable LDCs to remove connection barriers, enable the lowest connection costs and optimize the ability of DERs and non-wires alternatives (NWAs) to participate in existing and future energy markets, thereby supporting

electrification and energy transition objectives while maintaining reliability and safety of distribution networks and avoiding unnecessary costs.

In addition, virtual net metering is one technology that was repeatedly raised throughout the roundtables and submissions as participants believed that it could enable the effective contribution of renewables and distributed energy resources.

HOMES AND BUILDINGS

Participants across all streams of engagement shared their view that electrification of homes must be coupled with a reduction in energy demand to prevent overloading the grid. This requires finding pathways to make energy-efficient technologies affordable and accessible to the entire market. Participants saw a need to improve the effectiveness of such programs and allocate marketing budgets to engage with communities that can benefit the most. Retrofits, particularly deep energy retrofits using innovative methods like prefabricated panels, were deemed essential by roundtable participants for reducing energy demand and improving the efficiency of buildings. In addition, participants saw a need for intervention to bridge the gap between developers and builders to ensure that energy-efficient technologies are integrated from the beginning of construction. Multiple participants noted that full electrification of building heat in the near term will be extremely costly, and that gas backup is a good approach. Incremental change in buildings and homes – to install technologies such as hybrid heating, heat pumps and electric appliances – would be best integrated with backing from municipal bylaws and financial incentives. A credible net metering model was also seen as crucial to roundtable participants to ensure fair compensation for energy contributions and charges for consumption.

HYDROGEN

Participants across all streams of engagement saw hydrogen as a viable opportunity for the province, given Ontario's extensive natural gas infrastructure that could be converted to use hydrogen over time. Participants also noted the potential to generate hydrogen from off-peak electricity or unused hydroelectric power. However, in the roundtables, there was disagreement on whether hydrogen should be utilized as a potential storage medium or a "fuel type" and the cost-competitiveness of hydrogen was not universally

agreed upon. Some participants suggested that Canada and Ontario need to work together to de-risk low-carbon technologies, including creating a strong domestic supply of hydrogen in the province. While hydrogen as a fuel is not new to the industry there is also need for further education programs to ensure public support and social acceptance of Ontario's Low-Carbon Hydrogen Strategy, and to better understand how hydrogen can be used to support grid decarbonization.

TRANSMISSION INFRASTRUCTURE

A common theme across engagements and submissions was that upgrading transmission lines in key areas is important to support the energy transition by spreading the benefits of new technologies around the province and potentially adjacent regions. Transmission enables the interconnection of markets allowing for reduced costs and increased reliability; it can connect different regions allowing for flatter load curves, provide energy access leading to social benefits, and allows more renewable connections. Grid limitations, infrastructure constraints, supply chain challenges, and availability of transmission lines need to be addressed.

ELECTRIC VEHICLES

There was some agreement that the electrification of transportation requires a comprehensive approach, with consideration of solutions such as vehicle-to-grid, charging networks, and electrification of certain vehicle fleets. Government and regulators can support EV adoption by creating policies that eliminate or mitigate barriers to EV charging such as designing EV-specific delivery cost rates, harmonizing codes across jurisdictions, and encouraging interoperability to facilitate seamless adoption across all charging solutions. Challenges remain for long-haul trucking due to current battery limitations. Some participants suggested empowering utilities to make investments in the distribution system in advance of having firm customers in place to ensure the distribution system can keep pace with demand for electric trucking. It was suggested that utilities could better support EV charger adoption by streamlining their connection process and shortening timelines for installations. Logistics for electrification of medium- and heavy-duty electric vehicles was another area where more work is needed.

While out of scope for the Panel, numerous participants and submissions indicated a need for skilled labour in deploying emerging technologies, and government support for training programs can help address this labour shortage. It was noted that many municipalities have few residents, and fewer engineers. This makes planning, financing and implementing decarbonization projects very difficult.

EXPANDING NUCLEAR ENERGY

Numerous participants and submissions shared the view that Ontario's nuclear fleet should be expanded and continuously modernized. Participants saw a "Made-in-Ontario" advantage for nuclear energy, particularly with OPG positioning itself as a global leader in small modular reactor (SMR) deployment, and that this should be fully leveraged. Participants highlighted the opportunity of a long-term nuclear build program that maintains a steady nuclear supply chain, including skilled trades and professionals, while pursuing nuclear technologies that provide the lowest cost and risk.

DISTRICT ENERGY

One-on-one engagement participants highlighted the potential value of expanding the use of district energy systems utilizing established and emerging technologies, including deep lake cooling, industrial heat waste recovery, geo-exchange and district heat pumps, among others. It was suggested that such systems and technologies presented significant opportunities to enhance energy efficiency, reduce total energy demand and mitigate carbon emissions in all communities, particularly in rapidly densifying downtown cores. Participants noted that early-stage engagement on community and infrastructure planning, clear, long-term targets for energy efficiency objectives and engagement with diverse stakeholders would help maximize the potential of district energy solutions.

SOCIAL, INDIGENOUS, AND COMMUNITY ACCEPTANCE

To ensure social, Indigenous and community involvement, some participants stressed that consideration should also be given to co-benefits of decarbonization, such as

addressing health concerns and social issues. Approaches to gaining public involvement should respect community diversity and pluralism. Participants indicated that different communities may require tailored strategies and communication styles. Some participants flagged the risk of misinformation and suggested that government work with industry associations to build trust and credibility through public education about the benefits and risk of new technologies.

Participants across engagement streams stressed the importance of a multi-pronged approach to improve Indigenous engagement and community involvement. Participants noted that involving Indigenous and non-Indigenous communities in decision-making and building long-term partnerships with communities would be necessary to improve Indigenous engagement and community involvement in energy planning and project development throughout the energy transition. As previously noted, affordability is a critical factor for public acceptance of new technologies. Special attention should be given to Indigenous, northern and remote communities to avoid leaving them behind in the transition. Participants also recommended targeted investments in the north for appropriate technologies.

REGULATORY AND POLICY FRAMEWORK IMPROVEMENTS

Overall, participants shared the belief that government plays a unique role in ensuring a reliable, affordable and secure energy supply. Government should facilitate and develop policies but not control market operations. This makes collaboration and coordination between different levels of government necessary for an effective energy transition. Regulatory frameworks should be flexible, streamlined and consistent to accommodate new technologies and market innovations.

Numerous participants across all streams of engagement recommended that industrial policy and competition or antitrust policies should be considered to support emerging technologies. Government funding, incentives, and subsidies can accelerate the adoption of new technologies. Providing financial support for renewable energy projects, EV charging networks, and energy efficiency programs is essential. Ensuring a level

playing field for all technologies while considering social responsibility standards are important. An aspect of this is ensuring harmonized standards for infrastructure to encourage the widespread adoption of emerging technologies, such as EV charging networks. Many participants suggested that a technology-agnostic approach is beneficial, with the focus on achieving the electrification and energy transition goals rather than "picking winners."

A recurring theme of the discussions and submissions was that bold government actions and risk-taking are required to advance in the right direction and mitigate climate change risks. Carbon capture, utilization and storage (CCUS) was repeatedly mentioned in the open call submissions. Submissions suggested a streamlined permitting regime for approving CCUS which would encourage commercial scale projects.

MARKET ENTRY AND PARTICIPATION OF NEW TECHNOLOGIES: TIMING, BENEFITS AND CHALLENGES

Participants across all streams of engagement saw opportunities and challenges for market entry of emerging and established technologies. It was commonly stated that the adoption of new technologies is constrained by outdated regulatory codes and policies that need to be updated. Early adopters face challenges due to regulatory barriers, which hinders the integration of new technology into existing systems. Also, stakeholders noted that transparent access to data and information on the success of technologies aids in decision-making and encourages adoption. Consumer choice was emphasized in the written submissions as an opportunity to provide options to support the energy transition.

Some participants shared the view that governments need to take the "long view" on technologies and the energy transition, as these technologies are expensive in terms of money and time. There was general agreement that government should not select technologies but let the market determine success. In addition, open call submissions suggested that no regrets projects should be expedited.

Participants shared the belief that for long-term planning for energy technologies, linear assumptions about technology improvements should be avoided. Participants anticipate that technology trajectory curves will likely bend much faster given our environment, so "the change in the next 30 years is not going to be like the change in the last 30 years." Concerns exist about large-scale lock-in with certain technologies, which could lead to stranded assets and risks for stakeholders.

KEY THEME FIVE: COMMUNITY AND CUSTOMER PERSPECTIVES, AFFORDABILITY AND ENERGY SECTOR OBJECTIVES

Community and customer perspectives play a pivotal role in shaping the energy transition. Throughout the engagements, the Panel explored opportunities to balance energy system costs, energy reliability and climate objectives while considering the needs and interests of Indigenous communities, rights-holders and the general public.

CONSIDERATIONS FOR AFFORDABILITY

Many participants noted that affordability of the energy system will be one of the most important priorities for consumers through the transition; however, they shared different opinions on how to attain these objectives. Overall, roundtable participants agreed that the transition will place pressure on affordability that needs to be addressed. Ontarians would not give a "blank cheque" to finance the energy transition – they would want clear information about energy costs and other public priorities, such as healthcare.

Climate change and electrification may reduce the lifespan of some assets and require them to be replaced more quickly, placing additional pressures on affordability. Some participants noted that the lowest price is not always the best option, and that there may need to be a "balanced scorecard" or priorities, such as reliability, safety, Indigenous participation and environmental impacts. It was also noted by multiple open call submissions that affordability might differ based on regional and other characteristics – energy costs are higher for those who live in remote communities or those who have chronic illnesses that lead to higher energy needs.

There was a debate in one roundtable about willingness-to-pay. Some participants suggested that the government should conduct a customer survey, across the province, to see how much more customers are willing to pay to support the transition. Other participants noted that perspectives of non-respondents might not be accounted for in

such surveys and for this reason surveys can be misleading, and that it is too early in the energy transition to poll Ontarians on energy costs.

Overall, participants agreed that in many cases consumers cannot make energy-related assessments on their own, which is why they rely on governments and agencies to make informed decisions on their behalf. Examples of government decisions may include rate-smoothing approaches for big investments, different rate structures that influence demand patterns or provide more customer choice, conservation and demand management and supply options that consider the unique circumstances of remote communities (e.g., better integrated of heat and power needs).

Additionally, multiple open call submissions noted that the energy transition, including investments in new energy infrastructure should be increasingly funded from the tax-base to maintain long-term energy equity, particularly for communities experiencing energy poverty or high electricity distribution costs related to electrification and the energy transition. Some participants noted that transitioning costs to the tax base could result in unintended consequences in the form of reduced cost transparency and a weakened business case for the implementation of demand side energy efficiency programs for industrial and residential consumers. Overall, there was agreement on the critical role of government in helping vulnerable and marginalized communities to be part of the energy transition.

It was also noted that proper pacing of the transition would be important to keep costs low for residential and commercial consumers, as well as industrial consumers which could become uncompetitive if the transition moves too quickly resulting in large increases in costs or moves too slowly resulting in companies locating to jurisdictions that are transitioning more quickly.

CUSTOMER CHOICE

Multiple one-on-one engagement participants noted that Ontario should decarbonize in a cost-effective manner that meets customer choice, reliability and affordability objectives. Decisions should not limit low-carbon and renewable fuel options as tools to achieve energy affordability, accessibility and to maintain customer choice.

Some areas where it was noted that consumers should have choice include:

- The ability for residential and small business consumers to offset emissions from their energy use.

- Ability to use lower-emissions fuels, where natural gas is not available to support reliability.

Options for local generation and storage including use of renewables, distributed energy resources and district energy systems to support reliability. This includes updates to the net metering regulation to allow for more effective sharing of excess power back through the grid.

Further, there was agreement that all customers will need to understand the energy transition, including costs and savings opportunities available to them, so that they can make informed choices. Policy strategies should ensure all customers can participate in and benefit from transitioning regardless of their circumstances.

OPTIONS TO SUPPORT A COST-EFFECTIVE ENERGY TRANSITION

Multiple participants made comments on financing the transition, namely regarding the need for financing for affordability measures for residential, commercial and industrial customers. A participant shared that Ontario could learn from other jurisdictions (like Australia, the European Union and the U.S.A.) where energy affordability services have emerged. This includes cooperatives that help individual households to afford energy efficient equipment. Some participants said that there needs to be new programs specific to renters, in addition to homeowners, for energy efficiency upgrades so that landlords do not simply pass on costs for upgrades onto renters. Participants flagged that uptake for IESO retrofit programs were low in Indigenous communities compared to municipal programs and suggested the need for partnership between provincial and federal government on this matter as it is less likely that there is a locally owned utility on-Reserve that can assist with programming.

As discussed in more detail in the 'Focused Feedback on Indigenous Energy Matters' section, enabling access to financing can help lower costs for Indigenous equity partnerships. More broadly, open call innovative funding mechanisms could help accelerate the energy transition while minimizing the impact of the transition on taxpayers and customers. These include mechanisms that facilitate the mobilization of financial resources for renewable energy projects, energy efficiency initiatives and community-led energy programs.

Participants disagreed about which market structure for the procurement of electricity resources would lead to the most affordability for customers. Some participants saw virtue in allowing municipalities to procure renewable energy as they see fit with DERs, while others suggested a single buyer (e.g., the IESO) would create the most advantageous price position – especially for balancing local, regional and provincial needs at the same time. A participant pointed out that investing in demand reduction could make energy more affordable while creating a new set of economic development opportunities. Participants did agree that municipalities are closer to the needs in their communities and should at least be given some ability and resources to address their own energy-related pain points.

INDIGENOUS AND LOCAL COMMUNITY ENGAGEMENT, TRANSPARENCY AND SOCIAL LICENSE

Roundtable participants stressed the importance of Indigenous and local community engagement, transparent communications and social license to enable an effective transition.

INDIGENOUS CONSULTATION AND ENGAGEMENT

Working with diverse Indigenous partners is integral to supporting more holistic and integrative approaches, and to meaningfully include Indigenous perspectives throughout project development, planning and decision making. To do this, participants largely agreed that long-term funding is important to build and maintain capacity, especially considering the length of time it takes to build relationships. Participants noted that as

energy projects and the energy transition advance, more engagement and consultation with Indigenous partners will be required. Participants noted that engagement and consultation will progress more effectively and expediently where there has been an investment in relationship and capacity building with Indigenous communities. This should be seen as a key aspect of reconciliation that improves energy democracy and supports the rapid pace of transition and electrification.

Equity participation and capacity building of Indigenous partners was a theme that came up frequently across all roundtable and one-on-one engagements. A participant clarified that equity participation should not only be available to Indigenous communities, but to any community affected by a project. This was noted partly because project ownership and funding are perceived to buy attention, improve the community's energy literacy, and increase participation in decarbonization initiatives. To make this a reality, a participant proposed that such actions should be a prerequisite of a proponent receiving a community's support.

ENGAGEMENT AND EDUCATION

Many engagement participants' open call submissions noted key principles that are needed to bring consumers and citizens along through the energy transition. These principles include:

- **Transparent communication and public education** about the true costs of energy and opportunities and challenges related to electrification (including safety considerations for emerging technologies, and education regarding cleaner appliance alternatives).

- **Customer participation** is necessary to create a sense of responsibility and ownership over the success of the energy transition and allow for choices that reflects consumer needs.

- **Consistent, meaningful, and accessible engagement** is important from the beginning of any energy planning process; whereby accessible engagement

processes consider access to reliable internet and distance as part of any virtual and/or in-person engagement process.

- **Community-level engagement and empowerment** to make environmental and culturally appropriate community energy planning decisions.

- **Expert evidence regarding the direct and indirect costs and risks of climate change and climate change adaptation (including inaction)** should be considered as part of energy planning, including at the local level.

On the topic of energy literacy, participants shared interest in building more widespread energy literacy amongst stakeholders and the incremental nature of this task. They said that efforts should focus on community leaders, key messages for future energy planning and providing accessible public resources for customers to access to do their own research. These resources should be as "jargon-free" as possible. Multiple participants shared the insight that demonstrating new or better processes to citizens helps to ensure buy-in, for example, demonstrations and tours that show how projects work can be useful. Overall, better engagement needs to accommodate transparent and inclusive communications for different information and relationship needs.

PROJECT-SPECIFIC ENGAGEMENT

When engaging on projects, roundtable participants were clear that both time and care must go into the process. This would involve providing ample time for communities to prepare and provide their input, as they may also be involved in other engagements or consultations. As a baseline, participants suggested that accurate information on all potential options, including costs, should be provided on any project. The intent for engagements should be made clear and engagements should foster trust through a flexible pacing and reasonable location of meetings – especially for Indigenous and remote communities.

Roundtable participants acknowledged that the paradigm shift of distributed energy resources and two-way flow is already a significant mindsight change for planners and, equally so, for customers. This insight led to a discussion about the potential need for

more education and relationship building to increase capacity for new types of network projects and garner more customer choice.

ACHIEVING ENVIRONMENTAL AND CLIMATE OBJECTIVES

Overall, roundtable participants felt that the province must do a better job of visioning and communicating environmental and climate objectives. Participants agreed that there is not currently a vision or journey for the energy transition that communities can look to for guidance or understanding. Further, numerous participants saw the goal, vision, and journey for Ontario as being to achieve net zero by 2050.

CONSUMER PERSPECTIVES ON RELIABILITY, RESILIENCY, AND ADAPTATION

CONSIDERATIONS FOR RELIABILITY AND RESILIENCY

Roundtable participants shared their views of consumer perspectives on reliability, resiliency and adaptation. Grid resilience is very important to communities and customers. Customers are most anxious and frustrated when faced with severe longer-term outages. More energy alternatives in case of an outage were noted as being required, especially during the winter. Some one-on-one engagement participants raised that reliability is an especially large concern in rural and remote areas as those areas tend to be dependent on a single transmission line. They also noted that reliance on electric heat increases customer sensitivity to outages, in both rural and urban settings, and that electrification of transportation will only compound this sensitivity.

There were comments on the advantages of heat pumps, in particular, from both climate and energy efficiency perspectives; however, various participants argued that heat pumps may not be viable in all areas of the province. Participants noted that back-up power, especially for heating, must be guaranteed, especially in remote communities given the potential for outages. Some participants clarified that for some communities

this may mean that propane or diesel power should be accepted as back-up for the foreseeable future to ensure a steady supply of power.

Some open call submissions noted that it might be helpful for communities to establish sustainable community visions that reflect environmental performance, local energy and economic opportunities, and cultural values or priorities. Such a vision, established by or with the community (with assistance on technical options), could lead to longer-term changes to housing types or densities that are more economic and sustainable, yet respectful of community values and priorities.

Some one-on-one engagement participants suggested that the OEB could provide greater certainty and accountability to regulated entities in terms of necessary investments in climate change mitigation and adaptation.

In addition to back up power for heat, some participants felt that DERs provide opportunities to pursue improved resiliency. Engagement participants and open call submissions noted that DERs have the potential to help consumers meet their own energy needs and contribute to the grid and added that barriers to DER implementation within communities and at the local level must be reduced. Further, these participants felt that LDCs should encourage DER implementation in local areas to improve the resiliency of local grids and reduce the amount of energy imported by transmission lines. A participant noted that DERs can create opportunities for "wins" for consumers, and that demonstration projects can be helpful in achieving community buy-in and building relationships. The resiliency benefits for natural gas were also mentioned, given that natural gas pipes are located underground and may be able to better withstand certain types of weather events.

GOVERNMENT ROLES TO SUPPORT AN AFFORDABLE ENERGY TRANSITION

INFORMED PROGRAM DEVELOPMENT

Participants felt that government should do thorough research and engagement to ensure that programs and funds are designed with an accurate understanding of industry processes and realistic timelines for approvals. Participants felt that incentives available for new projects could be communicated more clearly. Participants suggested that without this understanding proponents may be reluctant to apply for government programs. It was also noted that there is room for improvement by the province and the federal government in the provision of funding to support residential customers with the upfront capital costs associated with taking action to decarbonize. Some suggestions for incentives included those for fuel switching to heat pumps, competitive EV pricing, low-carbon, energy efficiency upgrades and rooftop solar installations.

Support for community level energy planning was also called for by participants. Participants acknowledged that a one-size-fits all approach for regulations would be problematic as each community has different needs. Interestingly, one open call submission suggested that Ontario consider aligning its Emission Performance Standard program with the range of compliance options enabled under Alberta's Technology Innovation and Emissions Reduction (TIER) regulation. The TIER regulation enables regulated facilities to meet their compliance obligations using emission performance credits or emission offset credits. Emission performance credits represent unused emission allowance from previous years. Emission offset credits are generated by projects which have voluntarily reduced emissions, meet TIER regulation requirements, and are listed on the Alberta Emission Offset Registry.

KEY THEME SIX: FACILITATING ECONOMIC GROWTH

The Panel explored opportunities to advance Ontario's participation in green global supply chains and facilitating cross-sector collaboration in energy-intensive sectors through the engagements.

OPPORTUNITIES AND TOOLS TO SUPPORT ECONOMIC AND SUSTAINABLE DEVELOPMENT IN THE ENERGY SECTOR

Participants across all streams of engagement shared various ideas about opportunities and tools to support economic and sustainable development in the energy sector. Many agreed that the difficult balance between sustainability, reliability, and affordability (otherwise known as the 'energy trilemma') is a useful way to conceptualize the challenge at hand. Like feedback from other roundtable topics, participants indicated that a whole-of-government approach is required along with clarity of priorities to create regulatory certainty for industry. Participants stressed that Ontario should not take for granted its clean energy advantage as other neighbouring jurisdictions invest in decarbonizing their electricity system. Sending a positive message to investors and expanding the Made-in-Ontario supply of clean electricity was identified as essential to unlocking future growth: good jobs, energy security, high-quality investment.

Participants stressed flexible approaches amid the uncertainty of the energy transition. They also suggested that plans be multi-step operations that are measured, paced and predictable and leverage near-, mid- and long- term opportunities. Some participants noted prioritizing long lead time assets in this context.

Some participants noted that a clean electricity supply is necessary for industries to be competitive amid new environmental, social and governance (ESG) measures – especially for leading edge green companies. Participants from heavy industry specifically noted that ESG – alongside affordability and reliability – will be critical for retaining industry.

KEY THEME SIX: FACILITATING ECONOMIC GROWTH

Participants shared a variety of examples of tools for economic development, such as the importance of building forums and tables to bring actors together, specifically regional tables. There was suggestion that Ontario should build on its history of community energy plans with legislation and government direction to build community energy plans into regional planning. Participants also saw a need to ensure there is an even playing field for new, innovative, and cost-effective actors to enter Ontario markets, specifically for transmission.

Participants across all engagement streams identified the multiple emerging economic opportunities related to the energy sector; some of those opportunities include:

- Expanding the clean energy grid via nuclear and hydro sectors, DER and battery manufacturing, which is attractive for industrial investment.

- Supporting LDC's capability to facilitate local economic development.

- Moving rapidly to build out wind and solar industries/supply chains, create conditions for economies-of-scale, and reduce reliance on imports given Ontario's expertise in wind and solar and cost competitiveness of the technologies.

- Harnessing mineral opportunities in the north and northwest by developing a robust electricity supply to the region through connections to the bulk grid and development of renewables.

- Producing biofuels and renewable fuels to meet domestic requirements, and to reduce fuel security and employment risks, given that some long-term contracts for Canadian agricultural and forestry feedstock to supply U.S. biofuels producers are being executed. Near term reliance on natural gas may reduce volatility.

- Demonstrating/deploying technologies to help activate capital and develop opportunities, for example, through the establishment of hydrogen hubs in regions such as Sarnia-Lambton, Hamilton, Durham Region, etc.

FINANCING AND FUNDING TOOLS TO SUPPORT COMPANIES THROUGH THE ENERGY TRANSITION

Participants suggested that certainty in the energy transition is critical, especially regulatory certainty, and should be created by government. Policy reversal was raised as a threat to the energy transition and participants stressed the need to reduce this risk. Participants shared that there seem to be more decarbonization incentives for producers rather than the demand side, and that this should be more balanced.

Regarding energy efficiency and conservation, participants suggested that the government needs to create an environment where industries can invest in upgrading their equipment to more energy efficient processes, not only to reduce energy consumption but also to secure continued operation of the facilities and associated jobs for the long-term. This environment needs to include changes to the tax regime, depreciation treatment, capital cost allowances, and the recommendation that these changes should be enshrined to provide certainty.

Participants suggested that government needs to develop creative ways to provide loans, incentives or otherwise reduce the burden of the transition for private companies, but there was disagreement about whether Ontario should be focused on investing in organizations that are already present in the province or attracting new ones. Some participants felt that smaller, frequent pilot projects could improve investor confidence. Regarding labour (which is out of scope for the Panel) multiple participants stressed that the lack of skilled trades for the transition could lead to issues. They stressed that there are a finite number of workers which the entire energy transition industry is competing to acquire; this pool needs to be expanded.

Furthermore, some participants suggested the need for mechanisms to support industry growth like the U.S. Inflation Reduction Act (IRA). Some participants recommended Ontario explore tax programs like the U.S. rather than different funding programs that may not be as competitive or automatic – tax incentives are applied when an entity meets the criteria and files taxes, whereas funding envelopes require in-year-out-year assessments and approvals from government or agencies. Overall, it was noted that trade

exposed industries could be subject to significant shifts in available work if Ontario does not keep pace with other jurisdictions in incentivizing economic development.

GOVERNMENT-LED COLLABORATION AND COORDINATION (FEDERAL, PROVINCIAL, MUNICIPAL AND AGENCIES)

Participants across all engagement streams identified that regulatory permitting issues create uncertainty for business investment. They felt there is a need for greater harmonization between federal and provincial rules to avoid duplication and lengthy processes, particularly for projects with long lead times. Participants shared that because there are many actors in the Ontario system, it is challenging for consumers to navigate when really, they want "one stop shopping."

There was disagreement among participants regarding the degree to which authority should be passed to community or local levels. Some participants shared that it is important that decision making be dispersed to a lower level because they understand their local issues and how to address them. Some participants advised that a balance between different levels of governments is especially necessary for balancing the build out of DERs to ensure stability of the centralized grid and avoid stranded assets while building optionality.

APPENDIX A: LIST OF CONTRIBUTING ORGANIZATIONS AND INDIVIDUALS

OVERVIEW:

Below is the list of stakeholders and partners that the Panel has engaged with from March to July 2023.

STREAM ONE: ONE-ON-ONE AND GROUP-STYLE STAKEHOLDER ENGAGEMENT PARTICIPANTS:

1. Advanced Energy Management Alliance (AEMA)
2. Alectra Utilities
3. Association of Major Power Consumers in Ontario (AMPCO)
4. Association of Power Producers of Ontario (APPrO)
5. Atlantic Canada Opportunities Agency (ACOA)
6. Attawapiskat Power Corporation
7. Bruce Power Ltd.
8. Canadian Fuels Association
9. Canadian Hydrogen and Fuel Cell Association (CHFCA)
10. Canadian Nuclear Association (CNA)
11. Canadian Propane Association (CPA)
12. Centre Wellington Hydro
13. ChargePoint
14. City of Hamilton
15. City of Mississauga
16. City of North Bay
17. Concentric Energy Advisors
18. Electricity Distributors Association (EDA)

19. Elexicon Energy Inc.
20. Enbridge Gas Inc.
21. Enova Power
22. Essex Powerlines Corporation
23. Former Under Secretary, Energy & Climate Solutions for Massachusetts (Judy Chang)
24. Energy Storage Canada
25. Environment and Climate Change Canada (ECCC)
26. Fort Albany Power Corporation
27. Fort Frances Power Corporation
28. Fortis Inc.
29. Halton Hills Hydro Inc.
30. Hydro One
31. Hydro One Remotes
32. Hydrogen Business Council
33. Imperial Oil
34. Independent Electricity System Operator (IESO)
35. Industrial Gas Users Association (IGUA)
36. Infrastructure Canada
37. Innovative Research Group (Greg Lyle)
38. Kashechewan Power Corporation
39. Lakeland Power Distribution Ltd.
40. MaRS
41. Municipality of Kincardine
42. Municipality of Middlesex Centre
43. Natural Resources Canada (NRCan)
44. Newmarket-Tay Power Distribution Ltd.
45. Niagara-on-the-Lake (NOTL) Hydro
46. North Bay Hydro Distribution Ltd.
47. Oakville Hydro Electricity Distribution Inc.
48. Ontario Chamber of Commerce (OCC)
49. Ontario Energy Association (OEA)
50. Ontario Energy Board (OEB)
51. Ontario Power Generation (OPG)
52. Privy Council Office (PCO)
53. Region of Waterloo
54. Renewable Industries Canada (RICanada)
55. Synergy North Corporation
56. Toronto Hydro
57. Town of Tecumseh
58. Township of O'Connor

STREAM TWO: ONE-ON-ONE AND GROUP-STYLE INDIGENOUS ENGAGEMENT PARTICIPANTS:

1. Anishinabek Nation
2. Conservation on the Coast
3. First Nations Major Projects Coalition (FNMPC)
4. Five Nations Energy Inc.
5. Grand Council Treaty #3
6. Haudenosaunee Development Institute (HDI)
7. Indigenous Clean Energy
8. Maawandoon Inc.
9. Métis Nation of Ontario (MNO)
10. Mississaugas of the Credit First Nation (MCFN)
11. Mohawk Council of Akwesasne
12. Six Nations Elected Council
13. Three Fires Group
14. Wataynikaneyap Power

STREAM THREE: ROUNDTABLE ENGAGEMENT PARTICIPANTS:

1. Advanced Biofuels Canada
2. Associated Canadian Car Rental Operators (ACCRO)
3. Association of Major Power Consumers in Ontario (AMPCO)
4. Association of Municipalities of Ontario (AMO)
5. Association of Power Producers of Ontario (APPrO)
6. Atomic Energy of Canada Limited (AECL)
7. Borden Ladner Gervais LLP (BLG)
8. buildABILITY Corporation
9. Buildings Ontario Transformation Hub
10. Canadian Environmental Law Association (CELA)
11. Canada's Energy and Utility Regulators (CAMPUT)
12. Canadian Association for the Club of Rome (CACOR)
13. Canadian Biogas Association
14. Canadian Climate Institute
15. Canadian Home Builders' Association (CHBA)
16. Canadian Housing Evidence Collaborative (CHEC)
17. Canadian Hydrogen and Fuel Cell Association (CHFCA)
18. Canadian Nuclear Association (CNA)
19. Canadian Nuclear Safety Commission (CNSC)
20. Canadian Propane Association (CPA)
21. Canadian Renewable Energy Association (CanREA)
22. Canadian Steel Producers Association (CSPA)
23. Canadian Urban Transit Research & Innovation Consortium (CUTRIC)
24. Canadian Vehicle Manufacturers' Association (CVMA)
25. Capital Power
26. Chemistry Industry Association of Canada (CIAC)
27. City of Toronto
28. Clean Air Partnership

29. Clean Energy Canada
30. Climate Challenge Network
31. Convergent Energy and Power
32. Demand Renewables
33. Distributed Energy Resources Stakeholder Initiative (DERSI)
34. Dowler-Karn
35. Earnscliffe Strategies
36. Efficiency Canada
37. Electrical Safety Authority (ESA)
38. Electricity Canada
39. Electricity Distributors Association (EDA)
40. Electro-Federation Canada (EFC)
41. Enbridge Gas Inc.
42. Enel S.p.A.
43. Energy Storage Canada
44. Enerlife Consulting Inc.
45. Environmental Defence
46. Environmental Energy Institute
47. Essex Powerlines Corporation
48. Global Risk Institute (GRI)
49. Google Nest
50. Guidehouse
51. HEC Montreal
52. Housing Services Corporation
53. Hydro One
54. Hydrogen Business Council
55. Grand Council Treaty #3
56. Imperial Oil
57. Independent Electricity System Operator (IESO)
58. Indigenous Clean Energy
59. Industrial Gas Users Association (IGUA)
60. Innovative Research Group (Greg Lyle)
61. Ivey Business School – Western University (Guy Holburn)
62. Ivey Business School – Western University (Brandon Schaufele)
63. Low Income Energy Network (LIEN)
64. Manor Park Community Benefits Network
65. Maawandoon Inc.
66. Metrolinx
67. Ministry of Energy (ENERGY)

68. Ministry of the Environment, Conservation and Parks (MECP)
69. Natural Resources Canada (NRCan)
70. NextEra Energy Canada
71. Ontario Building Officials Association (OBOA)
72. Ontario Clean Air Alliance
73. Ontario Energy Association (OEA)
74. Ontario Energy Board (OEB)
75. Ontario Financing Authority (OFA)
76. Ontario Greenhouse Vegetable Growers (OGVG)
77. Ontario Mining Association (OMA)
78. Ontario Power Generation (OPG)
79. Ontario Society of Professional Engineers (OPSE)
80. Ontario Tech University (Daniel Hoornweg)
81. Ontario Tech University (Jacquie Hoornweg)
82. Ontario Waterpower Association (OWA)
83. Organization of Canadian Nuclear Industries (OCNI)
84. Ottawa Renewable Energy Co-operative (OREC)
85. Oxford Community Energy Cooperative
86. Peak Power Inc.
87. Pembina Institute
88. Pollution Probe
89. Powerconsumer Inc.
90. Prowind Inc.
91. Public Interest Advocacy Centre
92. PwC
93. Queen's University (Mark Daymond)
94. QUEST Canada
95. Renewable Industries Canada (RICanada)
96. Schneider Electric Canada Inc.
97. Shell Canada Ltd.
98. Siemens Canada Ltd.
99. Sub-metering Council of Ontario (SCO)
100. Suncor Energy
101. Sussex Strategy Group
102. TC Energy Corporation
103. The Atmospheric Fund (TAF)

104. The Truck Renting and Leasing Association of America (TRALA)
105. Three Fires Group
106. Toronto Metropolitan University (TMU) (Bala Venkatesh)
107. Toronto Transit Commission (TTC)
108. Town of Caledon
109. The Transition Accelerator
110. Toronto and Region Conservation Authority (TRCA)
111. University of Waterloo (Claudio Canizares)
112. University of Waterloo (Jatin Nathwani)
113. University of Waterloo (Jessie Ma)
114. Voltus, Inc.
115. Workbench Energy
116. York University (Mark Winfield)
117. Zero Emission Bus (ZEB)Committee – (OPTA-ZEB)

STREAM FOUR: OPEN CALL FOR WRITTEN SUBMISSIONS RESPONDENTS:

1. Advanced Energy Management Alliance (AEMA)
2. Agrivoltaics Canada
3. Alectra Utilities
4. Association of Major Power Consumers in Ontario (AMPCO)
5. Association of Municipalities of Ontario (AMO)
6. Association of Power Producers of Ontario (APPrO)
7. Atomic Energy of Canada Limited (AECL)
8. Boltzmann Institute + John Stephenson (Director)
9. Bruce Power Ltd.
10. Bunli Yang - General Public
11. Canadian Association for the Club of Rome (CACOR)
12. Canadian Biogas Association
13. Canadians for Nuclear Energy
14. Canadian Manufacturers & Exporters (CME)
15. Canadian Nuclear Safety Commission (CNSC)
16. Canadian Propane Association (CPA)
17. Canadian Renewable Energy Association (CanREA)
18. Canadian Urban Transit Research & Innovation Consortium (CUTRIC)
19. Capital Power
20. Chemistry Industry Association of Canada (CIAC)
21. Clean Air Council and Clean Air Partnership
22. Coalition of Concerned Manufacturers and Businesses of Canada (CCMBC)
23. Cornerstone Hydro Electric Concepts Group (CHEC)
24. Electrical Safety Authority (ESA)
25. Electricity Distributors Association
26. Electricity Human Resources Canada

27. Electro Federation Canada (EFC)
28. Elexicon Energy Inc.
29. Enbridge Gas Inc.
30. Enercare Inc.
31. Energy Probe
32. Enerlife Consulting Inc
33. Enwave Energy Corporation
34. Essex Powerlines Corporation
35. Evolugen by Brookfield Renewable
36. Fortis Inc.
37. Green Energy Coalition
38. Green Ribbon Panel
39. Grid United
40. Hearth, Patio & Barbecue Association of Canada
41. Hydro One
42. Industrial Gas Users Association (IGUA)
43. Ivey Business School - Energy Policy and Management Centre
44. Jule
45. Laborers' International Union of North America (LiUNA)
46. Métis Nation of Ontario
47. Mississaugas of the Credit First Nation (MCFN)
48. NextEra Energy Canada
49. Niagara-on-the-Lake (NOTL) Hydro
50. Northland Power Inc.
51. Oakville Hydro Electricity Distribution Inc.
52. Ontario Energy Association (OEA)
53. Ontario Energy Board (OEB)
54. Ontario Home Builders' Association (OHBA)
55. Ontario Mining Association (OMA)
56. Ontario Power Generation (OPG)
57. Ontario Society of Professional Engineers (OSPE)
58. Ontario Stakeholder Council Working Group on Electrification and Buildings Ontario Transformation Hub
59. Ontario Waterpower Association (OWA)
60. Ontario's Nuclear Advantage
61. Ottawa Renewable Energy Co-operative (OREC)
62. Ottawa Wind Concerns
63. Pembina Institute

64. Pollution Probe
65. QUEST Canada
66. Region of Peel
67. Richard Gilbert, former CEO Toronto District Heating Corporation, Chair of BoD for Boltzmann Institute
68. Riverdale Ratepayers Association
69. Russ Houldin - General Public
70. S&C Electric Canada
71. Sarnia-Lambton Economic Partnership
72. Saugeen Ojibway Nation (SON)
73. Shell Canada Ltd.
74. Shepherd Rubenstein Professional Corporation | Regulatory Law
75. Society of United Professionals
76. SWTCH Energy Inc.
77. TC Energy Corporation
78. Tesla Inc.
79. The Atmospheric Fund (TAF)
80. Toronto Hydro
81. Township of McMurrich/Monteith
82. Umicore
83. Voltus, Inc.
84. Wind Concerns Ontario
85. York University (Mark Winfield)

APPENDIX B: DISCUSSION GUIDE FOR ROUNDTABLES AND OPEN CALL

The full list of discussion questions explored in the roundtable engagements, and posted online to help inform written submissions through the open call can be found **here.**