

**SUBMISSION: Planning Ontario's Energy Future: A
Discussion Guide to Start the Conversation**

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Introduction

Clean Energy Canada is pleased to submit comments on “Planning Ontario’s Energy Future: A Discussion Guide to Start the Conversation” to Ontario’s Ministry of Energy as part of the province’s next long-term energy plan (LTEP). This submission reflects our preliminary comments, and we look forward to working with the Ministry of Energy throughout the entire planning process.

Ontario begins the LTEP process from a position of strength. Having completed the single-largest climate change initiative in North America by eliminating coal-fired electricity generation in 2014, greenhouse gas (GHG) emissions from Ontario’s electricity sector have fallen by 80 per cent since 2005. Ontario also enjoys an energy supply mix from a variety of sources, with about 32 per cent of that mix being supplied from clean, renewable energy resources¹ including hydro, solar, wind and biomass. The 2017 LTEP is a road map that will set the direction for the province’s energy future for the next 20 years, a period of time in which production and use of zero-carbon electricity will increase.

In June, 2016, the province released its Climate Change Action Plan (CCAP), outlining the approach Ontario will take to reduce GHG emissions. Reflecting an international movement to limit global warming to 2 degrees, Ontario’s plan includes the launch of a cap and trade system to price carbon in 2017, and policies and programs to reduce reliance on fossil fuels in transportation and buildings. Climate change gives us the impetus to look at the whole of Ontario’s energy system and find ways in which we can reduce our fossil fuel use.

How can we do this?

Ontario is becoming less emissions intensive, even with an increase in economic activity.² This decoupling of emissions and economic growth reflects a global trend which in 2014, saw, for the first time in 40 years, a halt in the increase of greenhouse-gas emissions without help from an economic downturn.³ However, this does not mean Ontario gets to rest on its laurels. Even with improvements in the province’s emission intensity, emissions will continue to grow in the absence of policy action.⁴ Those policy actions, as dictated in the CCAP, will result in increased electrification: fuel-switching from fossil fuels to clean power to fuel our cars, trucks, and trains, heat our homes, offices, and drive our industries.

This shift from fossil fuels to clean electricity is needed in Ontario, but it will also occur throughout the rest of Canada and around the world. While not a one-size-fits-all solution, electrification will be a big part of the international effort to live up to climate commitments such as the Paris Agreement (2030) and G7 commitment to decarbonization by 2100. As a result, the global market for clean electricity technologies is growing quickly. So is **demand for the technologies and services** that

¹ Independent Electricity System Operator. (2016). Ontario Planning Outlook.

² (2016). Overview of Macroeconomic and Household Impacts of Ontario’s Cap and Trade Program.

³ Clean Energy Canada. (2015). Tracking the Energy Revolution.

⁴ (2016). Overview of Macroeconomic and Household Impacts of Ontario’s Cap and Trade Program.

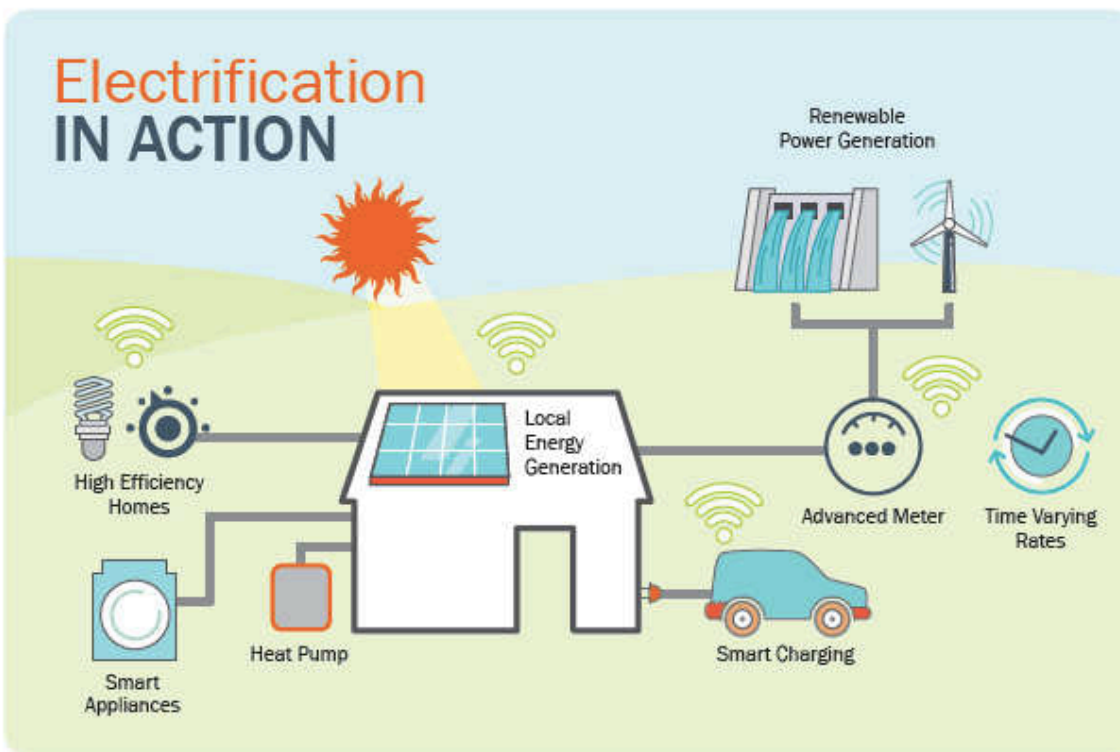
underpin electric transportation, buildings, industrial processes and smart grids – many of which Ontario has expertise in because of policies supporting renewable energy, storage, and the installation of smart meters. These new technologies can help to optimize Ontario's energy system, and support the transition to clean power in a cost-effective way that meets the needs of Ontarians.

Effective energy system planning in Ontario requires a forward-thinking approach. The 2017 LTEP must be the roadmap for Ontario's continued transition to affordable, reliable clean power sources. One that provides value for money to Ontarians, and leverages the significant opportunity of new, competitive, low-carbon technologies.

POLICY SOLUTIONS

Electrification: Ontario's Clean Power Future

Ontario enjoys a relatively emissions free electricity grid, with only a little over 7% of power generation contributing to the province's GHG profile. Ontario has recently attracted more than half of the annual investment flowing into clean energy across Canada, and this growing proportion of clean electricity now presents Ontario with a comparative advantage when it comes to fuel-switching to electricity, and thereby reducing GHG emissions from sectors and uses currently reliant upon fossil fuels.⁵



Source: Adapted from the Acadia Centre's EnergyVision (2014)

The 2017 LTEP is an opportunity to continue the transition to powering Ontario with clean energy sources. To do that effectively, the province should utilize this process to inform Ontario's plan for

⁵ Clean Energy Canada. (2015). Tracking the Energy Revolution. Retrieved from <http://cleanenergycanada.org/trackingtherevolution-canada/2015/>.

how our transportation systems, buildings, and electricity sector will continue to transition towards increased electrification, and to identify opportunities for Ontarians in that transition. To do this, Ontario should consider the following objectives for inclusion in the 2017 LTEP:

- Sector-by-sector electrification goals and energy pathways for end use sectors (transportation, buildings, industry, etc.) for the short, medium, and long term.
- Assessments, including cost-benefit analysis, of the grid modernization that will be needed to support electrification and plans to achieve those improvements, recognizing the advantage and economic value of the potential electricity storage capacity of hydro reservoirs as well as smaller-scale storage and distributed generation.
 - Investments in “smart” grids and micro-grids will allow for more efficient use of electricity and greater integration of decentralized power while maintaining reliability, resilience—especially in the face of a changing climate— and affordability for consumers.
- Targeted approaches for electrification in remote, rural and Indigenous communities, which also represent prototype solutions, including microgrids, for a world marketplace.

In Ontario, the governing energy board, agencies, and utility commissions can be perceived as presenting a structural barrier to electrification, and this issue should be addressed in the 2017 LTEP. As an example, some utilities are mandated, or interpret their mandate, to choose “least cost” electricity generation, rather than “lowest emission,” “most resilient,” or “best life-cycle return.” Restrictive utility mandates can inhibit investments in new clean power to enable more electrification; to plan for increased demand as the transition to electrification takes hold; to conduct pilot programs; to support R&D efforts; to value energy efficiency and conservation; to invest in smart grid technology; and to change rate structures where necessary to support electrification activities.

Therefore, utility mandates may need to be updated for the 21st century, now that electrification and low-carbon electricity are important policy goals. Updated acts and regulations could allow for R&D support, pilot projects, innovation, growing clean power capacity, and new rate structures – specifically ones that support DSM approaches to power management - while assuring affordability and economic competitiveness.

Finally, Ontario could offer its expertise in electrification more broadly to the rest of the country. As more and more renewable electricity generation comes online, Canada’s electricity transmission and distribution system operators will face new challenges. Through the coal phase-out and increased reliance on renewable power, Ontario has already worked hard to develop and implement solutions, which could be shared.

Ontario’s Clean Energy Technology Advantage

According to the *2015 Canadian Clean Technology Industry Report*, 35 per cent of cleantech companies in Canada are located in Ontario, which has grown particularly strong in the area of clean energy technologies. The decision to phase out coal-fired power generation, followed in 2009 by passage of the Green Energy and Green Economy Act, sent strong signals to the market and sparked a new era of energy innovation in the province. The province was the first jurisdiction in North America to put a smart meter⁶ in every home and small business, and was the first in Canada to open access to smart meter data as part of the White House-inspired “Green Button” initiative.⁷ Armed with this standardized data, software developers are creating “apps” that help consumers and businesses use energy more strategically and efficiently. Today, there are more than 260

⁶ http://www.ieso.ca/imoweb/pubs/smart_grid/Smart_Grid_Forum-Report-May_2011.pdf - page 4

⁷ www.greenbuttondata.org

companies⁸ in Ontario working to develop and commercialize technologies that can clean up electricity, make the grid smarter, reduce the carbon footprint of buildings, and drive emissions out of transportation. These companies will be essential in supporting Ontario's transition to clean power through reliable, price competitive technologies.

Technology Opportunity: Energy Storage

Energy storage is a clear example of Ontario's leadership in clean energy technology. To date, the province's Independent Electricity System Operator has procured 56 megawatts⁹ of grid-connected energy storage, representing more than 6 per cent of all projects installed globally to date (Germany, by comparison, had 67 megawatts installed by the end of 2015¹⁰). It's an impressive feat for a jurisdiction accounting for just 0.6 per cent of worldwide electrical generating capacity.¹¹

Leading companies include Temporal Power (flywheels), Hydrostor (underwater compressed air storage), Electrovaya (lithium-ion batteries), Hydrogenics (hydrogen) and Opus One Solutions (integration/management). One newcomer to watch is e-Zn, which has developed a zinc-metal energy storage system with potential to dramatically reduce the cost of off-grid and grid-connected energy storage.

Energy storage has a unique value proposition in that it can play multiple roles in supporting Ontario's electricity grid, from supporting behind the meter solutions (batteries) to distribution support (flywheels), to bulk system storage (pumped system hydro).¹² While assessing the falling costs of energy storage technology can be complex (as it pertains to assessing the economics of single use cases versus multiple use cases), both the Rocky Mountain Institute and Lazard's – a financial advisory firm – predict significant cost declines in energy storage technologies over the next 5 years.¹³

Technology Opportunity: Microgrids

As global energy systems shift towards decentralization, consumers are seeking heightened engagement with providers, and the cost of advanced energy technologies is continuing to fall. As these trends become more pronounced, microgrids have potential to offer benefits to utilities, communities, and industrial customers including enhanced resiliency, provision of grid ancillary services, optimization of assets, customer self-sufficiency, options for more distributed operations, avoided cost opportunities and reduced carbon emissions through integration of renewables.¹⁴

The global microgrid market is rapidly expanding. As of November 2016, there were approximately 1,681 microgrid projects in 122 countries with 16,552 MW in capacity.¹⁵ Navigant Research concludes that that the global vendor revenue for microgrids may be as much as \$20 billion annually

⁸ Analytica Advisors. (2016). Canadian Clean Technology Industry Report, 2015.

⁹ http://www.ieso.ca/Documents/Energy-Storage/IESO-Energy-Storage-Report_March-2016.pdf – includes recent 50MW and 6 MW through the “Alternative Technologies for Regulation” project (2012). Excludes 660kw Hydrostor system installed in partnership with Toronto Hydro in Lake Ontario.

¹⁰ <http://www.greentechmedia.com/articles/read/german-energy-storage-market-to-reach-1b-by-2021>

¹¹ Ontario capacity approximately 36GW (IESO) as percentage of global capacity of 6418GW in 2015 (Bloomberg New Energy Outlook 2016 report).

¹² www.energystorageontario.com

¹³ <https://cleantechnica.com/2016/01/22/the-real-cost-of-energy-storage-according-to-lazard/>

¹⁴ Advanced Energy Centre. (2015). Future of Microgrids.

¹⁵ Navigant Research. (2016). Microgrid Deployment Tracker 4Q16

by 2020.¹⁶ This represents potentially significant opportunities for investment in and export of Ontario energy innovation in this space, given our expertise in energy storage, smart grid, and behind the meter data technologies.

Both technology examples bring benefits to Ontario's energy grid as part of an overall shift to clean power. However, barriers including the current regulatory and legislative framework, the rules and policies affecting Ontario's local distribution companies and a lack of customer understanding threaten the deployment of these technologies. It is therefore essential that the 2017 LTEP address the structural market barriers in Ontario's energy system that are hindering the adoption of cost competitive, grid effective, low carbon technologies.

A Leader Within Canada

Ontario announced a landmark deal with Quebec in October of this year to transfer power between the two jurisdictions. The amount of hydroelectric power that will flow from Quebec to Ontario each year is enough to power a city with nearly a quarter million people. And because this clean electricity will be replacing natural-gas-fired power, it will cut one million tonnes of GHG emissions.

By avoiding an unnecessary overbuild of power generation to meet peak demand, this kind of optimization can also help reduce costs. The Ontario and Quebec agreement will see the provinces swap 500 megawatts of power annually, taking advantage of differences in seasonal demand. It's a precedent that can—and should—be built upon to a much larger scale within Canada.

Both Alberta and Saskatchewan have set laudable targets for increasing the share of renewable power on their grids over the coming decades, they're still burning fossil fuels for power. But they both neighbour provinces—B.C. and Manitoba—that generate ample hydropower. Through greater integration of their grids, these provinces could cut more carbon pollution faster and gain access to lower-cost electricity. As mentioned in the above, Ontario has an opportunity to share experiences and learnings from both a broader shift to electrification and the shared power agreement with its provincial counterparts.

The federal government's fall economic update reiterated that interprovincial power lines could be a strategic opportunity for federal green infrastructure investment. A recent poll conducted by Nanos Research and commissioned by Clean Energy Canada found that 82% of respondents said the federal government should help provinces use more clean power.¹⁷ Ontario should work with the federal government to secure funding in its interest to support the flow of clean power sources to support peaking and storage on Ontario's grid.

THE WAY FORWARD

In their 2016 World Outlook Bloomberg New Energy Finance predicts the future of energy: "cheaper coal and cheaper gas will not derail the transformation and decarbonisation of the world's power systems. By 2040, zero-emission energy sources will make up 60% of installed capacity. Wind and solar will account for 64% of the 8.6TW of new power generating capacity added worldwide over the next 25 years, and for almost 60% of the \$11.4 trillion invested." Ontario's LTEP therefore is an important opportunity to plan, not just for the next 10 years, but to set the path for the next 30 years. It is with that view that we offer the following recommendations:

¹⁶ Navigant Research. (2014). "Microgrids" <https://www.navigantresearch.com/newsroom/microgrid-market-will-reach-nearly-20-billion-in-annual-revenue-by-2020>

¹⁷ Clean Energy Canada. (2016). Canadians' Opinion on the Clean Energy Transition

1. Ontario's 2017 Long-Term Energy Plan serves as a road map for the province's clean energy future. Considering the increased demand created by the implementation of the CCAP, new power will be supplied by clean resources. This holistic plan will look at decarbonisation across Ontario's entire energy system including electricity, heating and cooling, transportation, and opportunities to improve energy efficiency.
2. As part of its road map to a clean energy future, Ontario will look to incorporate competitive clean energy technologies. Cost effective and efficient, there are opportunities for innovation and exports in storage, microgrids, and other clean technologies that can bring economic benefit to Ontario in addition to grid efficiencies. This means modernizing Ontario's energy market system, and reducing barriers that hinder adoption of new technologies.
3. Ontario should continue to play a leadership role within the federation, supporting a Canada-wide adoption of a strategy to encourage fuel-switching to clean power, and working with the federal government to secure green infrastructure investment that benefits Ontario's energy system and ultimately, Ontarians.

Ontario's Long-Term Energy Plan is an opportunity to set outcomes that will realize the broader goals for the province's future – reducing GHG's and growing a prosperous low carbon economy. Energy is vital to that conversation; it is the sector where any climate plan is realized.

We look forward to working with the Ontario Government, and the Ministry of Energy to help inform the 2017 LTEP.

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