



A STATE OF RENEWAL

ONTARIO'S INNOVATION SANDBOXES

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QUEST



About QUEST

QUEST is a national non-government organization that works to accelerate the adoption of efficient and integrated community-scale energy systems in Canada by informing, inspiring, and connecting decision-makers. QUEST undertakes research, communicates best practices, convenes government, utility, private-sector and community leaders, and works directly with local authorities to implement on-the-ground solutions. QUEST grounds all its activities in the “Smart Energy Community”– a concept that encapsulates the ideal end state of the organization’s work.



About Pollution Probe

Pollution Probe is a national, not-for-profit, charitable organization which is improving the health and well-being of Canadians by advancing policy that achieves positive, tangible environmental change. It is a leader in building successful partnerships with industry and government to develop practical solutions for shared environmental challenges.



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LOW CARBON INNOVATION IN ONTARIO

Canadian climate and energy plans shifted significantly in 2020 and 2021 with commitments set by the federal government and a number of companies to reach net-zero emissions by 2050. Canada's energy systems will require dramatic and fast-paced transformations to meet these targets.

While the Ontario government has been ambiguous in its targets, many Ontario-based companies have been ambitious. At the same time, Ontario has a history of energy innovation — from nuclear to battery storage — that could play a role in achieving net-zero targets.

Further, a recent report by Pollution Probe and QUEST found that current policies and programs across Canada — including Ontario — don't provide the necessary support to develop the new **business models** and **services** needed to introduce innovation and meet our net-zero targets.¹

As part of a multi-year Innovation Sandbox Initiative, Pollution Probe and QUEST are working together to understand how “Innovation Sandboxes” can help propel low-carbon innovation into the energy sector. By introducing Innovation Sandboxes into Canada's energy sector, we can control the potential risks associated with innovation, safely learn about new approaches, and reduce uncertainty. Innovation Sandboxes in the energy sector also inform policy and regulatory changes, and enhance collaboration among diverse stakeholders.

The Ontario Energy Innovation Sandbox, run by the Ontario Energy Board (OEB), is the first in Canada and two and a half years after its introduction in 2019, the sandbox is undergoing a renewal. The goal of the renewal is to integrate updates to better overcome the barriers to achieving net-zero in Ontario.

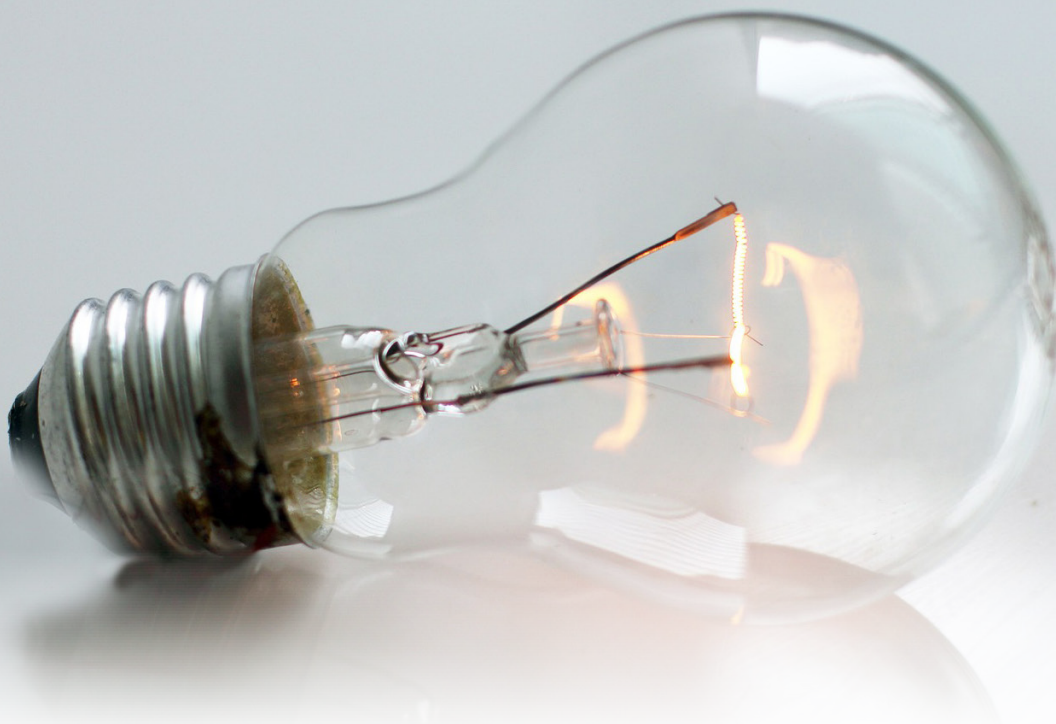
ABOUT INNOVATION SANDBOXES

Innovation in the energy sector is crucial if Canada is to meet its net-zero targets. At the same time, accelerating innovation in low-carbon energy sources has dual benefits: it can both contribute to the quick reduction of emissions and lead to long-term economic growth, assisting Canada in its recovery from the economic impacts of COVID-19.

However, Canada's energy innovation policies are not adequate to ensure the rapid deployment of this much needed low-carbon innovation. By focusing on research, development and demonstration of emerging technologies, and relying on the use of public funding as the main mode of intervention, policies and programs designed to encourage innovation in Canada's energy sector have neglected the importance of deployment.

The deployment of innovation is centred around integrating and managing new technology, changing perspectives and corporate cultures, building new competencies and filling skills gaps, inventing new business models, and envisioning how utilities are going to be run and managed. While the strengthened 2020 federal climate plan includes funding to accelerate the adoption of new and proven low-carbon technologies, we will need more than money to reduce the non-technological barriers that prevent them from being widely adopted.

¹ Richard Carlson, Mariana Eret, Michael Lee, and Aida Nciri (November 2020). *Getting to deployment: Bridging the Gaps in Energy Innovation in Canada*, Pollution Probe and QUEST. Retrieved from: <https://questcanada.org/wp-content/uploads/2020/11/Innovation-Sandboxes-Report-2-EN-1.pdf>



To overcome these non-technological barriers, energy innovation policies and programs should look to:

1. Increase collaboration and knowledge sharing so that people can work together to reduce barriers
2. Help innovators navigate the complex energy regulatory and policy landscape
3. Create space for safe real-world trials so they can demonstrate their market readiness
4. Use lessons from innovative initiatives and pilot projects to inform policy and regulatory changes, and remove the social and economic barriers to the diffusion of innovation.²

Innovation Sandboxes are a set of policy tools that can help overcome these barriers. Most of the focus of energy Innovation Sandboxes is on two other types of innovation: business model innovations and social or processual innovations. Energy Innovation Sandboxes provide the opportunity to change how processes, procedures, policies, rules or regulations are applied in a controlled manner, with the ultimate goal of creating durable and lasting systemic change to enable innovations that benefit the energy sector, consumers, and society. They create safe and controlled spaces for innovation to be integrated into the energy system by examining real (and often perceived) barriers, as well as testing solutions in a real-world environment. Innovation sandboxes can be used to test new business models and regulatory structures in all areas, from electric-vehicle smart charging, smart homes, different transportation fuels such as hydrogen, and local markets for solar and storage, among others.

Innovation sandboxes use three tools — innovation hubs, enquiry services and regulatory trials — to effectively promote system-level innovation (Figure 1). Innovation hubs use collaborative tools or platforms that allow the sharing of information and lessons among the diverse stakeholders in the energy sector. Enquiry services help innovators navigate the complex landscape and understand any regulatory barriers to their work. On occasion, barriers are perceived and not truly limiting innovation, so this service often clears up any potential misconceptions. Finally, regulatory trials address real regulatory barriers by granting innovators temporary exemptions to test new ways of doing things. Findings and experience from the innovation Sandboxes are then used to inform policy and regulatory changes.

² For more information see Richard Carlson and Aïda Nciri (Forthcoming 2021). *Jump On In: The Role of Energy Innovation Sandboxes in Getting to Net-Zero*.

INNOVATION SANDBOXES

INNOVATION HUBS

- Places of collaboration among diverse stakeholders
- Assistance to conduct trials under existing rules
- Knowledge exchange and information sharing to ensure transparency
- Pathway to other tools

ENQUIRY SERVICE

- Customized guidance to help innovators navigate the system and overcome perceived barriers
- Written assurance that the project does not raise compliance concerns

REGULATORY TRIALS

- Time-bound derogation or exemption to existing rules for specific trials
- Development of new rules or changes to existing rules
- Formal and publicly available assessment and evaluation
- Only used when necessary

REGULATORY AND POLICY LEARNING

Results and outcomes will be used by regulators, policymakers and others to inform discussion on the future of energy transition

Source: Richard Carlson and Aida Nciri (July 2020). *Enter the Sandbox: Developing Innovation Sandboxes for the Energy Sector*. Retrieved from: <https://questcanada.org/wp-content/uploads/2020/07/Innovation-Sandboxes-Report-1-EN.pdf>

PROGRESSION OF THE ONTARIO ENERGY BOARD INNOVATION SANDBOX

The Ontario Energy Board (OEB) — the energy regulator in Ontario — introduced an Innovation Sandbox in 2019 following feedback from the sector concerning regulatory barriers, and the desire to act quickly to encourage innovation.³

The OEB Sandbox offers an Enquiry service in which innovators can approach the OEB for regulatory information, as well as Regulatory Trials where derogations from OEB codes, rules, licensing requirements, and some statutory provisions can be made. Progress has been slow, and in the 18 months reported (January 2019 to June 2020), 33 proponents approached the OEB. The only public outcome has been an information note from the OEB on how a regulated utility can use behind-the-meter storage systems. Four applications were made related to regulatory requirements for which the OEB did not have the authority to provide relief, and exemptions from other regulators or legislation would have been required; a fifth application was made related to activities for which no exemption was required.⁴ The OEB notes that information and guidance on regulatory issues were what most of the proponents

³ Advisory Committee on Innovation (November 2018). Report to the Chair of the OEB. Retrieved from: <https://www.oeb.ca/sites/default/files/Report-of-the-Advisory-Committee-on-Innovation-20181122.pdf>

⁴ Ontario Energy Board (2019) Innovation Sandbox: Reporting 1. Retrieved from: <https://www.oeb.ca/html/sandbox/reporting-1.php>

wanted, rather than Regulatory Trials.⁵ The Enquiry Service offered in many cases revealed that there were no regulatory barriers. The opportunity to clarify regulation has been an identified benefit of the OEB Sandbox.

To help inform revisions to the OEB's Innovation Sandbox, Pollution Probe and QUEST organized and hosted a workshop on September 2, 2021 with key energy sector stakeholders including regulators, federal and provincial government staff, utilities, industry associations and academia. The outcomes from these sessions are provided in the form of this Summary Report, to support input into the ongoing OEB Sandbox Renewal consultation.

Using Chatham House Rules, the session was designed to facilitate interactive discussions amongst the participants on barriers to low-carbon innovation in Ontario, what an ideal Innovation Sandbox would look like, and how the OEB's Innovation Sandbox could be revised to meet Ontario's needs.

Participants recognised the need to put in place policies such as the OEB's Sandbox to accelerate the deployment of the innovation necessary to get to net-zero. While the OEB's Sandbox is a good step towards this, there was general agreement from this workshop that there are many opportunities to improve the way the existing OEB sandbox is designed and operated.

BARRIERS TO INNOVATION IN ONTARIO'S ENERGY SECTOR

The following key barriers to innovation in Ontario were identified:

1. POLICY AND REGULATION ARE NOT CLEARLY ALIGNED AND CONNECTED TO GOVERNMENT INITIATIVES ON NET-ZERO

There is no clarity around the goal of innovation in the energy sector (why we need to “innovate”) and criteria on which an innovation or pilot project can be assessed. The lack of clarity seemingly comes from the absence of legislative mandates on net-zero for the OEB and the Independent Electricity System Operator (IESO), preventing them from considering carbon objectives. The sandbox needs to be combined with more stringent provincial targets/goals in the energy sector. This would require formal, legislated net-zero targets/goals and overall carbon policies from the federal and provincial government.

2. EXISTING PROVINCIAL REGULATORY FRAMEWORKS AND POLICIES DO NOT PROMOTE INNOVATION, AND CONTRIBUTE TO A RISK-AVERSE CULTURE

Overall, there was a consensus that the current regulatory system does not provide incentives for utilities to be directly rewarded for deploying innovation. While an innovation that reduces costs can allow the Local Distribution Companies (LDC) to retain some of the savings, there are no major mechanisms in the regulatory frameworks to push utilities to implement new ways of doing things. As a result, there is a “feedback loop” feeding conservative culture among the utilities, the government and the regulator in the province. The utilities are comfortable in a culture of taking no or low risks as the regulator does not have a mandate for innovation and the government is not supportive of innovation policy.

⁵ Ontario Energy Board (July 2020). Innovation Sandbox: Reporting 2. Retrieved from: https://www.oeb.ca/_html/sandbox/reporting-2.php

Among key barriers to innovation, participants noted:

- **Utility conservatism:** Established utilities lack interest in innovation (even if it would reduce costs or benefit consumers). While some utilities do innovate, in general utility culture is used to the current status-quo.
- **Narrow regulatory mandates:** The regulator conducts conventional cost-benefit analysis based on the financials of a project, which is not conducive to low-carbon innovation. Non-financial benefits, such as grid services and carbon reduction, are not considered.
- **Outdated regulatory frameworks:** The existing regulatory framework is lagging on some technologies and needs to be modernized. For instance, the current definition of a pipeline hinders the development of hydrogen projects.
- **Lack of safe space to experiment:** There is no room for safe trialing and experimentation, which does not enable the conditions for controlled failure. Learning from failure can be an eye opener on what to change in the system and how.
- **Lack of access to energy market for new entrants:** In addition to inadequate regulatory frameworks, additional barriers that slow down innovations can include energy policy and access to the energy market. Some participants also felt that new entrants faced bigger barriers to enter the energy market, and foster innovation. As an example, the capacity market does not consider the specific constraints of smaller players.



3. DIFFICULTY IN MOVING FROM DEMONSTRATION TO DEPLOYMENT

The existing regulatory framework and configuration of the energy sector in Ontario does not allow for successful pilots to be replicated and deployed. As a result, the adoption rate of local solutions is low. The move to commercialization and update is particularly challenging for smaller companies. There is a need to move solutions forward in the energy sector. Two specific barriers were identified:

- The need to overcome the “valley of death” and value the process of moving from demonstration to commercialisation.
- The need to structure and formalise collaboration and knowledge-sharing. Clarity on the mandates among different key stakeholders, or services within an organization are missing, and multiple nudges are required to get things done, thereby causing delays.

IDEATION: IDEAL SANDBOX DESIGN

Using the concept of an “ideal sandbox” to facilitate the conversation, here is what we heard about what is needed to reduce or remove the barriers discussed in the previous section:

1. AN IDEAL SANDBOX IS BUILT ON THE FOUNDATION OF CLEAR GUIDANCE ON THE PURPOSE OF INNOVATION, SOUND LEADERSHIP AND ALIGNMENT WITH NET ZERO TARGETS

The ideal sandbox has clear targets and goals that are supported by strong policy leadership. The energy sector in Ontario needs to adopt a guiding vision of where the province wants to go in terms of innovation and what the role of the utilities should be. Having clear guidelines and objectives endorsed by both the provincial and federal governments would provide greater certainty of direction to players in the energy market. This will help unlock investment in a more strategic and direct way and ensure they align with set future goals. Decarbonization was mentioned as a key objective to consider.

2. AN IDEAL SANDBOX INCLUDES INNOVATION WITHIN THE BROADER REGULATORY CONSTRUCT AND ENERGY SYSTEM

An ideal sandbox would be a “province-wide” sandbox that includes regulatory, market and policy barriers to allow for testing of new ideas and solutions. It would also move beyond a siloed approach to energy and include electricity, thermal and transportation. Funding, or alignment with other funding programs, is also important.

An ideal sandbox would also seek to align innovation with infrastructure and investment cycles. For example, when infrastructure is nearing end-of-life, a sandbox project could be introduced, or even mandated, to see how new and innovative methods could meet energy needs without replacing like with like. This would reduce the risk of infrastructure lock-in and potentially stranded assets down the road.

3. AN IDEAL SANDBOX WOULD ESTABLISH MECHANISMS TO CHANGE THE UTILITY CULTURE

An ideal sandbox provides spaces for inclusive knowledge sharing and increased transparency. Successes need to be rewarded but also passed on so they can be scaled up and quickly and widely adopted in the sector.

As one workshop participant noted: “Some of the utilities I talked to said they weren’t interested in promoting moonshot ideas as they may be forced to use it, and they want to continue doing things the same way.”

4. AN IDEAL SANDBOX WOULD PROMOTE ACCESSIBILITY, PROVIDE A HUB OF KNOWLEDGE EXCHANGE, AND ASSIST IN THE MOVE FROM DEMONSTRATION TO DEPLOYMENT

An ideal sandbox would be easy for all stakeholders, including innovators and communities, to engage. It would provide a safe space for collaboration. It would also recognize the differences in knowledge and ability to participate for different utilities, companies (including start-ups and small businesses) and communities, among others.

Improved information sharing is seen as important, especially for new players or those newly entering the sector. This information sharing should be widespread and purposefully include other jurisdictions, including the federal government, to help ensure full informational transparency and proper dissemination of best practices and lessons learned. It is important to note that a sandbox is not for R&D, but rather focused on deployment and helping to overcome the “valley of death” of commercialization.

FEEDBACK ON THE OEB INNOVATION SANDBOX

CURRENT STRENGTHS OF THE OEB'S SANDBOX

1. **A sandbox is needed.** The OEB's sandbox is a good first step towards the innovation of Ontario's energy sector and the OEB's consideration of lessons from the first iteration of their sandbox is welcomed.
2. **Enquiry services should continue and expand.** The enquiry services of the OEB's sandbox are valuable, especially to innovators and new entrants. Offering information services and one-on-one group guidance is key to innovation. These services could be expanded to better support innovators and new entrants by:
 - Providing support to applicants to secure funding for their projects, similar to the work done by the Clean Growth Hub, a federal initiative.
 - Refining guidance on what is and isn't possible, potentially offering letters of comfort or assurance to reassure investors that a company's proposed project would not be affected by current regulations. This is particularly important for small businesses.

HOW THE OEB'S SANDBOX CAN BE ENHANCED OR UPDATED

1. **Establish clear guiding principles and objectives that provide a vision of Ontario's future energy sector**

Part of the OEB preparedness for the future is being educated about future states and conditions, and regulatory states that are needed to manage them. The OEB is currently attempting this but more can be done. The OEB could be "the head of the pack" and have an idea of where innovation is going so they can prepare appropriate regulatory frameworks.

The OEB needs to set clear objectives, parameters and eligibility criteria against which projects entering the sandboxes are evaluated. These criteria and parameters should consider the following:

- The different desired future end-states of the energy system that are guided by larger key policies, including net-zero targets.
- The pace of innovation, by distinguishing incremental changes from game changer solutions that transform the status quo, inform, and lead to different configurations of the energy systems.
- Value around producing new learning and knowledge that can inform policies and regulation changes.
- The associated benefits of innovation, such as, but not limited to, economic considerations around Ontario's competitiveness and creation of a cleantech innovation system, as well as environmental and climate benefits.

2. Keep it open, but also target areas of need

While having an open Regulatory Trial process, where innovators can come forward with any new ideas, is useful, there is a need for the OEB to put forward calls for specific projects that can meet identified areas that require innovation.

- Identifying potential projects based on needs can help address the risk aversion in the sector and the current levels of uncertainty in areas where innovation would be most beneficial.
- Such targeted calls for projects could be tied into potential funding, either by the OEB or through other agencies (such as the IESO or NRCan).

3. Make it more inclusive, make it work for all of Ontario

We shouldn't have innovation that only works in small towns or big cities, unless it's a specific targeted technology. The spectrum of Ontario utilities is diverse: some are large, others are small, some are innovative, others are more conservative. Projects need to be able to scale and to be used by all utilities in Ontario.

- Consider a "provincial energy sandbox" that includes all agencies, the OEB, the IESO and the Ministry of Energy where all barriers — from regulatory to market to policy — can be addressed.
- Expand the current range of stakeholders involved to include wider engagement with consumers, civil society, academics and communities, among others: current stakeholders are more focused on the front-end of development.

4. Work to change culture around risk (while ensuring consumers are always protected)

As one participant noted, "There should be a way to open the gates and encourage people to try new things but the system as a whole still has to operate, creating, in a limited way, more opportunities for new business models and methods." Under the current regulatory system, there are very few drivers to encourage the adoption of innovation within utilities. The fear of failure, which is a possibility, can discourage innovation. The current system uses government funding to effectively bypass the regulatory system. However, this is not sustainable and may not create the conditions for innovation that can transform the sector and benefit everyone.

- The process should allow for risk taking, which would include the potential for failure. With the proper oversight, the effect on consumers can be minimized.
- Funding for innovative sandbox projects that could advance the sector yet have a higher risk threshold should be considered. This would ensure that the project remains within the regulatory system while consumers are protected.
- Utilities could be incented through the regulatory system to adopt innovation that benefits consumers through an adder on their rate of return.

5. Establish an Innovation Hub to share knowledge and bring the sector together

Fostering connection and sharing knowledge and lessons learned have been identified as key missing activities in the current sandbox. Participants suggested that the OEB's sandbox should consider a forum where innovators can meet with LDCs and regulators to share ideas and get early-stage feedback and exchange ideas within the regulatory context. There is a need for both small and large forums.

- In the UK, it was found that one-on-one “speed dating” sessions with regulators, utilities and innovators to discuss early-stage ideas was most beneficial.
- Sandbox project results should be shared so that lessons from a project, even if it was a failure, could inform future projects in other jurisdictions. One option could be to leverage CAMPUT (the association of Canadian energy regulators) to have a centralized forum for all stakeholders to come together and share among themselves, and not just with senior management.
- Larger idea-sharing sessions with the wider sector and stakeholders could help in ensuring everyone understands the direction of energy systems in Ontario. This can be a venue for where innovative ideas are exchanged that can help to reduce the conservatism in the sector by demonstrating what has worked.
- Information sharing needs to be expanded to not only include the senior management, but to include all levels in the sector. An effort should be made to also engage civil society, academia, consumers, communities and others who have a role to play in the future of energy systems.

RECOMMENDATIONS FOR THE OEB SANDBOX RENEWAL

The following recommendations, based on workshop participants’ feedback and input, suggest ways in which the OEB Sandbox Initiative can be enhanced to better overcome ongoing challenges in Ontario’s energy sector and meet the need of energy players when it comes to deploying low-carbon innovation:

1. Establish a clear statement of targets and goals for the sandbox to help direct innovation.
2. Develop targeted calls in areas of the energy sector where specific needs, challenges or uncertainty have been identified. These calls could include potential funding, or linkages to funding from other agencies, such as the IESO or NRCan.
3. Coordinate or create a “Provincial Sandbox” that includes the IESO and the Ministry of Energy to also address market and policy barriers outside the scope of the OEB.
4. Continue and expand one-on-one feedback and support activities, and connect innovators individually with LDCs and other stakeholders (speed dating sessions). Targeting small businesses should be a goal of this enquiry service.
5. Create and facilitate an Ontario-wide innovation network open to all players, large and small, producers and consumers, and encourage information sharing and collaboration. This should include lessons learned and regular case studies.
6. Mandate the use of low-carbon innovation in the wider regulatory framework and create incentives for deploying innovation that benefits the sector and consumers.