ONTARIO ENERGY BOARD

Innovation Sandbox Annual Report

January 2024 – December 2024

Ontario Energy Board

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1. INTRODUCTION

Since its launch in January 2019, the OEB's Innovation Sandbox – a first for Canada's energy sector – has supported innovators in exploring new approaches, business models and technologies that can enable cost-effective, reliable service for Ontarians. Since Day One, the Sandbox has offered two streams of support: an Information Service for early-stage discussions for innovators with questions about an idea or concept, and a Project-Specific Support Service providing tailored regulatory guidance for pilot projects. These services are one way the OEB fulfils its mission to facilitate innovation.

The OEB recognizes that transparency is critical to ensuring both continuous program improvement and disseminating important guidance and lessons for those with the next great idea. To support this, the OEB reports on how the Sandbox is used by innovators, including through this Annual Report.

We've taken several steps since then to increase the value that the Sandbox brings to our sector, including our Innovation Sandbox Renewal consultation launched in June 2021. This initiative led to the rollout of "Sandbox 2.0" starting in January 2022, which included improvements to our services, such as an enhanced website, greater stakeholder outreach and funding opportunities.

Through Sandbox 2.0, the OEB made a commitment to an annual report to share real-world insights and foster sector-wide dialogue. Our annual reports provide visibility into the types of projects receiving Sandbox support, highlight common themes and opportunities, and share lessons learned to facilitate future innovation.

In 2024, the Sandbox continued to deliver regulatory guidance and support for energy sector innovators. Common discussion themes at the Sandbox table included energy storage, reliability and distributed energy resource (DER) integration. This year's report highlights several accomplishments and initiatives, which include:

- Meaningful progression of projects under the Innovation Sandbox Challenge, an initiative providing up to $1.5 million in funding and regulatory guidance to support six innovative projects.
- Updates to the Innovation Handbook to incorporate the latest sector developments and provide clearer guidance on regulatory requirements and opportunities.
- The Joint Targeted Call – a partnership between the Sandbox and the Independent Electricity System Operator's (IESO) Grid

Innovation Fund (GIF) – continues to provide valuable insights on pilot projects exploring the capabilities of DERs to deliver grid services at both local and provincial levels. The OEB is continuing to support the IESO's GIF through its role as a regulatory partner in the 2024 targeted call.

2. SANDBOX 2.0 OVERVIEW

The OEB has implemented all of the commitments made during the consultation, including long-term commitments, marking a significant milestone for this initiative.

2.1 Sandbox Long-term Commitments

Consider Additional Types of Reporting

The OEB has used various reporting tools to demonstrate its commitment to transparency, advancing knowledge sharing and supporting innovation in Ontario's energy sector in response to stakeholder feedback, emphasizing the importance of additional reporting. The OEB released the Innovation Handbook in March 2023, providing innovators with a comprehensive guide on OEB policies, staff guidance, and decisions related to innovative activities and business models. The Handbook was updated in September 2024 to provide the sector with the latest developments. Updates on projects receiving regulatory support through the OEB-IESO Joint Targeted Call were provided in November 2023, in the Joint Targeted Call Interim Report, with a final report to be released once projects have concluded. Insights from projects funded through the Innovation Sandbox Challenge are also provided in this report.

Reassess Idea of a Concierge Service

After assessing stakeholder interest in the OEB pursuing a concierge service to support matchmaking and project advancement within the Sandbox, the OEB concluded that this role is not aligned with the OEB's mandate of independent and impartial regulation. Instead, to foster ongoing and open dialogue in the sector and continue the facilitation of innovation, the Sandbox engaged the sector through events such as the IESO-OEB Joint Engagement on DERs Integration panel discussion in November 2023. The event featured a presentation by the OEB and IESO on their ongoing work related to DERs and provided stakeholders an opportunity to share feedback.

Exploring Government Funding Partnerships

Stakeholders also highlighted the importance of exploring partnerships with provincial and federal governments to secure funding for innovative projects. The OEB offered up to $1.5 million through the Innovation Sandbox Challenge in March 2023, with six projects selected and continuing to receive the funding in 2024. The OEB also pursued a funding opportunity at the federal level, submitting an expression of interest to the Government of Canada in January 2024, followed by a full project proposal. The OEB passed the preliminary stages of the federal government's review, and as of October 2024, was in the process of the due diligence phase that evaluated the proposed project's financial forecasts and activities. Further updates on the proposal will be provided throughout 2025.

3. SANDBOX INITIATIVES

3.1 Joint Targeted Call

Background

In June 2021, the Sandbox and IESO's GIF initiated a first-of-its-kind collaboration to hold a targeted call for project proposals to test the potential for DERs to provide grid services at both local and provincial levels. Seven projects were selected, with five receiving regulatory support from the Sandbox. Those five projects focused on electric vehicle (EV) charging management, DER benefits and the Distribution System Operator (DSO) model[1]. Projects have progressed through key phases such as program design, participant recruitment and technology integration. In 2024, some projects were finalizing testing of technologies and market models, while others were transitioning to final reporting.

The Sandbox is monitoring insights from these projects, including assessing the potential for enhancing DER capabilities to generate savings for ratepayers. The progress achieved so far has yielded valuable insights, reinforcing the OEB's ongoing efforts to support DER integration through initiatives such as the DER Connections Review, EV Integration and the Benefit-Cost Analysis (BCA) Framework. A more detailed analysis of the insights gained from the final outcomes of the Joint Targeted Call projects will be provided in a final report, following the conclusion of the projects.

Pilot Project Updates

Toronto Hydro
Project title: Benefit Stacking Transmission and Distribution System Non-Wires Alternative Pilot Project

This project is exploring how an electricity distributor can coordinate with the IESO to dispatch DERs as local demand response resources to meet local distribution and simulated bulk system needs. Through this pilot, Toronto Hydro is testing a dual participation model by acting as a DER aggregator to procure demand response capacity to defer or avoid distribution system upgrades while also meeting simulated bulk system needs. In 2022, Toronto Hydro introduced program rules to streamline DER participation in a local demand response auction and providing transmission-level services, ensuring compliance with IESO Market Rules and Toronto Hydro timelines. These program rules have guided simulated

[1] A DSO is an entity with advanced capabilities to integrate, manage and optimize DERs for distribution and wholesale market services.

program deployment in 2023 and 2024. Toronto Hydro is using real-world testing to meet local distribution system needs, while also running simulations to explore how those same DERs could support the bulk system.

Additionally, a Transmission-Distribution Coordination Protocol was developed to define communication procedures for managing local, wholesale and overlapping resource needs. Aligned with IESO Market Rules and draft protocols from the Transmission-Distribution Coordination Working Group, this protocol was successfully tested during the 2024 summer obligation period, a timeframe when participating resources are contractually required to be available to deliver grid services during peak electricity demand. During the simulation, the protocol enabled the coordination of dual activations, meaning DERs were dispatched simultaneously to both meet local electricity distribution needs (managed by Toronto Hydro) and broader provincial system needs (managed by the IESO), demonstrating coordinated grid support across both levels.

Toronto Hydro held its first local demand response obligation period in summer 2023 with four activations. Despite challenges around limited participation in the local demand response auction due to monetary barriers (e.g., compensation uncertainties and potential penalties) for dual participation in simulated IESO-administered markets (IAMs), Toronto Hydro secured an additional 2 MW of capacity for summer 2024. The summer 2024 obligation period saw five activations. Of those five activations, three were local demand response capacity auction activations and two were out-of-market wholesale activations. One of the five days included both a local and wholesale dispatch on the same day. Each activation involved dispatching participating demand response resources to reduce electricity during peak periods, either to address local distribution needs or to simulate support for the bulk electricity system.

Project Insights

Toronto Hydro's pilot is exploring how DERs can meet distribution and bulk system needs. The project highlighted the value of distributors in enabling benefit stacking, which allows DERs to provide value to both the local distribution system and the bulk electricity system, and the potential to reform market rules to address monetary barriers (e.g., compensation uncertainties and potential penalties) to dual participation. It also pointed to the importance of aligning procurement timelines, engaging with aggregators and customers to ensure resources are available when needed, and clarifying the treatment of market revenues and incentives for non-wires solutions so that DER providers have a clearer understanding of the benefits associated with providing grid services. Streamlined measurement and verification processes also demonstrate the potential for distributors to efficiently identify where and when DERs can meet system needs. Utilities would therefore be able to gather data, assess its quality, carry out calculations and provide settlement statements, verifying how much electricity

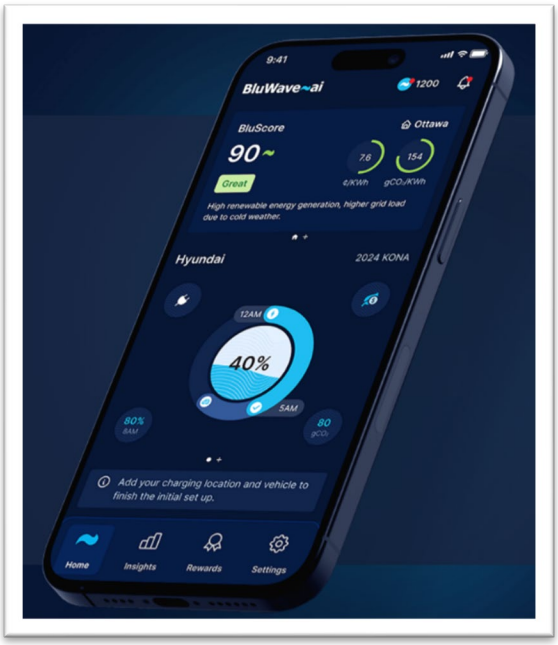
demand was actually reduced during an activation.

BluWave-ai
Project title: EV Everywhere

Ottawa-based tech company BluWave-ai partnered with Hydro Ottawa on a pilot project for demand-side management of privately-owned EV charging infrastructure. The project is leveraging BluWave-ai's cloud-based artificial intelligence (AI) platform to optimize EV charging patterns and energy injection/consumption from battery energy storage systems (BESS) to reduce peak demand, as well as inform the potential deferral of future infrastructure upgrades. EV owners download a managed charging app that grants the platform secure remote access to key vehicle charging data (e.g., battery state of charge, plug-in status, charging session details) and enables charging control. Hydro Ottawa compensates participants in exchange for making their vehicle available for managed charging each month.

As of the end of 2024, preliminary simulated testing has contributed to 160 kW of capacity out of a targeted 240 kW, and enrolled over 200 participants, based on real-world charging behaviour. The project also ran more than 90 demand response events during 2024, demonstrating average participation rates of more than 90% of eligible vehicles. The project team also developed modelled projections to estimate how the system would perform at scale. This marks early progress and lays the foundation for future phases with installed BESS. Seasonal testing, including operating reserve, demand response activated by grid prediction/AI models and transmission-distribution coordination, is planned with results expected to follow in 2025. The project is also expected to install two BESS units – one behind the meter, the other in front of the meter so that the stationary batteries in conjunction with EVs can collectively manage load variability at constrained substations by throttling charge/discharge of stationary batteries coupled with charging loads of EVs.

Project Insights



The EV Everywhere project encountered challenges related to equipment certification and cybersecurity. The use of BESS units built to European standards led to deployment delays because they weren't aligned with Ontario's certification requirements. Additionally, Hydro Ottawa's internal cybersecurity policies limited third-party control of front-of-the-meter assets, which constrained the demonstration of autonomous, AI-driven grid services. This highlighted the need for contingency planning and collaboration between distributors and service/equipment providers to ensure compliance with technical and cybersecurity requirements such as connection agreements, metering and data sharing, and protection and control coordination under the Distribution System Code, alongside certification standards governed by other authorities.

Enel X

Project title: Unlocking DER across Ontario

This project aims to address barriers preventing behind-the-meter battery storage and other DERs from participating in the IAMs. The project is testing new market participation models and alternative measurement and verification methods to improve the accuracy of performance tracking of DER aggregations. It seeks to overcome implementation challenges, such as registration processes, energy market design, size thresholds and limitations in measurement and verification approaches, by demonstrating the ability of aggregated resources to provide reliable, dispatchable services across multiple market programs (capacity auction and operating reserve) as well as local distribution system needs and simulated energy dispatches. While the market participation is being tested in a simulated environment, the DERs are operating in real-world conditions to meet local distribution needs, providing valuable data on both fronts. The project is expected to provide insights into how to enable broader participation of behind-the-meter battery storage and other DERs in the IAMs.

Enel X selected 12 sites to participate in the pilot program, with a combined

maximum load reduction capacity of 53 MW. There were 42 operating reserve dispatches and 11 capacity auction dispatches. Enel X leveraged a combination of load curtailment and behind-the-meter BESS generation. Enel X reported it maintained high availability of resources (80-90%) and demonstrated dispatch performance in the IESO's Capacity Auction and operating reserve market, as well as meeting local distribution needs. Enel X developed custom tools to collect and report BESS/site availability to Powerconsumer, which simulated the wholesale market operator and was responsible for issuing dispatches. Enel X's platform received the instructions for aggregated dispatches and allocated the dispatches to the assets across the assigned resource portfolio. Enel X delivered a final report to the IESO, providing insights into how to facilitate broader participation of smaller and more diverse DERs in the IAMs. Testing has been completed per the IESO's DER Integration Framework with results to follow in 2025.

Project Insights

Enel X reported opportunities to increase the participation of DERs by expanding aggregation rules, enhancing measurement and valuation methodologies to more accurately capture DER capabilities, and establishing a new resource type that bridges the gap between dispatchable load and hourly demand response requirements. Performance assessments typically occur at the site level, whereas measurement at the asset level (e.g., at the battery meter) can provide a higher degree of accuracy of the performance assessment. Furthermore, Enel X reported that enabling aggregation and dual participation in both wholesale and local markets is essential to unlocking DER value. Wholesale licensing and minimum load thresholds can result in financial barriers for the participation of smaller DERs, which highlighted the potential value of streamlined participation processes and compensation mechanisms that reflect the full value of DER services.

Essex Powerlines
Project title: DSO Pilot Project (PowerShare)

The PowerShare project, led by Essex aimed to establish a local Distribution System Operator (DSO) market to enable near real-time activation of DER flexibility (the ability of DERs to adjust their energy production or consumption in response to grid needs). Using NODES' platform (a digital marketplace for trading flexibility services), the project demonstrated the ability of DERs to participate in a local energy market and receive compensation for supporting grid operations, including local constraint management and improved resilience.

Essex reported the project demonstrated real-time flexibility activation through a functioning market framework, conducting more than twenty successful non-test activation days ranging from 0.29 MW to 3.5 MW. The project also engaged a 4.4 MW flexible load facility. Essex states that across Phase 1, over 8 MW of participant capacity was enrolled, 694 MWh of capacity was reserved (available during contracted hours), and more than 240 MWh of flexibility validated and delivered. A summary of DSO market activities for the duration of phase 1 is expected in 2025. While the PowerShare initiative continues to progress, IESO and OEB involvement through the Joint Targeted Call is to conclude in 2025 following the completion of a project summary report that will explore the project's lessons learned, including barriers to participant recruitment and market maturity.

According to Essex, a key achievement has been addressing metering and telemetry challenges to ensure participants can provide flexibility services using existing (traditional) distribution infrastructure, thereby maintaining settlement-grade data accuracy while reducing participant costs. Essex also reported that simulated coordination between the local energy market and IAMs identified key integration points and gate closure protocols to support future dual participation in the project, which supports the need for well-defined protocols to align flexibility at the distribution level while also participating in available wholesale markets.

Project Insights
Essex noted several key lessons related to the implementation of a local energy market. One insight is the need for improved alignment between transmission - and distribution-level market-based services.

The project team has also emphasized the importance of clearer processes and tools to allow distributors to recover the costs they incur when procuring grid services (such as energy or capacity), from DER providers, suggesting that targeted market design efforts, including defining required flexibility services and

providing market-ready revenue models would improve market viability. This approach would help support the overall viability of a local market by ensuring sufficient flexible capacity and a clear understanding of expected activation frequency. Essex reports that broader customer education and awareness across Ontario would help increase DER participation.

The project also raised concerns about non-firm connection agreements (an arrangement that permits a user to connect to the electricity grid with the understanding that their access may be curtailed or limited) becoming a source of non-compensated flexibility surfaced through the project and informed the market-first approach of engaging customer DERs, reinforcing the importance of thoughtful market design. According to Essex, pricing remains the primary barrier to onboarding additional DERs, with some participants indicating they had additional DERs to enroll but could not proceed given the absence of sufficient revenue expectations or program continuity.

Despite challenges, Essex asserts that PowerShare demonstrated a viable pathway to enabling DSO market functionality, supported by participant enthusiasm and strong operational performance. Lessons from this pilot provide insight into participant recruitment, onboarding, T-D market coordination, and settlement logistics, offering valuable insights for future iterations of distribution-level markets in Ontario.

3.2 Innovation Sandbox Challenge

Background

The OEB launched the Innovation Sandbox Challenge in March 2023 to advance its statutory objective of facilitating innovation in the electricity sector. This initiative responded to stakeholder feedback during the Sandbox Renewal consultation that highlighted the need for funding to support innovative projects. The Challenge aims to support projects that inform OEB policy on the energy transition and assess innovative solutions with potential value to consumers. Guided by stakeholder input and a November 2022 poll, the OEB selected two themes for the Sandbox Challenge: (1) advancing pilots to broader implementation and (2) developing innovative strategies to enhance consumers' understanding of their role in the energy transition. These themes are intended to address critical barriers to successfully scaling innovative ideas, as well as empower consumers to participate meaningfully in energy transition.

Following a call for proposals in March 2023, and supported by a webinar to guide applicants, the OEB selected six innovative projects in October 2023 that will, in the aggregate, be awarded up to $1.5 million in funding.

The following section provides an overview of each project, including milestones, notable achievements, challenges addressed and key insights.

Pilot Project Updates

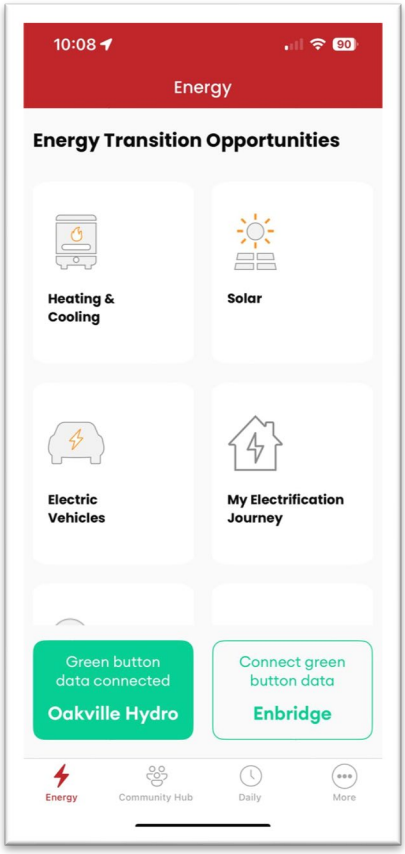
Oakville Hydro

Project title: Digital Customer (Residential and Small Business) Education and Engagement on Energy Transition

Oakville Hydro aims to help residential and small business customers understand and assess their energy transition options through a mobile application (app). The EcoShift app collects data on customer readiness including their willingness to adopt DERs and their interest in alternative DER ownership models (e.g., customer-owned, utility-owned or controlled, or third-party aggregator). The project also gathers insights on customer perspectives on the control and management of DERs, examining preferences for ownership and operational responsibility and assessing how different ownership models impact energy transition economics at both the customer and distribution grid levels. Additionally, the project estimates the timing of customers' load growth and collects data to simulate the potential impact of that load growth on grid capacity and reliability. The project also integrates Green Button data to provide insights on energy consumption and aims to include customizable energy alerts and educational quizzes designed to promote energy-saving behaviour and awareness. This includes encouraging actions such as installing an electric heat pump to optimize heating and cooling efficiency. Finally, the project is exploring ways to optimize innovative strategies, such as personalized digital engagement tools, customer-driven ownership models for DERs and data-informed approaches, to better meet the needs of residential and small businesses customers.

Project Accomplishments to Date

The project team built a beta version of the app and demonstrated the customer interaction journey to the Sandbox team. Drawing on their prior interactions with energy stakeholders, the Sandbox team recommended tools to enhance customer experience, which Oakville Hydro incorporated into the updated app. This includes educational content such as an electrification journey checklist and a tailored heat pump recommendation tool, which aims to facilitate decision-making by illustrating economic considerations and payback periods. An evaluation plan has been developed such that the project design can be expected to facilitate appropriate data collection to measure engagement and awareness.



Oakville Hydro found it difficult to secure contractor participation for in-home consultations due to the limited familiarity with heat pumps and other energy transition technologies. Oakville Hydro responded by expanding engagement efforts to include non-profit organizations, renewable energy associations, and municipal partners. This outreach generated initial contractor interest with some contractors offering free consultations through the app.

Furthermore, identifying appropriate residential and small business testers for the app was challenging due to confidentiality and eligibility constraints. Since the app was still in development, Oakville Hydro needed to limit access to a controlled group to protect sensitive project information. As a result, the team initially focused on recruiting Oakville Hydro employees as voluntary testers and later expanded that to include more employees than needed, anticipating that some might drop out or not meet eligibility criteria. The project team also held a virtual onboarding session to align expectations and ensure participants understood the app's objectives.

In October 2024, the EcoShift app received approval from app stores and was ready for launch to Oakville Hydro's customers.

Project Insights

The need to engage users was a critical takeaway for Oakville Hydro. Participation during beta testing was challenging, with 13 out of 20 beta testers dropping out, despite check-ins and app notifications. The decline in participation revealed that initial interest alone is not enough to maintain engagement over time, reinforcing the need for tangible motivators, such as rewards or recognition, to keep users involved throughout. Gamified elements like the Eco Champion Points System, a rewards-based feature that lets users earn points on engagement, and quizzes proved highly effective in maintaining long-term interaction, emphasizing the value of educational tools that both inform and incentivize participation in the energy transition. The Eco Champion Points System allows users to earn points by taking quizzes, answering surveys, and sharing their energy transition experiences with other users, which can then be used toward incentives, rewards, or further engagement within the app.

Oakville Hydro also identified several key insights in analyzing customer data via Green Button. Electricity and natural gas distributors have flexibility in how they design their data reports, with each distributor having the ability to select from a range of optional data fields in certain instances. Inconsistencies between data sets arose that posed challenges for the proponent's development of a standardized algorithm for analyzing customer energy data and comparing insights between different distributors. While Oakville Hydro could manage its own customers' data consistently, the project aimed to support a broader user base, including customers of other utilities – making it necessary to account for variations where they occurred. Additionally, the lack of timely data presented another hurdle. Oakville Hydro collects electricity interval data daily using smart meters, while natural gas data is limited to monthly updates as there are no smart meters for natural gas. This lag limited the app's ability to deliver timely alerts and insights for natural gas, reducing its potential in helping users manage their energy use. The project team addressed data challenges by creating algorithms that focus on key customer data points and use the most up-to-date information available. Also, the EcoShift app's use of Green Button's "Connect My Data" feature emphasized that data belongs to customers, not distributors, and underscored the importance of account holder identification to protect privacy and ensure accurate insights. This work supports greater customer engagement in the energy transition by prioritizing a strong authentication process to safeguard customer privacy and addressing challenges related to inconsistent data points and reporting periods.

These efforts align with the OEB's objectives of ensuring that customers have greater control over their energy data, access to timely and reliable information, and the ability to make better informed decisions about their energy use.

The project is expected to help address economic barriers to DER adoption, particularly customer hesitancy toward technologies like heat pumps due to uncertain payback periods. By incorporating cost-benefit analyses (i.e., evaluating the payback period of heat pumps compared to standard air conditioning replacements) and energy alerts into the app, and collaborating with contractors and renewable energy associations, the project aims to foster greater customer understanding of and trust in these technologies. Customer confidence and impact of the EcoShift app will be further assessed in future milestones.

The OEB's BCA Framework serves as an economic evaluation tool for electricity distributors to determine when DERs offer a cost-effective alternative. Similarly, the EcoShift app supports this goal by enabling consumers to conduct their own economic analysis when considering technologies that advance the energy transition. Furthermore, project outcomes may support the development of Phase II of the BCA Framework, a project included in the Minister of Energy and Electrification's December 2024 Letter of Direction, by focusing on refining inputs used in cost-benefit analyses and defining broader energy system impacts,

particularly related to DERs as non-wires solutions. By providing real-world data on peak load reduction and cost effectiveness, the EcoShift app expects to quantify both system and societal benefits. Insights from the app are expected to contribute to a more data-driven approach in evaluating DER impacts, aligning with the OEB's efforts to enhance decision-making and optimize system planning.

Moving forward, subsequent milestones – including the full deployment of the EcoShift app – are expected to enable the collection of key metrics such as DER adoption rates, customer interactions with energy-saving features and engagement with gamified educational tools. The project aims to yield further insights into how utilities can influence behaviour and drive energy efficiency.

Hydro One
Project title: Bringing Along Low-Income Customers in the Energy Transition

Hydro One, Ontario's largest electricity distributor with almost 1.5 million customers across 75 per cent of Ontario's geographic area, in collaboration with CLEAResult, an energy efficiency program consultancy, is working with low-income customers to encourage more participation in and improve their understanding of demand response programs. The project explores how low-income customers with baseboard heaters may reduce their winter energy bills by using smart thermostats to manage their heating. It also helps enable participation in Hydro One's *my*Energy Rewards residential demand response program, which offers customers incentives to reduce electricity use during peak periods by using smart thermostats. This project aims to assist electricity distributors in engaging low-income households in energy transition initiatives and better serving them through that transition. Additionally, the project is expected to yield insights into the potential of baseboard smart thermostats to reduce electricity demand during local distribution peak demand periods in the winter through demand response events.

Project Accomplishments to Date
To help with customer recruitment and program delivery, Hydro One prioritized targeted outreach and a streamlined application process to maximize participation, with a goal of enrolling up to 400 low-income customers in the pilot. Hydro One selected CLEAResult as its implementation partner to leverage existing infrastructure from the *my*Energy Rewards demand response program while adapting that infrastructure to meet the specific needs of low-income customers.

The project team has completed a suite of communication and engagement materials, including a dedicated webpage that allows for controlled, invitation-based enrolment. Email campaigns are the primary outreach method, with direct mail and phone outreach as backup options if participation levels are lower than

expected. Hydro One also conducted an analysis to identify a group of customers well-suited to participate in the program, such as those primarily heating with electric baseboards.

Project Insights

This project has provided an early understanding of engaging low-income customers and addressing operational challenges associated with the implementation of demand response programs to such customers. Hydro One's preliminary research revealed a high level of skepticism among low-income customers towards pilot programs, as many viewed them as short-lived with no long-term benefits. Hydro One also found that potential bill savings were not a strong motivator for participation, as many low-income customers found it difficult to see immediate financial benefits and were uncertain about how much they would actually save. In response, Hydro One offered smart baseboard thermostats and installation at no charge, emphasizing ease of use and comfort benefits (e.g., automated control and remote access). Hydro One also integrated project participants into their broader demand response program to enable demand response participation after the project ends. This approach is meant to not only address immediate customer skepticism but also demonstrate how cost and trust barriers can be reduced to support the adoption of energy-saving technologies, such as smart thermostats. It also highlights the importance of active engagement and communication on benefits and risks, as well as mechanisms to help customers manage upfront costs. The effectiveness of this strategy will be further assessed as recruitment progresses, in the hopes of getting a broader understanding of how to build lasting public support for similar energy programs undertaken by distributors that aim to engage low-income customers.

By increasing accessibility to energy programs for low-income households, Hydro One aims to remove financial barriers for customers so they can participate in and benefit from demand response initiatives.

Alectra

Project title: Alectra eMobility Customer Engagement Platform

Alectra will build off its existing customer engagement web-based platform to include a new feature, called an eMobility module, that includes interactive tools and educational content to help residential customers understand the costs and benefits of switching to an EV. In a second phase, the project aims to facilitate the participation of residential customers with Level 2 EV chargers in demand response events. Alectra will deliver, arrange and oversee the installation of the EV chargers for a subscription fee, and through the platform, provide personalized insights into greenhouse gas emissions and cost savings. This project will explore the characteristics of business models and financing options that resonate most

with customers to facilitate province-wide program deployment.

The findings will aim to support decarbonization efforts that depend on customer participation. As households transition to increased electrification, the demand from EV charging and heat pumps is anticipated to rise, which could put pressure on the localized areas within the distribution system. This pilot aims to demonstrate how utilities can use DERs installed in homes to delay the need for system upgrades caused by these increasing demands.

Project Accomplishments to Date
Alectra is in the early stages of developing its eMobility Customer Engagement Platform. Foundational work is in progress including project planning and coordination with vendors, customer engagement and enrolment planning, development of the eMobility platform and related marketing materials. The eMobility platform includes several tools such as a greenhouse gas calculator, an electricity rate comparison tool to provide cost estimates of different charging schedules and Level 1 and Level 2 chargers, as well as a public charging locator and route planning tools. Testing and refinement of the platform and its tools are ongoing to ensure data accuracy and a user-friendly experience.

Pollution Probe
Project title: Innovation in Rural, Remote and Indigenous Communities

Pollution Probe will create a framework to help rural, remote and Indigenous communities in Ontario better understand, and benefit from energy innovation. This project aims to examine how governments and utilities can more effectively support each community's journey toward achieving net-zero emissions. Additionally, it will explore ways to scale innovative clean energy technologies across more communities by identifying opportunities to demonstrate or deploy such technologies in these areas.

Project Accomplishments to Date
Pollution Probe and its project partners have completed the initial project planning phase, which includes engagement with rural, remote and Indigenous communities across Ontario. This engagement has included direct interviews and virtual workshops with communities to inform the development of the framework. The final framework is expected to be launched before the end of 2025.

Project Insights
The project continues to progress with the development of the framework. One key takeaway has been the lack of capacity in rural, remote and Indigenous communities across Ontario to deal with energy issues. Smaller municipalities, for

example, may not have dedicated staff working on energy planning. In most cases, the smaller the community, the more this challenge is pronounced. This has led to difficulties engaging with communities. In some cases, appropriate contacts such as municipal leaders, utility representatives and Indigenous community members are unavailable or unable to participate due to limited time and capacity. To address these challenges, the project team collaborated with the Association of Municipalities of Ontario and Cambium Indigenous Professional Services (CIPS), an Indigenous-owned consultancy, to help keep engagement efforts on track. At the same time, once communities were successfully engaged and the project was explained, there was strong interest in participating in the energy transition and seeing how they can benefit from energy innovation.

Energy innovation and the energy transition may also not be priorities for some communities due to other, more pressing issues. For example, the lack of affordable housing or employment may be more of a focus. As such, energy initiatives that can also address these broader needs are more likely to gain interest and support. Communities are more inclined to engage with projects that offer multiple, tangible benefits aligned with their most urgent concerns.

It also became clear that a “one-size-fits-all” engagement approach does not meet the needs of all communities. Pollution Probe recognized from early interactions with communities that tailored strategies, such as hiring Indigenous consultants or using referral-based engagement, were more effective in reaching rural, remote and Indigenous communities. Participation from these communities would benefit from a stronger focus on understanding their individual needs through open communication and greater allocation of resources and time. Meaningful relationship building, in particular, often requires more time and sustained effort, which should be factored into future planning and outreach strategies.

Stakeholder and Indigenous community engagement is a key input in informing the OEB’s policy development initiatives. The insights from this project are expected to help OEB staff in their approach to engaging various stakeholders and Indigenous communities more effectively and to enhance opportunities for their participation in the energy transition.

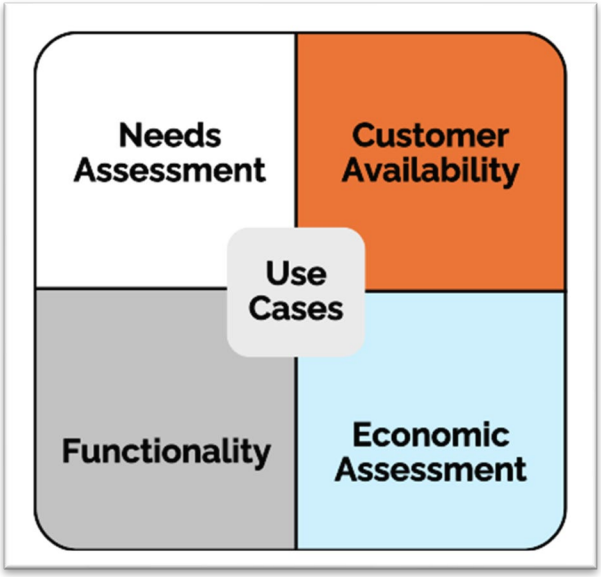
Powerconsumer
Project title: Flexibility Markets Handbook: Mapping DSO Functionality from Pilot to Scale: Identifying Regional Opportunities for Utility-scale Integration of Flexibility Services in the Energy Transition

Powerconsumer will use demonstrated or simulated flexibility market use cases to develop a Flexibility Handbook for Ontario distributors to help them plan for and

scale the use of customer-based energy solutions as an alternative to traditional grid infrastructure. A flexibility service refers to the ability of a customer or DER to adjust electricity consumption or generation in response to a request from a utility or market operator. Enhancing flexibility in the distribution grid helps manage the increasing penetration of DERs and demand-side market participation. This project will focus on several key policy areas, including the roles and functions of DSOs, DER integration, opportunities for coordination between gas and electricity distributors, planning for the energy transition, and strategies to boost customer participation in the transition.

Project Accomplishments to Date

Initial work has focused on assessing the system needs of eight distributor partners, gathering feedback through iterative engagement to understand where and how flexibility markets could align with operational priorities and planning processes. A flexibility market is a local or regional energy market where electricity distributors can procure flexibility services, such as demand response or DERs, from customers to meet system needs.



Powerconsumer concluded that the eight distributors have varying degrees of readiness to assess their respective system needs. Some distributors have dedicated teams that can support this project, facilitate data sharing and enable collaboration. Others have fewer resources available for these purposes, limiting their ability to provide access to data and participate. Many distributors also lack real-time visibility into system constraints or cannot share customer demand data due to consent requirements and outdated digital infrastructure. Data access was only permitted to Powerconsumer after signing non-disclosure agreements, with customer information anonymized and shared through secure protocols.

Some distributors face resource constraints, which limit their understanding of customer behaviour and market dynamics. This creates uncertainty about how their customers will participate in flexibility services, under what conditions and at what cost. This uncertainty makes it difficult to assess the economic viability of flexibility services over traditional infrastructure investments, which are more familiar and predictable. As a result, the project is progressing in a staggered way – distributors are engaging at different stages, with varying levels of readiness and capacity. The barriers identified reflect not only project-specific issues, but also

broader considerations in advancing DSO functions. These include the need for real-time visibility into system constraints and customer-level demand, clear cost comparisons with traditional upgrades, and more consistent operational frameworks.

Despite these challenges, the project has helped raise awareness and interest in flexibility markets among distributors. This has set the stage for developing a business case for flexibility markets for future milestones while ensuring alignment with regulatory requirements and distributor priorities.

Project Insights

Identifying a specific system need has proven to be an iterative process, often requiring several meetings with distributors. Each use case varies significantly in scope and scale, emphasizing the need for ongoing collaboration. Some distributors acknowledged a future need for such initiatives but did not perceive an immediate necessity. The project team discovered that integrating flexibility as part of a distributor's operational planning enabled further interest and momentum towards distributor participation.

The regulatory landscape for electricity distributors shifted throughout this project's early phases with the release of the OEB's BCA Framework in May 2024. The release of this Framework provides an opportunity for the project to test the Distribution System Test and Energy System Test prescribed in the BCA Framework in evaluating non-wires solutions through practical use cases. These tests aim to enable distributors to assess the viability of flexibility for meeting system needs, aligning with the OEB's efforts to establish scalable, standardized methodologies for addressing grid challenges.

Powerconsumer is also exploring the possibility of harmonizing the BCA Framework used in electricity planning with the Discounted Cash Flow + test used by gas distributors, laying the groundwork for improved coordination between electricity and gas distribution systems. By examining how these frameworks assess project feasibility and cost effectiveness, the goal is to align methodologies and explore how flexibility services can support both electricity and gas system needs, enabling a more integrated approach to energy planning. The project team is also working toward a broader "best practices" workshop with distributors to explore standardization opportunities.

In early 2024, Powerconsumer, alongside the IESO, Hydro One and NODES, presented at DistribuTECH, an annual conference for the utility industry focused on showcasing innovations in the sector. Powerconsumer shared insights from their various pilots to test flexibility solutions as alternatives to traditional infrastructure. The presentation offered valuable insights on the results of projects testing flexibility solutions, supporting the development of the Flexibility Handbook

as part of this project.

These lessons are expected to inform the OEB's work, as called for in the Minister of Energy and Electrification's December 2024 Letter of Direction, to develop and assess local and market opportunities for DERs, including alternative energy business models like DSO capabilities. In particular, this project aims to help identify where and which DSO capabilities are most needed and highlight where grid modernization investments can offer higher value.

Subsequent milestones aim to define work to establish the functional requirements utilities must meet to enable flexibility markets, ensuring that distributors can effectively acquire and dispatch DERs. Additionally, the project will conduct simulated flexibility transactions to estimate economic outcomes, comparing the cost effectiveness of flexibility services against traditional infrastructure investments. These efforts are expected to identify areas where DSOs can align processes and share functionalities.

Taykwa Tagamou Nation
Project title: Indigenous Community Solar: Innovations to Enable First Nation Energy Transition Leadership

Taykwa Tagamou Nation will investigate the challenges and opportunities arising from the energy transition for Ontario's First Nations, exploring the scalable deployment of renewable energy projects. By evaluating regulatory considerations, effective implementation strategies and various business models, the project seeks to enable First Nations to have greater control over their energy futures and localized benefits from DERs. These lessons are also expected to inform recommendations on future renewable energy initiatives, such as the proposed structuring of regulations to enable First Nations community energy projects in other communities across the province facing similar challenges and opportunities.

Project Accomplishments to Date
Taykwa Tagamou Nation established a research plan, including a schedule for key tasks to engage communities. A consultant was also engaged to draft a briefing note on Ontario's energy regulations and their impact on renewable energy and net metering. This briefing note outlined barriers to alternative avenues for monetizing surplus energy generated by First Nations. The conclusions from the briefing note served as a foundational tool, helping both the project team and communities understand how current policies influence renewable energy development. It highlighted opportunities for First Nations communities to leverage various business models to advance their energy goals.

In April 2024, Taykwa Tagamou Nation attended the Indigenous Led Projects Forum in Toronto, which brough together diverse stakeholders to engage in meaningful dialogue on Indigenous-led projects in Canada. Taykwa Tagamou Nation distributed preliminary surveys, leveraging the event as an opportunity to engage directly with several First Nations, initiate relationship-building, and begin identifying participants for their project. These surveys aimed to gather insights and identify communities interested in participating in Taykwa Tagamou Nation's research. Preliminary surveys highlighted the importance of trusted consultants and subject matter experts in helping First Nations communities interpret complex energy regulations, highlighting the value of accessible guidance in building capacity for community-led renewable energy initiatives.

Project Insights

Challenges arose during the preliminary survey phase, including the need to navigate unique world views and lived experiences of different First Nations, overcome communication barriers and adjust language to improve accessibility. Regardless, First Nations demonstrated a clear willingness to engage, showing a shared interest in renewable energy solutions as part of their Nation's energy goals.

Preliminary surveys identified capacity building as essential for broader implementation of renewable energy projects. Many community members balance competing priorities for their community that limit their ability to focus on skill development or project execution. Tailored education and mentorship programs are critical to empowering local expertise, ensuring that successful pilot projects can transition into sustainable, community-led initiatives. Early discussions with communities also highlighted challenges related to maintenance and scalability planning, emphasizing the need to integrate these strategies into project designs. By providing tailored support mechanisms such as culturally responsive engagement and technical guidance, Taykwa Tagamou Nation's efforts aim to help Indigenous communities navigate the evolving energy landscape and engage more effectively in energy planning and renewable energy initiatives. These takeaways are expected to also inform the OEB's work to enhance Indigenous participation in the OEB's adjudicative processes and ensure that Indigenous perspectives are meaningfully represented in energy regulation proceedings.

Additionally, the project team recognized that past experiences with unmet expectations from developers have contributed to skepticism among communities. This makes early and ongoing trust-building essential in the early stages of this project through longer-term engagement that ensures communities feel heard and that this project aligns with their priorities. The project team also recognized that many communities have abandoned projects due to financial constraints and inadequate consultation, leaving them wary of new initiatives. Challenges such as net-metering policies that some communities view as restrictive, as well as limited

grid access have further reinforced this skepticism, emphasizing the need for clear, community-driven project planning and sustained support.
Preliminary research by Taykwa Tagamou Nation identified net metering as both an opportunity and a challenge for First Nations. It presents clear benefits, including energy cost savings. However, Taykwa Tagamou Nation's research revealed challenges related to limited community administrative capacity (e.g., managing billing and credit distribution under community net metering models). Subsequent milestones are expected to explore these barriers further and provide related recommendations.

As part of the engagement phase, Sandbox staff visited certain communities, such as Chippewas of the Thames First Nation, and observed interviews. These interviews were with First Nations that had successfully implemented renewable energy projects, as well as those that faced barriers and had to abandon their initiatives. They also explored examples from communities outside Ontario that had developed sustainable renewable energy project models potentially applicable in the province. These sessions revealed a need for increased awareness of the OEB's role and responsibilities. The insights aim to help inform the work on enhancing participation by Indigenous communities in the OEB's processes and in the energy transition more broadly. Targeted outreach and education efforts will be essential to empowering Indigenous communities to navigate regulatory frameworks effectively and participate fully in shaping energy policies. Subsequent milestones are expected to compile research findings into a final report, highlighting key barriers and related recommendations such as proposing the structuring of regulations to enable First Nations community initiatives, in order to reduce barriers and support capacity building for First Nation energy sovereignty.

3.3 Innovation Handbook

Innovation is essential for a sustainable and evolving energy sector. The OEB released the Innovation Handbook in March 2023 to serve as a useful reference guide for industry innovators, consolidating OEB policies, staff guidance and decisions that have supported innovative projects and proposals. Recognizing the importance of keeping pace with sector developments, the OEB updated the Handbook in September 2024, ensuring it remains a valuable resource for facilitating innovation and supporting transformative energy solutions. Key developments reflected in the 2024 Handbook updates include the BCA Framework, amendments to the Distribution System Code related to the effective integration of DERs and EV infrastructure and the authority to issue licence exemptions for innovative pilot projects.

3.4 Regulatory Partner in IESO’s 2024 GIF

In April 2024, the IESO's GIF launched a targeted call for projects focused on electrification and demand management, with the OEB acting as a regulatory partner, providing project-specific support. The call invited proposals targeting two streams: EVs (including light-, medium- and heavy-duty vehicles, as well as rail transit) and space and water heating across all sectors, which also includes ventilation and cooling for non-residential weather-sensitive loads. The two streams for proposals aim to demonstrate how EVs and controllable weather-sensitive loads can provide system flexibility and be integrated to support the electricity system. Successful applicants will be referred to the Sandbox and must seek and obtain regulatory guidance (if applicable) as part of their first project milestone.

4. CONCLUSION

The year 2024 brought notable advancements for the Sandbox, with milestones achieved across multiple initiatives, including the Innovation Sandbox Challenge, updates to the Innovation Handbook and acting as a regulatory partner in the IESO's GIF targeted call. The Sandbox will continue to support innovation in the sector to deliver value to consumers and help advance key policy priorities in a constantly evolving energy landscape.