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2024 Grid Innovation Fund Electrification and Demand Management

IESO April Stakeholder Engagement Session

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Purpose of Today's Webinar

To provide an overview of the 2024 Grid Innovation Fund Targeted Call and seek stakeholder feedback on the draft Proposal Guideline

Agenda:

- Background and Context
- Objectives and Project Streams
- Key Performance Indicators
- Eligibility Criteria, Review and Approval Process
- Regulatory Partner and Supporting Organizations
- Next Steps

The Grid Innovation Fund

Enables the IESO to objectively evaluate the cost-effectiveness and viability of innovative solutions to increase electricity grid reliability and customer affordability

- \$9.5M/year for pilot projects
- Open to for-profit and non-profit entities excluding individuals, incorporated individuals, sole proprietorships, trusts or joint ventures
- 250 projects funded since 2005
- Investment in projects up to three years in length
- IESO funding supplemented with proponent and partner funding

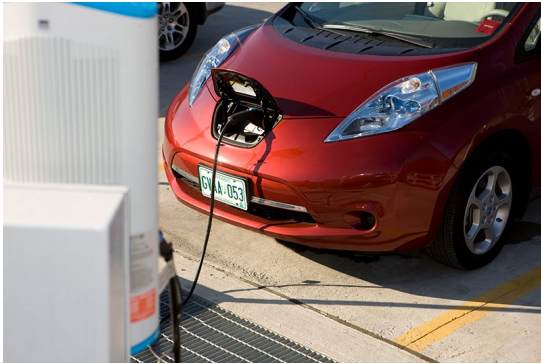
Context

- Electrification of the transportation and space heating sector are major contributors to rising demand in the province, changing daily load profiles, and seasonal peak shifting¹
- Opportunity to demonstrate how novel demand management can provide flexibility services to the grid without compromising consumer transportation or heating needs to:
- Help address Ontario's growing electricity needs
- Support customers managing electricity costs and reducing greenhouse gas emissions
- Enable the IESO and distribution utilities to more fully integrate controllable loads as non-wires alternatives at the distribution level, with benefits to the provincial grid
- Inform future conservation and demand management program design
- Inform policy and regulatory discussions and initiatives

¹ Outlined in the IESO's 2024 Annual Planning Outlook (APO)

Problem Statement

How can electrification of the transportation and heating/cooling sectors be achieved in a way that helps address Ontario's growing electricity demand while maintaining grid reliability, sustainability and affordability for ratepayers

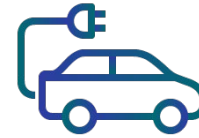


Objectives

Demonstrate how EVs and controllable weather-sensitive loads can provide system flexibility and be integrated to support the electricity system:

1. Demonstrate the *types of flexibility services* that aggregations of EVs or heating equipment can provide to the grid
2. Develop and demonstrate *programmatic approaches / participation models* that enable consumers to leverage these assets for additional revenue opportunities
3. Obtain *Ontario-specific end-use load profiles* and data to support distribution and bulk system planning activities
4. Quantify *infrastructure deferral savings* potential
5. Support *sector evolution* through informing policy and regulatory initiatives
6. Quantify the *greenhouse gas emissions reductions* that can result from electrification and load management of EVs and heating equipment

Stream 1: Electric Vehicles



#	Sub-stream	Description
1A	Vehicle to Grid (V2G)	Demonstrate how EV fleets or aggregations can be utilized to provide local and/or wholesale level grid services to support the reliable operation of the grid <u>through energy injection from the vehicles back into the distribution grid</u>
1B	Managed Charging (V1G) and Vehicle to Home/Building (V2H/V2B)	Demonstrate how EV aggregations can be managed to mitigate charging impacts on the distribution network and bulk electricity system and support the reliable operation of the grid <u>through aggregated managed charging and bi-directional charging to offset home or building load,</u> or provide backup power during power outages

Local distribution companies (LDCs) must either lead or be a partner in proposals for Stream 1. Integration with distribution utility tools, systems, and planning processes must be explored.

Stream 2: Space and Water Heating and Cooling

#	Sub-stream	Description
2A	Small to medium-scale heating and thermal storage	Demonstrate the capability of thermal storage and control solutions to manage space and/or domestic water heating needs while providing system flexibility in the winter season for the following applications: (1) heat pumps integrated with thermal storage in new installation applications with or without aggregation; and/or (2) aggregation of control solutions for existing space and/or water heating systems
2B	Large-scale heating and thermal storage	Design and install a large-scale heat pump system integrated with thermal storage to provide the space and/or process heating needs of a large customer and demonstrate how the system can provide system flexibility for the distribution network and bulk electricity system on an enduring basis
2C	Aggregation of HVAC loads	Design and implement a new program to aggregate and manage non-residential controllable HVAC loads to support the distribution network and bulk electricity system, with a focus on automation and the ability to provide real-time or near real-time visibility

Proposed Minimum Size Targets

Stream 1: EVs

1A Vehicle to Grid: Projects should aim for minimum fleet size of:

- $\geq 500\text{kW}$ installed charger capacity
- $\geq 500\text{kW}$ vehicle discharge capacity
- ≥ 5 vehicles

1B Managed Charging and V2H/V2B: Aim for minimum aggregation of:

- $\geq 100\text{kW}$ available capacity for $>60\text{mins}$
- ≥ 50 vehicles (uni-directional or >20 EVs (bi-directional))

Stream 2: Space and Water Heating and Cooling

2A Small/Med Heating w Thermal Storage:

- $\geq 100\text{kW}$ minimum effective/average available load reduction for >60 mins

2B Large Heating w Thermal Storage:

- $\geq 200\text{kW}$ minimum effective/average available load reduction for >60 mins

2C Aggregations of HVAC Loads:

- No threshold

Eligibility: Project Type and Category

Project Type

- Program: Testing of a new program/participation model
- Emerging Technology Demonstration: Testing of a near-commercial technology in a real-world environment (technology readiness level 7 or higher)
- Tool: Testing of a new energy management tool or approach demonstrating reliability services for the distribution network and bulk electricity system

Project Category

- System Flexibility: reducing/shifting electricity consumption, increasing electricity consumption and/or injecting into the distribution network in response to distribution and/or bulk system needs
- System Integration: integration of a demand-side resource/aggregation into distribution utility and IESO planning and operations and includes testing components such as visibility, dispatching, etc

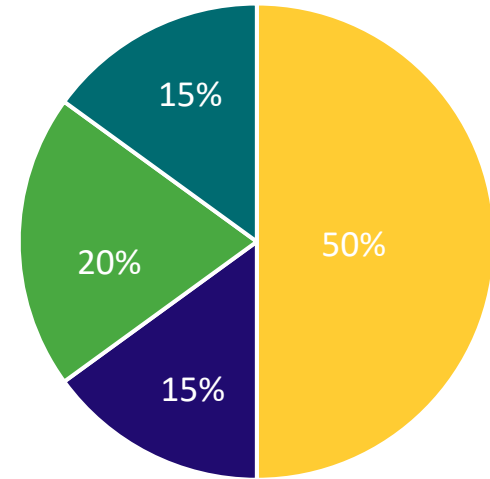
Eligibility: Proposal Applicant and Partners

- Eligible applicants: non-profit and for-profit incorporated entities including but not limited to electricity distributors, technology companies, fleet owners/operators, academic institutions, public sector organizations and others
- A minimum of three partners, including the lead applicant, must participate in the project and provide cash and/or in-kind contributions
- **Funding is not available to individuals, including incorporated individuals, sole proprietorships, trusts, or joint ventures**



Eligibility: Project Funding 1/2

- \$9.5M IESO funding envelope for GIF 2024
- Maximum \$4.75M of IESO funding per project
- Minimum \$1M of IESO contribution funding request for Stream 1 projects only
- IESO maximum contribution: 50% of total project value
- Applicant minimum cash contribution: 15% of total project value
- Applicant and partner minimum cash contributions: 35% or more of total project value
- Project expenses must align with the GIF eligible project expenses outlined in Appendix A



■ IESO Max Contribution ■ Applicant Cash
■ Applicant or Partner Cash ■ Cash or In-Kind

Eligibility: Project Funding 2/2

- Project partners are required to submit signed Letters of Support stating their cash and/or in-kind contributions with the proposal submission
- Grant stacking with non-IESO sources of funding is encouraged; duplicate funding is not permitted
- Projects cannot receive additional funding from other IESO-administered programs (i.e. Save on Energy programs) or participation in markets for the duration of the project term (i.e. Capacity Auction).
- All budgeted expenses using IESO funds are subject to audit



Key Performance Indicators (KPIs) and Testing

- To measure the success of projects and the GIF 2024 call, the following KPIs² will be assessed:
 1. Flexibility provided
 2. Program effectiveness
 3. Ontario-specific load profiles
 4. Infrastructure deferral savings potential
 5. Sector evolution
 6. Greenhouse gas emissions reductions
- The IESO will provide a standardized testing framework to successful proponents that will assist in measuring bulk electricity system impacts and transmission-distribution coordination in a consistent manner



² Further details in Appendix B

Evaluation Criteria 1/2

#	Category	Evaluation Criteria Description	Points
1	Project Purpose and Outcomes	Is the purpose of the project clearly described and aligned with the high-level objectives of the 2024 GIF call?	5
2	Grid Flexibility	The proposal clearly articulates: (1) the types of flexibility services that will be tested; (2) the types of needs they will address (at local and bulk levels); (3) how flexibility will be tested and quantified; (4) the distribution and transmission assets that will be involved; (5) the types of unique end-use load profiles that will be provided; (6) how hourly demand data will be measured, collected, etc.	20
3	Demand-side Program Design and Innovation	The proposal clearly describes a well-defined, unique program design/participation model, articulates how outcomes can be used to inform future programs, demonstrate the innovative aspects of the proposal	20
4	Project Design	The scope, work plan and scheduled tasks are reasonable and contained logical framework that supports the successful completion of the project. The approach to measure KPIs is appropriate. A realistic Marketing Plan to attract participants is included.	20

Evaluation Criteria 2/2

#	Category	Evaluation Criteria Description	Points
5	Project Funding	Budget items are relevant to achieving the project's objectives and are clearly linked to activities/deliverables, project risk is appropriately allocated, the proponent is in good financial standing and able to carry their financial obligations	15
6	Project Team and Partners	The project team has the qualifications and experience required to execute a large-scale, strategic project	5
7	Emissions Reductions	Publicly recognized / standardized methodologies for calculating GHG emissions are used.	5
8	Sector Evolution	The proposal describes: <ol style="list-style-type: none">1. How outcomes can be used to inform regulatory innovation and policy initiatives2. How post-project activities would enable broader uptake of the solution	10
TOTAL			100

Evaluation and Approval Process

- Submitted proposals will be screened for eligibility (e.g. project type and timeline, project category, project applicant, project funding)
- Eligible proposals will be numerically evaluated against the evaluation criteria by a Technical Review Committee comprised of internal subject matter experts with the support of external technical experts if needed
- The highest ranking project from each stream will be selected first, followed by the highest overall ranked projects across both streams until the \$9.5M funding is allocated
- Highest ranking projects will be recommended for executive approval and offered a Contribution Agreement

Ontario Energy Board (OEB) Regulatory Partner

- OEB's Innovation Sandbox is collaborating with the IESO to provide regulatory support
- The Innovation Sandbox can provide project-specific support for innovative projects that require customized regulatory guidance
- Successful projects will be directed by the IESO to the Innovation Sandbox to seek and receive (subject to OEB approval) regulatory guidance
- Receiving regulatory guidance will be the first project Milestone
- **It is encouraged to engage with the Sandbox as early as possible to determine whether your proposal may require regulatory support**

Supporting Organizations

The Electrical Safety Authority (ESA) regulates and promotes electrical safety in Ontario and oversees the Ontario Electrical Safety Code. Installers and designers are required to satisfy the current OESC requirements, and are encouraged to refer to the latest bulletins issued by the ESA. See further details in the Proposal Guideline, Section 8.



For smaller-scale EV-related projects that do not meet the GIF \$1M minimum funding request, we encourage proponents to check out the Ontario Vehicle Innovation Network (OVIN) [R&D Partnership Fund – Advanced Charging and Vehicle-to-Grid \(V2G\) Stream](#) to see if your project would be a good fit for that program.



Next Steps

Timing	Activity
May 7, 2024	Stakeholder Feedback due
May 24, 2024	IESO to publish Final Proposal Guideline, Templates, Agreement
May 27 – July 21	Window to accept proposals is open
August – October	Proposal evaluation and selection
Q4 2024	Execute Contribution Agreements with successful proponents

Request for Feedback

- The IESO is seeking feedback on the 2024 GIF Call
- Interested parties are welcome to provide written feedback using the feedback form posted on the [GIF 2024 Engagement webpage](#)
- Feedback forms should be submitted to engagement@ieso.ca by May 7, 2024
- The IESO will post the responses to submitted feedback on the GIF 2024 Engagement webpage



Appendix

Appendix A: Examples of Eligible Expenses

- Bi-directional EV supply equipment – up to 100% of the incremental cost compared to an equivalent uni-directional charger
- Smart inverters, including multi-mode inverters
- Certain customer-related infrastructure upgrade costs needed to accommodate the project e.g. upgrading panels, switchgear, customer transformers, etc
- Integration of software solutions
- Software licensing fees
- Purchase of medium/heavy duty electric vehicle fleets – up to 100% of the incremental cost compared to an equivalent ICE (internal combustion engine) vehicle
- Heat pumps integrated with thermal storage for residential / small commercial applications
- Costs associated with the monitoring, verification, and evaluation of the project's impacts, including data collection, processing, analysis, and management
- Compensation or incentives paid to project participants based on the participation and/or performance of their resource(s) in a program
- Marketing and communications directly related to project activities, including training education initiatives
- Project-specific materials, equipment, products, services
- Salaries and benefits of employees directly involved in the design, selection, purchase, and installation
- Professional, engineering, scientific, technical, management and contracting services

Appendix A: Examples of Ineligible Expenses

- Purchase of personal-use light duty electric vehicles
- Uni-directional EV supply equipment
- Stand-alone heat pumps (without thermal storage) for residential applications
- Smart thermostats
- Supplementary generation assets that may support the project (e.g. stationary storage)
- Costs related to System Impact Assessment (SIA) or Connection Impact Assessment (CIA) processes
- Budget deficits
- Activities completed or costs incurred before the funding is approved or after the project is completed
- Costs over \$50,000 for any single consultant or contractor that has not been selected through a competitive process
- Costs associated with the purchase of real estate
- Any overhead costs generated by the lead applicant or third parties, such as operating costs related to general maintenance and repair
- Hospitality, travel costs, incidental or food expenses
- Any costs not directly related to the achievement of the project's objectives as defined in the contribution agreement between the IESO and the applicant

Appendix B: Key Performance Indicators (KPIs) 1/2

KPI	Description
Flexibility Provided	Quantifies the amount of flexibility provided to both the distribution network and bulk electricity system, including the number of flexibility services, number of instances, number of hours and total capacity (MW)
Program Effectiveness	Examines how effective project programs are in meeting the objectives of this call, including their ability to (where applicable): <ul style="list-style-type: none"><li>• Enroll and retain project participants<li>• Manage/optimize the energy consumption of the loads to provide flexibility services to the grid<li>• Provide real-time telemetry/visibility into individual and aggregated load behavior<li>• Provide data for individual and aggregated loads for performance validation and settlement purposes<li>• Develop and implement T-D coordination protocols

Appendix B: Key Performance Indicators 2/2

KPI	Description
Ontario-Specific Load Profiles	Indicates the number of unique end-use load profiles that are statistically significant and can inform planning processes at the distribution and bulk system levels
Infrastructure Deferral Savings Potential	Examines the project's ability to meet or contribute to the load relief requirements necessary to defer infrastructure upgrades at the distribution and transmission levels
Sector Evolution	Assesses the project's capacity to gather information and disseminate insights that will facilitate regulatory innovation and/or inform policy
Emissions Reductions (tCO2e)	Quantifies the reduction in Scope 1 and 2 emissions throughout the course of the project resulting from the electrification of the end use and management of the electric controllable loads

Thank You

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