
Smart Grid Fund and Jobs Development

March 10, 2017

Presentation Overview

- What is a smart grid?
- Smart Grid Fund (SGF) building on policy objectives
- Objectives of the SGF and program status
- Projects undertaken
- Commercialization and job creation components of the program
- Program development from one round of applications to following ones.
- Program results
- Next steps

Grid Modernization – What Makes a Grid Smart

- The smart grid is intelligent electricity infrastructure, built on a platform of sensors, monitoring, communications, automation and computers to improve the flexibility, reliability and efficiency of the electricity system.

Smart grid leverages smart meters and other software and hardware applications to improve utility visibility and control over their systems, as well as consumer awareness and control.

- Building a smart grid is not a single project, but a series of integrated initiatives and technologies that work together to create a modern electricity system aligned with the digital age. Advancing the smart grid is an investment in our clean energy future and our economy.

Electricity Sector – Drivers for a Smarter Grid

- A modern smart grid is driven at different planning levels by a range of actors and pressures

LONG TERM ENERGY PLAN

Bulk System

- **Key Players** – IESO, OEB, Transmitters, Large Generators
- **Key Pressures** – Regional reliability standards (NERC), domestic regulatory framework, supply / demand changes, efficiency improvements, security

Distribution

- **Key Players** – IESO, OEB, Local Distribution Companies (LDCs), Municipalities, New Entrants / Innovators
- **Key Pressures** – Distributed generation, rate design / recovery, technological change, consumer choice / control, LDC transformation

Customers

- **Key Players** – IESO, OEB, LDCs, Retailers, Other Service Providers, New Entrants / Innovators
- **Key Pressures** – Price increases, Time-of-Use, Conservation / Demand Management, energy independence, more customer control, “Internet of Things”

Overview of Smart Grid Fund Policy Origin

- Ontario's Smart Grid Policy included two main initiatives:
 - 1) A 2010 Directive to the OEB to promote the smart grid and provide guidance to utilities undertaking smart grid activities.
 - 2) The 2011 launch of the Smart Grid Fund, a \$50M competitive program to support smart grid technology capacity building and demonstrations.
- The Smart Grid Fund was first announced in Budget 2009 as a means to kick-start the testing and demonstration of technologies necessary for developing a smart grid in Ontario.
- A corollary goal was to place Ontario as an innovation leader for smart grid solutions – this is why commercialization is a key objective of the fund.
- By supporting these projects, Ontario gains valuable insights into the cutting edge solutions and also the barriers for implementing a smart grid.

Smart Grid Fund – Policy Program

Green Energy Act, 2009 - Set the objectives and framework for smart grid to “improve the flexibility, security, reliability, efficiency and safety” of the electricity grid.

Smart Grid Fund launched in 2011 – Very strong response rate in funding rounds. Sector consultations and various public reports advocate for ongoing innovation support.

LTEP 2013 – Committed to expanding the Smart Grid Fund based on strong stakeholder feedback and alignment with government policy (economic development, jobs, Ontario as innovation leader).

Navigant Report on Ontario’s Smart Grid Roadmap (2015) – Confirmed the value of implementing smart grid technology over the long term. Identified technologies that have high value.

Smart Grid Fund round 3: Focused on innovation projects that aligned with the high value technologies identified in the Navigant Report (slide 6).

Smart Grid Fund – Objectives and Outcomes

FUND OBJECTIVES

- 1. Advance one or more of the smart grid objectives** in the focus areas of consumer control, power system flexibility and adaptive infrastructure.
- 2. Create economic development opportunities**, including jobs, for Ontario organisations seeking to commercialize SG technologies.
- 3. Reduce risk and uncertainty of electricity sector investments** by enabling utilities and other electricity industry stakeholders to develop, test, and evaluate SG technologies and business models.

EXPECTED OUTCOMES

- Identify smart grid solutions for Ontario
- Accelerate technology commercialization
- Establish Ontario as a global smart grid leader
- Ensure a coordinated approach to smart grid development, and encourage information-sharing within industry

Key SGF Metrics*



*These program figures represent Round 1 &2.

SGF Projects

*Completed

	Grid Automation	Home Energy Mgmt	Data Analytics	Energy Storage	Electric Vehicle	Microgrid
Round 1	• dTechs • GE* • Prolucid	• Energate – Consumer Engagement*	• Essex Energy* • IBM* • N-Dimension*			
Round 2	• Grid 20/20* • Opus One • Varentec	• Energate – Dynamic Pricing* • McMaster • Rogers		• eCamion - Smart Energy Storage • Ryerson University	• FleetCarma* • Tech Mahindra • University of Ottawa	• Canadian Solar • eCamion - microgrid • Panasonic
Round 3	• 6 Projects		• 2 Projects	• 1 Project		• 4 Projects
Total	12	4	5	3	3	7

Round 3 projects expected to be announced in Spring 2017.

Unsolicited Projects: Advanced Energy Centre, Team Ontario Smart Home, oPower, Ryerson Smart Grid Lab, and Green Button.

SGF – Commercialization Component

At the **Program Guidelines** stage, it is clearly set out that the program not only supports technology demonstration and capacity building, it is meant to support economic development in the process.

- Commercialization of the developed solution is recognized as a primary factor for building on the current commercial presence of the recipient in the province and a key potential for job creation.
- Where applicants provide a project application that overall looks good, the recipient must show that they have and/or will build their presence in Ontario through the project and that additional staff for the project will be from Ontario.

A year following project completion, a **Commercialization Report** is submitted that provides an update on implementation of the commercialization plan that was developed during the project. This includes sales information such as the amount of product sold as well as information on the staff levels of the recipient and the number of staff that have been hired on a permanent basis as a result of the project.

SGF – Jobs Component

Jobs are considered and/or tracked at four additional points during the SGF project process:

- 1) Application** – There is a section of the application where applicants must state the number of jobs that will be created for the project by the: recipient; LDC collaborator; and other project collaborators.
- 2) Evaluation** - Higher scores are awarded to applications that create more jobs during the project, that have an established presence in Ontario and that plan to hire staff for the project in Ontario.
- 3) Contracting** – All expectations regarding hiring are included in the agreement.
- 4) Project Completion** – In the final project report, the number of actual jobs created are reported. Recipients also state in their commercialization plan the number of staff that will be required to support commercialization activities.

Program Results to Date

- Positive feedback from industry / innovators to continue providing innovation support.
- Ministry has surveyed recipients and collaborators on program views, commercialization barriers, etc.
- Recent reports recognize the value of continued investment in a smarter grid, consistent with LTEP commitment:

1) Ontario Smart Grid Forum

- Broad analysis of different avenues / focus areas for continued innovation support

2) Navigant Consulting

- Cost-benefit analysis found high value of continuing smart grid investments beyond 2020

Ontario Smart Grid Assessment
and Roadmap



NAVIGANT

3) Canadian Electricity Association

- Recommended ongoing innovation funding to stimulate modernization



Canadian
Electricity
Association

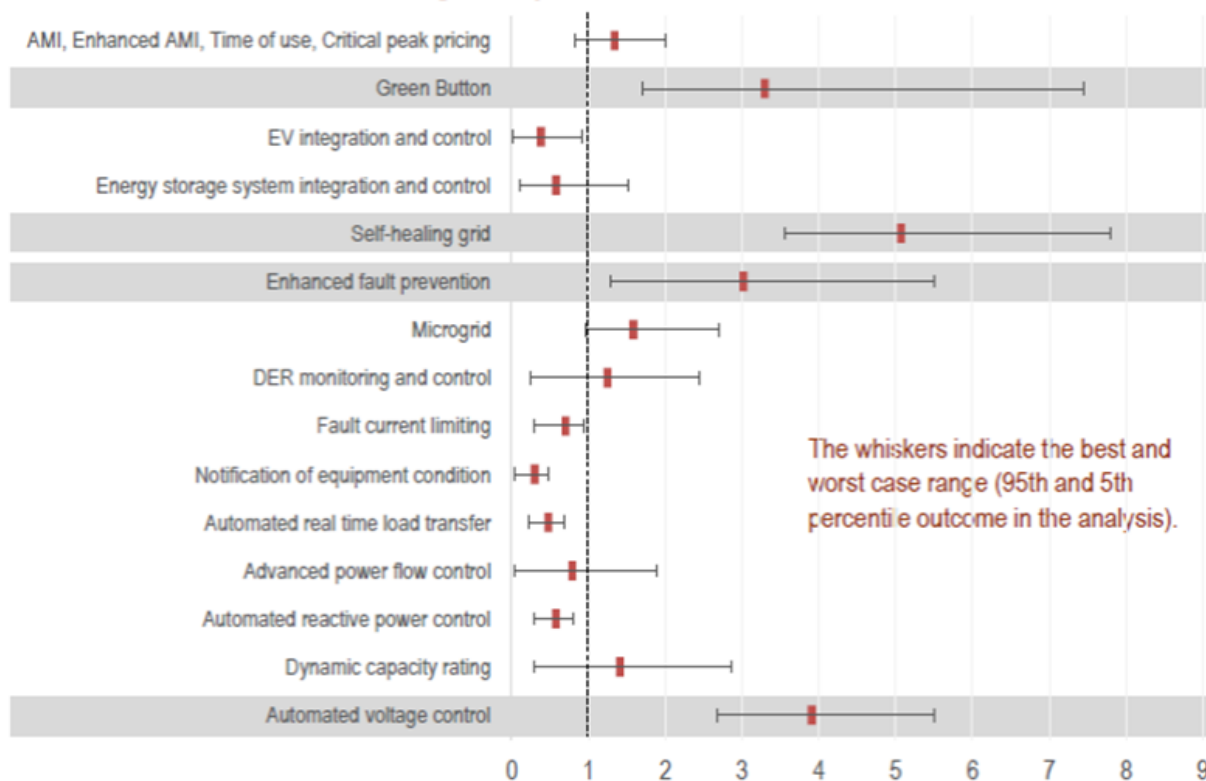
Association
canadienne
de l'électricité

Navigant Smart Grid Roadmap - Snapshot

Select Findings

- If Ontario continues to invest in smart grid through 2035, there is the potential to deliver a net benefit of \$6.3 billion (\$3.8 – 9.0 billion, depending on investment scenario)
- Some technologies demonstrate clear present value, while others may need more growth to show demonstrable benefit across the system
- Several barriers – immature technology, diffuse benefits v. concentrated costs – impede the development of a smart grid in Ontario

Benefit-cost ratios for smart grid capabilities



SGF Recipient and LDC Survey Overview

- A survey of SGF recipients and LDCs was conducted from July to September 2016.
- The objective of the SGF Survey was to:
 - Receive feedback on the SGF program;
 - Understand the barriers to adoption for smart grid technology;
 - Determine strategies to further promote smart grid development and commercialization in Ontario; and,
 - Develop a focus group of recipients for follow-up questions and primary research.
- Information collected included:
 - Top 3 ways in which the SGF has had a positive impact on your company
 - How did the SGF assist your company identify business development and sales opportunities?
 - How did the SGF assist in growing your company?

Survey Findings – Companies

Recipients have found SGF to be supportive of their overall technology development and their company. With respect to jobs, it has allowed companies to hire new employees and train existing and new employees during the project. Most of the new jobs created during the projects are highly skilled, well-paying positions.

1) Top 3 ways in which the SGF has had a positive impact on your company?

- "Helped to train people and generate jobs."
- "Raised general technical competence of staff"
- "Staff exposed to (new) standards"
- "Accelerated growth of technical staff complement"
- "Creation of new team and enabled indirect job opportunities"

2) How did the SGF assist your company validate your technology/ solution?

- "Helped fund the human and computing resources which were necessary to conduct leading edge research."

3) How did the SGF assist in growing your company?

- "Allowed our company to create highly technical jobs."
- "Hired 2 new business development staff. One new staff member is pursuing business development in USA."

Survey Findings – Local Distribution Companies

Overall, LDCs have found the program to support their understanding of new smart grid technologies within the organization and how specific technologies can change their operations to support different service objectives and customer needs.

Below are some comments on how the program has support LDCs with developing staff skill levels and facility with these innovative technologies.

1) How did the SGF assist your utility in identifying areas of growth and opportunity?

- "Microgrid is a new area for the whole industry. With the help of SGF people are hired and trained to be competent in this area."
- "Opportunity to learn from others in a collaborative project."
- "Gained needed engineering and technology skills"
- "Greater employee knowledge of electric vehicles and their potential impacts"
- "Experience gained by younger staff"

2) How did the SGF assist your utility's approach to innovation?

- "Expanding the team for new technology and business development."
- "Developed new skill set and knowledge base."
- "Field crews were exposed to new technology."

SGF Next Steps

- All SGF funding has been allocated.
 - The last application window was heavily oversubscribed.
 - Technical consultants suggested that this 3rd round included some of the most impressive smart grid solutions to date.
- The 2013 LTEP committed to expanding the SGF. The pathway for achieving this commitment is still being explored.
- Through the LTEP process, the Ministry is also considering changes to the SGF guidelines to align with Grid Modernization policy and learnings to date.
 - Over five years, the Ministry has developed in-depth knowledge and insight into cutting edge technologies and leveraged its learnings to identify both barriers and opportunities to support distribution grid modernization. This knowledge would instruct how best to focus future investments.

Further Information

For further information about the program and projects supported through SGF, please see the Ministry website at:

<http://www.energy.gov.on.ca/en/smart-grid-fund/>