

Ontario Smart Grid Forum: Report back from the WORKING GROUP

Tuesday, November 9th , 2010



Report back from the Ontario Smart Grid Forum Working Group on its recent (November 1st) deliberations on the following topics:

1. Smart Grid Costs and Benefits
2. Smart Meter Data Access

Smart Grid Costs:

- The Smart Grid Forum Working Group has largely completed its work on Smart Grid **costs** and this presentation will summarize where this effort currently stands.

Smart Grid Benefits:

- The Working Group is also accumulating key arguments and examples of specific smart grid **benefits** in each of the strategic focus areas previously identified by the working group and vetted by the Forum on October 12th.

- **Recall:** 2009 SGF Report (*“Enabling Tomorrow’s Electricity System”*):

“Preliminary cost projections prepared by Forum members and extrapolated to cover Ontario’s entire grid sector (distribution, transmission and the IESO) estimate that incremental annual capital spending on a smart grid would average about \$320 million over the initial five years.”*

* “Comparisons between this estimate and the smart grid spending estimates for other jurisdictions are not meaningful because of the different spending categories included in various figures and the different starting point for each jurisdiction. For example, the above cost estimate does not include the cost of renewable energy resources or any smart meter costs. “

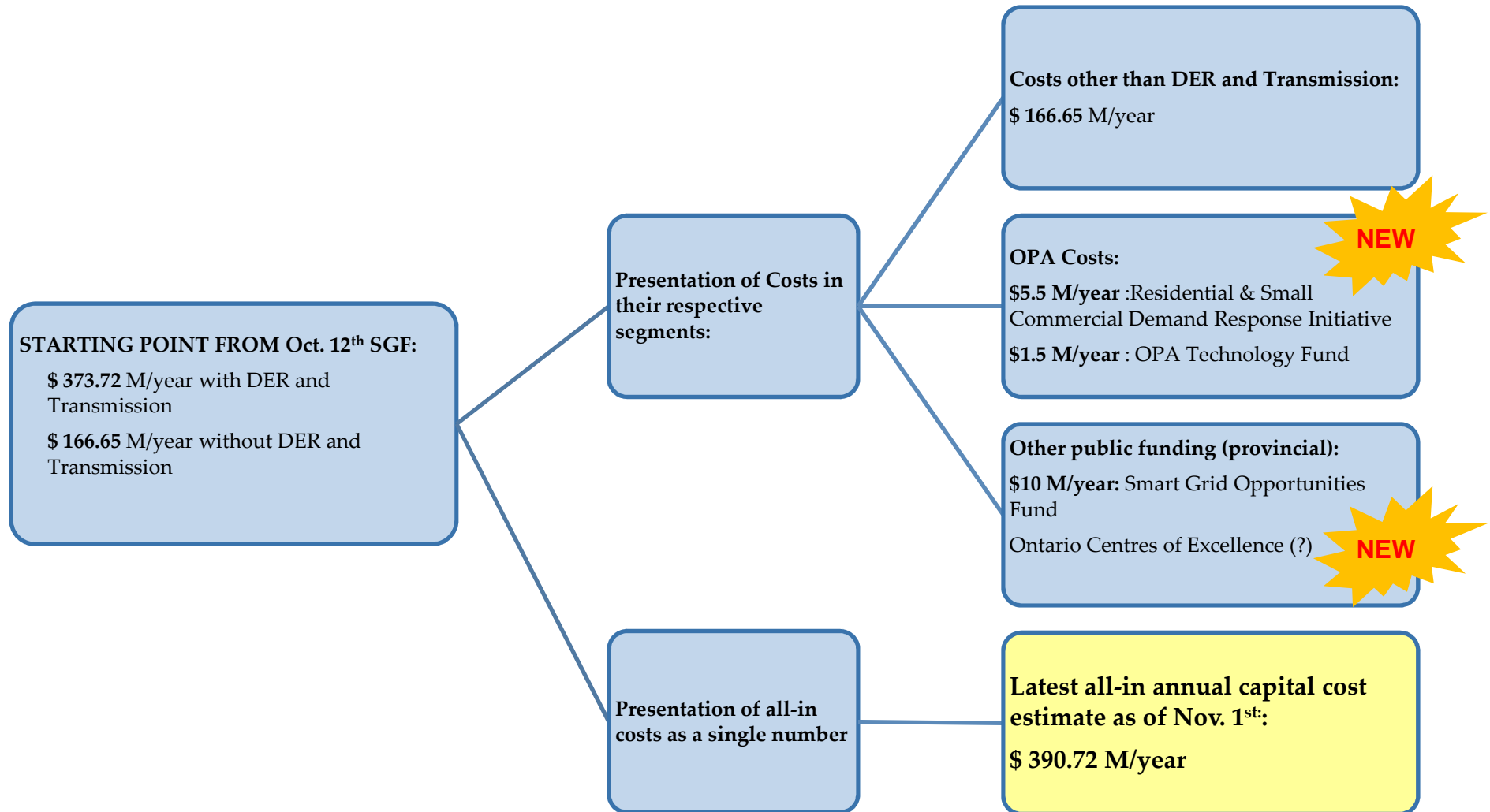
RECALL: Action Items for the Working Group assigned by the Forum on October 12th:

Action Item from SGF	Current Status
Re-examine the capital cost estimates in the context of comparative deployment rates amongst the smaller LDCs to ensure the model accounts for such differences.	<ul style="list-style-type: none"> • Still seeking EDA involvement and input. • Recommend that the current estimates stand as-is in the meantime given the diversity of the current sample (see also Oct. 12th working group report)
OPA conservation and demand management costs need to be included in the estimates, but still reported as a separate number.	<ul style="list-style-type: none"> • Estimates received and now included.
Isolate all capital expenditure estimates related to distributed generation.	<ul style="list-style-type: none"> • Working Group feels that this work is already complete due to considerations previously applied to the estimates. • This presentation will provide further details



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The Estimates as they Currently Stand – November 9, 2010



(All figures in \$ millions per year over 5 years).

Detailed Summary of changes presented to estimates:

(all figures in \$ millions/year)

	As of Sept. 7, 2010	As of Oct. 12, 2010	As of Nov. 9, 2010
Consumer Technologies	3.86	10.52	17.52
Distribution	133.91	141.76	141.76
Distributed Energy Resources	196.38	198.22	198.22
Transmission	6.36	8.86	8.86
Communications	8.08	8.84	8.84
Electric Vehicles	2.59	4.06	4.06
Innovation and the Economy	0.83	1.46	11.46
Totals:	352.01	373.72	\$ 390.72

The Cost Categories in More Detail

- At the October 12th SGF, an action item was assigned to the working group regarding the isolation of estimated distributed generation costs from other smart grid cost estimates.
- As the working group felt that this separation of costs has already been accounted for, it was further felt prudent to review the content of the detailed cost estimation line items...

1. Consumer Technologies
2. Distribution
3. Distributed Energy Resources
4. Transmission
5. Communications
6. Electric Vehicles
7. Innovation and the Economy

The Cost Categories in More Detail

Category	Principal Components	Examples of Current Pilot Projects
Consumer Technologies	<ul style="list-style-type: none"> • Various public utility expenditures on behind-the meter technologies. • OPA CDM funding • OPA Technology Fund 	<ul style="list-style-type: none"> • Automatic Demand Response • Demand Dispatch • Industrial/Commercial Demand Response • Home Area Networks/Home Energy Management Systems • Smart Appliances • Electric Thermal Storage • Thermal Storage - Ice Systems

The Cost Categories in More Detail

Category	Principal Components	Examples of Current Pilot Projects
Distribution	<ul style="list-style-type: none"> • Incremental additions to infrastructure to increase the functionality of the smart grid in terms of monitoring and automated control • Excludes additions to infrastructure simply to accommodate distributed generation 	<ul style="list-style-type: none"> • Communicating Digital Fault Indicators • Distribution Automation Reclosers • FDIR - Fault Detection, Isolation, Restoration • Grid Optimization and Management • Special Protection Schemes, Relay Upgrades • Real Time Asset Condition Monitoring • Substation Automation • Primary Line Monitoring • Transformer Smart Metering • Secondary Network Automation • Smart Grid Systems Integration • System Expansions

The Cost Categories in More Detail

Category	Principal Components	Examples of Current Pilot Projects
Distributed Energy Resources	<ul style="list-style-type: none"> • Expenditures triggered by FIT and MicroFIT programs. • Other expenditures, generally to bolster the grid's capability to accommodate distributed generation. 	<ul style="list-style-type: none"> • Flywheel Storage • Station and Community Energy Storage • Wind and Solar Projects • System Capacity and Protection Upgrades
Communications	<p>Communications network components that directly aid or enable incremental smart grid functionality above and beyond basic capability already embedded in field equipment.</p>	<ul style="list-style-type: none"> • Communications Infrastructure • WiMax Wide Area Network • Fibre Optic Network • SCADA • Outage Management System • Energy Management System • Mobile Computing • System Modelling and Analyses

The Cost Categories in More Detail

Category	Principal Components	Examples of Current Pilot Projects
Transmission	<ul style="list-style-type: none"> • Components that enhance the functionality of the transmission system consistent with the smart grid principles. • Various IESO system refresh projects. 	
Electric Vehicles	<ul style="list-style-type: none"> • Almost entirely pilot projects. 	<ul style="list-style-type: none"> • Fleet and Public Charging Infrastructure • Smart Charging Infrastructure
Innovation and the Economy	<ul style="list-style-type: none"> • Smart Grid Opportunities Fund currently assumed to be the single largest component (most significant departure from 2009 estimates) 	<ul style="list-style-type: none"> • University Programs for Smart Grid, Renewable Energy, Storage, Electric Vehicles, etc. • Smart Grid Opportunities Fund



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Smart Grid Benefits

- **Current Activity:**

- **Objective:** include specific points and arguments with a direct link to current activity in Ontario and the high-level smart grid principles.
- **As discussed at the Oct. 12th SGF:** Potential components of the benefits discussion for the Annual report in the following strategic areas:
 - Lowering barriers to adoption
 - Operating resiliently against attack and natural disaster; (security-related)
 - Fault detection, isolation and restoration (FDIR) (reliability-related)
 - Continuous commissioning and proactive maintenance (reliability-related)
 - Enable active participation by consumers
 - Enabling new products, services and markets
 - Optimizing asset utilization and efficient operation
 - Avoided cost of capacity and reduced operation of inefficient peaking plants (relates to efficiency, CDM and customer value principles)
 - “Power quality for the digital age”

Smart Meter Data Access

- At the October 12th SGF meeting, the OEA Corporate Partners Committee put forth a series of 8 recommendations regarding future arrangements for Smart Meter Data Access (see previous OEA CPC presentation for details).
- At its November 1st meeting, the SGF Working Group further deliberated on these recommendations and some of the more detailed questions they raise.

Smart Meter Data Access – Working Group Discussion

- **OEA CPC Recommendation 1:** “Clarify to the (greater) market who is responsible for controlling access to consumption data.”

Observations during the Working Group discussion:

- In order to lend clarity to ongoing discussions regarding this topic is recommended it is be addressed in terms of three major sub-components as follows:
 1. Real-time access to data at the smart meter data
 2. Access to billing-quality hourly and TOU data
 3. Access to aggregated smart meter data
- It would be helpful to develop use cases for each of the above scenarios to better understand what the specific requirements might be.
- Need to be conscious of the risk of ‘data overload’ for the consumer.

Smart Meter Data Access – Working Group Discussion

- **OEA CPC Recommendation 2:** “Establish an administrative process for customers and their agents to access their data...
 - both at the meter and at the LDC/MDM/R
 - with appropriate granularity and frequency
- **OEA CPC Recommendation 3.** “Form an independent technical evaluation team to determine whether existing installed meters can be accessed by in home equipment and publish the standards for each existing vendor.”

Observations during the Working Group discussion:

- Now is the time to get started, given the long lead-times required to work out the detailed rules, which will be an extensive effort, given the complexity of the topic and the number of parties involved.

Smart Meter Data Access – Working Group Discussion

- **OEA CPC Recommendation 4.** “Determine and publish a set of communications standards for all meter vendors in Ontario (e.g. Zigbee, ANSI C12.xx).”
- **OEA CPC Recommendation 5.** “LDCs should require that all future purchases of meters meet the communications standards established in {recommendation} 4 above”
- **OEA CPC Recommendation 6.** “OPA (or MEI) to negotiate bulk procurement of the proprietary native communication access licenses of the three primary AMI technologies currently in Ontario. Then allow open access for all third party vendors who wish to develop solutions that communicate over their network for a standard pass through fee.”

Smart Meter Data Access – Working Group Discussion

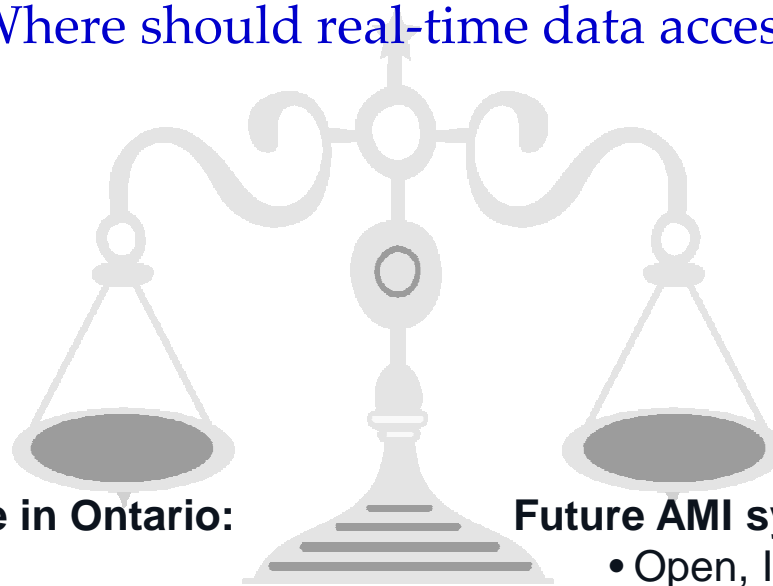
- **OEA CPC Recommendation 7.** “Establish a certification and test environment for Ontario’s smart grid to allow testing of products and demonstrations to ensure compatibility with LDC infrastructure (meters, etc.)”
- **OEA CPC Recommendation 8.** “OEB to direct that electricity retailers and agents be given access to smart meter data and ask the OEB EBT working group to enable this through their existing process. Invite the IESO to join the working group for this purpose.”

Observations during the Working Group discussion:

- Allowing access to billing quality data is likely a far less complicated problem than facilitated real-time data access because...
 - Real-time meter data access constitutes a whole new area of commercial activity that doesn't necessarily follow the current "retailer" business model in Ontario
 - AMI service providers are not currently focused on facilitating third party data access – nor have they been required to under the current framework.
 - Some (but perhaps not all) AMI systems in use in Ontario have multiple communication channels in order to segment high-priority operational data streams from billing quantity data.
 - Current AMI systems in use in Ontario are typically proprietary in nature and therefore require the vendor's technology to be embedded in the gateway device and therefore pushes the cost to the third party service provider.

Observations during the Working Group discussion:

The dilemma: Where should real-time data access costs fall?



Today's AMI systems in use in Ontario:

- Proprietary interfaces
- Recently installed, and at the beginning of their lifespan
- **Options:** Requires third party gateway systems to be modified to receive smart meter data – OR – an expensive and premature overhaul of the current systems which shifts the costs back to LDCs
- Privacy rules and implementation of those rules would still need to be worked out.

Future AMI systems:

- Open, International standards
- Will gradually replace Ontario AMI components over time, but this is still likely years away – unless a forced conversion is initiated before the end of the service life of the current infrastructure
- Still need to solve a massive logistical problem to implement privacy rules.

Q2, 2010	Q3, 2010	Q4, 2010	Q1, 2011
<p>Q2, 2010</p> <ul style="list-style-type: none"> • April 19 • May 17 • June 8 	<p>Q3, 2010</p> <ul style="list-style-type: none"> • July 13 - joint meeting with Corporate Partners Committee • August 10 • September 7 	<p>Q4, 2010</p> <p>Number of SGF meetings currently scheduled: 3</p> <ul style="list-style-type: none"> • October 12 • November 9 • December 7 	<p>Q1, 2011</p> <p>Publication of SGF 2010 Annual Report</p> <ul style="list-style-type: none"> • Jan 17 (tentative) • February 8 (tentative) • March 8 (tentative)
		<p>Currently Scheduled SGF WG meetings:</p> <p>Nov. 29</p>	



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Thank you.