

Ontario Smart Grid Forum - Support Presentation (selected agenda items)

Tuesday, February 1st, 2012



1. Minutes of previous meetings
2. Review of Forum Recommendation Tracking Log, version 8.7
3. The Forum and SmartGrid Canada
4. Theme discussion: The Consumer & Smart Grid
5. Report back form the Corporate Partners Committee
6. Report back form the Working Group
7. *OEB Renewed Regulatory Framework for Electricity* – potential implications for the Forum
8. The “Green Button” Challenge
9. Upcoming smart grid events
10. Roundtable update by Forum members

- **FINAL October 11th minutes:**
 - no further comments received.
 - Recommended as **FINAL**
- **DRAFT December 6th minutes** circulated for review.
 - Recommended comment deadline: Wed., Feb. 8th

Standing Item: Recommendation Tracking Log

(Issue 8.7)

Main development since our last review:

- Two additional 2009 Recommendations identified as having strong tie-ins with the OEB consultations.
- Working Group has noted them as such in the Recommendation Tracking Log. They join the watch list of 15 other recommendations potentially affected by the OEB consultations...

Recommendation B4 (from 2009 Report)

- *“The Ministry of Energy and Infrastructure in consultation with distributors, retailers and other providers of in-home devices and services should develop consumer education materials designed to explain how such devices and services can help manage electricity costs, improve comfort, help the environment and promote the reliability of the electricity system.”*

Rationale: Provisioning of behind the meter services and roles now firmly under consideration by OEB via Renewed Regulatory Framework Consultations

Recommendation C1 (from 2009 Report)

- *“Utilities should continue to propose smart meter functionality consistent with the best interests of their customers and apply for OEB approval to recover the costs of this functionality in rates.”*

Rationale: LDC support of third party access to smart meter data is now under consideration by OEB via Renewed Regulatory Framework Consultations

Other proposals for the Tracking Log from the Corporate Partners Committee:

1. The Tracking Log should include a boiler plate description of its origins and purpose
2. Upfront list of 'hot button' issues and areas of high activity since the last version



The Forum and SmartGrid Canada

Guest speaker:

Mr. Alex Bettencourt, SmartGrid Canada

Theme discussion: The Consumer and the Smart Grid

- **Q: What has our experiences taught us so far?** Background: see distribution item, Hydro Ottawa/Nanos Research, *“Time of Use Rate Study”* Guest speaker: **Mr. Nik Nanos, Nanos Research**
- **Q: What level of public investment in the smart grid do consumers expect?** Background: see distribution item, *“Understanding Residential Customer Support for – and Opposition to – Smart Grid Investments”*
- **Q: What are the latest consumer perceptions about the smart grid?** Background see distribution item, Smart Grid Consumer Collaborative (USA), *“2012 State of the Consumer Report”*, Jan. 2012

Report back from the Corporate Partners Committee

Report back from the Smart Grid Forum Working Group

Two Topics:

1) **Energy Storage**


- The Working Group is nearing completion on its discussion paper for the implementation of an energy storage framework in Ontario.
- Today's report will provide an update on that effort

2) **Annual Review of Forum's *Terms of Reference***

- The Forum is required to review its Terms of Reference on an annual basis. This report contains the Working Group's recommendations in that regard.

Modernizing Ontario's Electricity System: Next Steps

Second Report of the Ontario Smart Grid Forum
May 2011



“The Ontario Power Authority (OPA) and Independent Electricity System Operator (IESO), in consultation with industry and the Ontario Energy Board (OEB), should jointly develop a framework to promote the integration of distributed energy storage with the grid where it is cost-effective.”

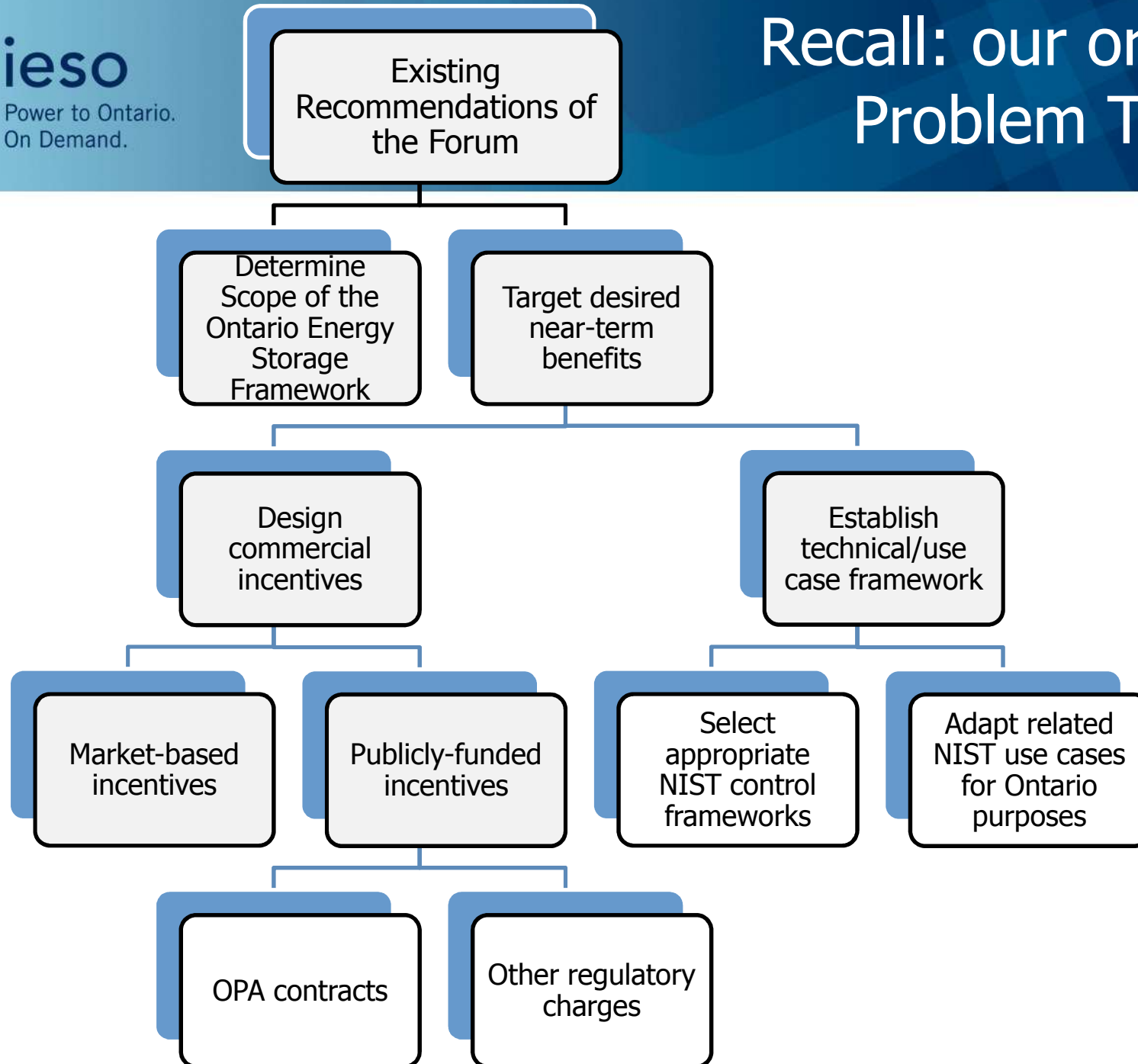
Update - OEB Staff Report:

- Some mention of storage during the OEB smart grid working group discussions.
- Also raised in the OEB staff discussion in section 4.2.2. regarding recognition of benefits for regulated entities:

*"The SGWG advised that consideration should also be given to broader system or societal benefits, the upstream benefits, such as the deferment of large investment in new transmission or generation capacity. These benefits include environmental benefits such as reduced carbon dioxide emissions. Besides CDM and renewable generation these benefits may be created by other types of distributed generation, gains in energy efficiency not attributable to CDM programs and **distributed storage**."*

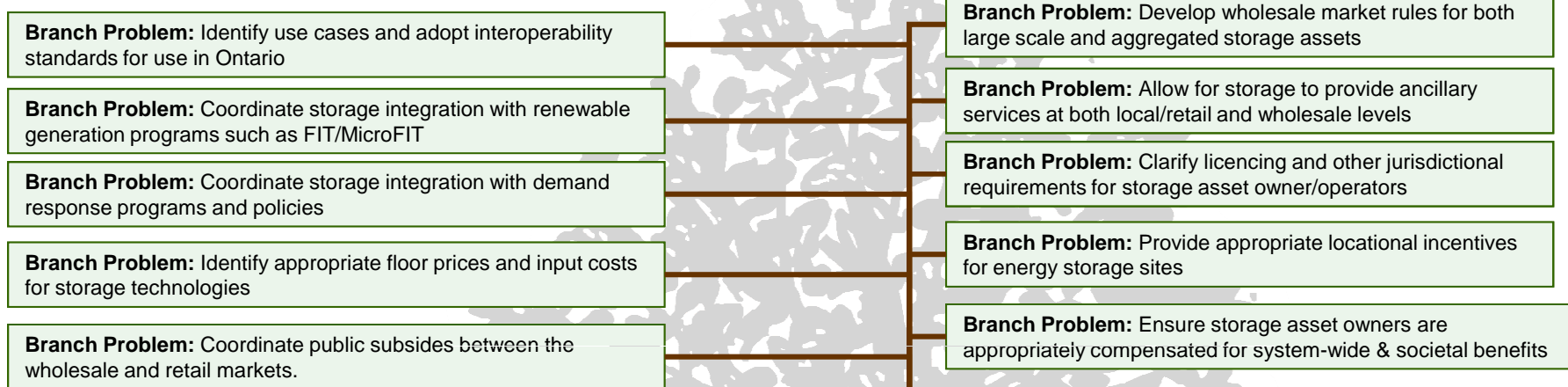
(OEB staff report, section 4.2.2)

Recall: our original Problem Tree...



...the storage Problem Tree continues to grow...

Branch Problems:




Trunk/Core Problem:

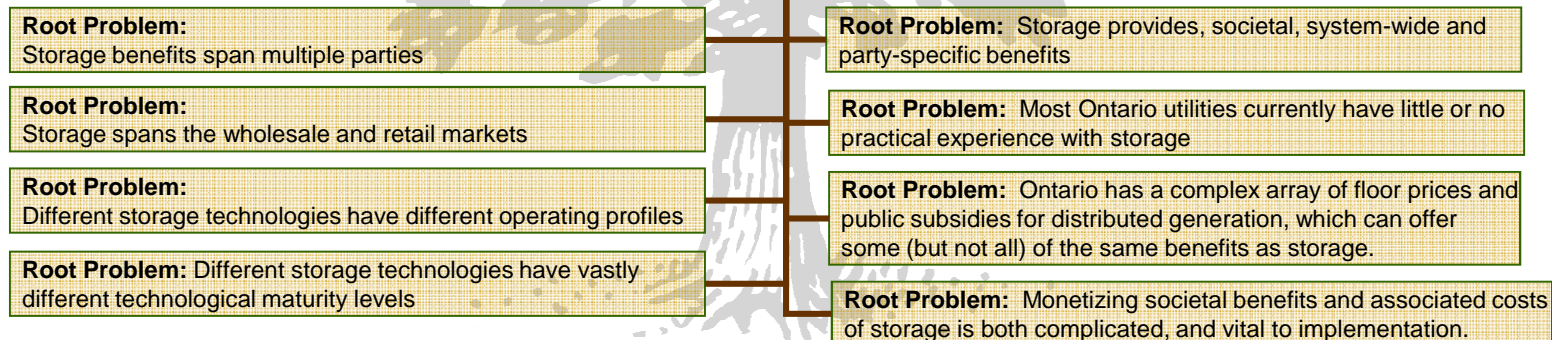
Trunk/Core Problem:
"...jointly develop a framework to promote the integration of distributed energy storage with the grid where it is cost-effective."

Related Problem Trees:

- D.R.
- E.V.s



Root Problems:



Key Inputs to the Working Group's discussion paper

Electric Power Research Institute,
"Electricity Energy Storage Technology Options - A White Paper Primer on Applications, Costs and Benefits"

Sandia National Laboratories,
"Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide"

Ontario Energy Board

Staff Discussion Paper

In regard to the Establishment, Implementation and Promotion of a Smart Grid in Ontario

EB-2011-0004

November 8, 2011

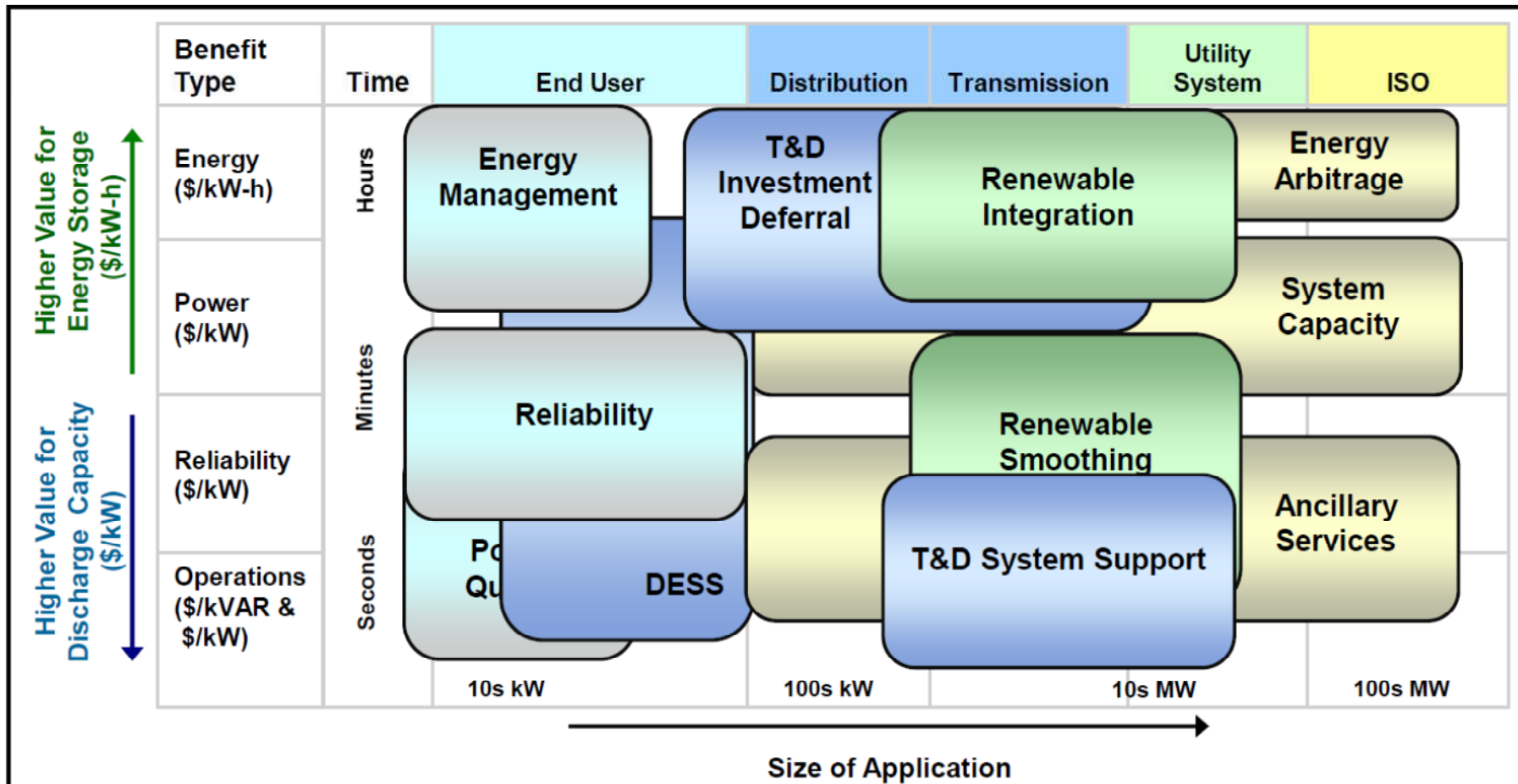
U.S. National Institute of Standards and Technology (NIST)
Priority Action Plan 7 - "Energy Storage interconnection Guidelines"

Working Group Discussion paper on developing a storage framework for Ontario

Working Group
Discussion paper
on developing a
storage
framework for
Ontario

- Nearing completion. Target is to have a draft for Forum review by April 16th meeting.
- Will elaborate on the problem tree analysis done to date, and potential implications for various electricity sector organizations.
- A roadmap for specific actions to be taken in Ontario
- Not meant to duplicate existing literature on storage technologies.

EPRI Diagram: Storage benefits and who receives them



Storage Benefits Compared...

EPRI benefit categories

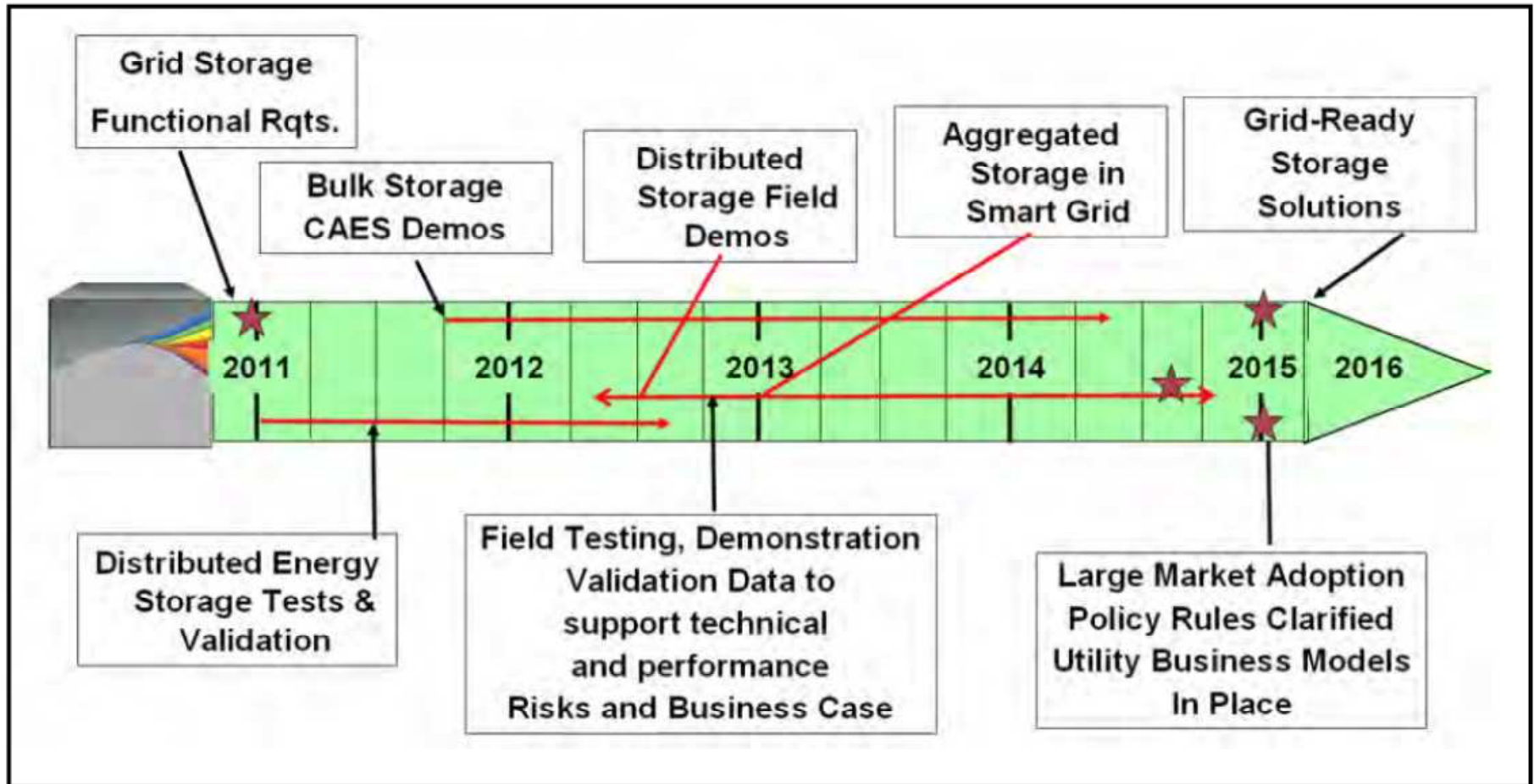
Value Chain	Benefit	
End User	1	Power Quality
	2	Power Reliability
	3	Retail TOU Energy Charges
	4	Retail Demand Charges
Distribution	5	Voltage Support
	6	Defer Distribution Investment
	7	Distribution Losses
Transmission	8	VAR Support
	9	Transmission Congestion
	10	Transmission Access Charges
	11	Defer Transmission Investment
System	12	Local Capacity
	13	System Capacity
	14	Renewable Energy Integration
ISO Markets	15	Fast Regulation (1 hr)
	16	Regulation (1 hr)
	17	Regulation (15 min)
	18	Spinning Reserves
	19	Non-Spinning Reserves
	20	Black Start
	21	Price Arbitrage

Working Group benefit categories

Ancillary Services	Utility Benefits
Power Quality	
Asset deferral	
Renewable Integration	
Microgrid facilitation	Customer and 3rd party Benefits
Distributed Generation facilitation	
Price arbitrage	

Key Point: Our previously identified list of potential storage benefits is comparable to that put forward in the literature reviewed.

How storage issues could play out ... According to EPRI:

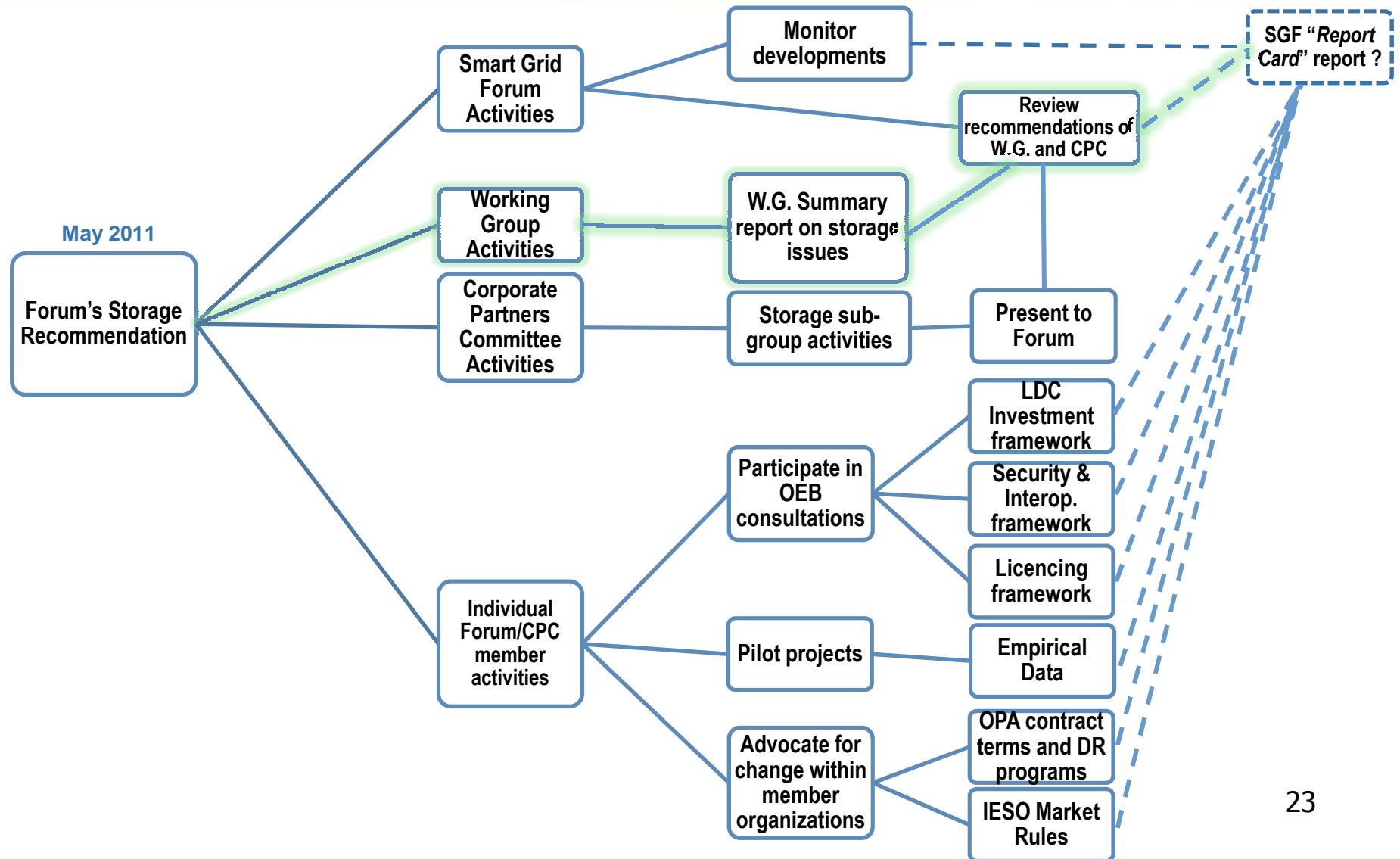


Source: EPRI, "Electricity Energy Storage Technology Options"

Potential Ontario electricity sector responsibilities for linking storage incentives & benefits.

Storage Incentives:		Ancillary Service Premiums	Demand Response Premiums	FIT/ MicroFIT Contracts/ Floor prices	Geographic/ locational incentives	Enviro. incentives	Electricity input costs
Utility Storage Benefits	Ancillary Services	OPA, IESO, LDCs Transmitters	n/a	OPA	n/a	n/a	n/a
	Power Quality	OPA, IESO, LDCs Transmitters	n/a	OPA	n/a	n/a	n/a
	Asset deferral	n/a	OPA LDCs Transmitters	n/a	LDCs, OEB, Transmitters	n/a	n/a
	Renewable Integration	n/a	n/a	OPA	OPA, OEB, LDCs, IESO Transmitters	???	n/a
Customer and 3rd party Storage Benefits	Microgrid facilitation	n/a	n/a	n/a	OPA, OEB, LDCs, IESO	n/a	n/a
	Distributed Generation facilitation	n/a	n/a	OPA LDCs	OPA, OEB, LDCs, IESO	???	n/a
	Price arbitrage	n/a	OPA, OEB LDCs	n/a	n/a	n/a	IESO OEB

How storage issues could play out in Ontario



- Both the Forum and its individual member organizations have a role to play in the development of an energy storage framework for Ontario.
- An early task, will be to ensure that storage is adequately addressed in the regulatory consultations currently taking place
- The Working Group is endeavouring to complete a paper describing the work ahead for the Ontario electricity sector for review by the Forum in April
- Should the Forum decide to issue a “report card” report in 2012, it could present an opportunity to renew attention on its storage integration framework recommendation.

Working Group's Terms of Reference Review

*“The Forum will annually review
its terms of reference.”*

Forum Terms of Reference
Section 5

Fundamental/Strategic Changes:

- **Q:** Do anticipated events for 2012 force a change upon the aims and purposes of the Forum?

- **Working Group Observations:**

- Not at the moment. It's premature to speculate on what changes may arise from the current OEB consultations.
- Too much tinkering with the *Terms of Reference* could be a time-consuming distraction for the Forum, with little benefit at this present time.

Structural/Tactical Changes:

- **Q:** Do the current *Terms of Reference* constrain the Forum in fulfilling its (current or future) goals in any way?
- **Working Group Observation:** No - not at the moment.

Administrative Changes:

- **Q:** Are there specific changes to the *Terms of Reference* required to bring it up to date or improve the way the Forum operates?
- **Working Group Observation:** Two recommendations (see next slide)

Two recommended administrative changes from the Working Group:

1. **Section 5:** Update to describe the addition of Corporate Partners Committee and acknowledge their *Terms of Reference*
2. **Section 6:** Delete reference to meeting on a monthly basis

Question for the Forum: does the Forum Agree to drafting the above recommended changes for confirmation at the April meeting?

- The Working Group also considered amending section 1 of the *Terms of Reference* to bring it up to date with more recent smart grid developments over the past two years including:
 - Development of high-level smart grid principles
 - Minister’s smart grid Directive to OEB, November 2010
 - Forum’s second report, 2010
 - OEB Renewed Regulatory Framework for Electricity
- However, after deliberations, the Group generally felt that such commentary would be better suited for a Forum “report card” report as opposed to the *Terms of Reference* itself.

Update:

OEB Renewed Regulatory Framework for
Electricity

Question for Forum members: Will your
organization be participating?

The 'Green Button'



What is it, and is it something that the Forum should be paying attention to?



September 2011:

“Consumers should have access to their energy usage information. It should be easily downloadable and in an easy-to-read format offered by their utility or retail energy service provider.”

“Furthermore, making this information available—in simple standard formats—will help spur innovative new consumer applications and devices from entrepreneurs, big companies, and even students.”

Aneesh Chopra

U.S. Chief Technology Officer



Key concept: Multiple sources of Energy Usage Information (EUI) distilled into **ONE** format (the "Green Button") for end-use

Sources of EUI



Via: ESPI, HAN, Web Portal

Single Data Format: all at once

Energy Usage Information
For location: 1423 Elm St., Newark, MD 20850

Meter Reading Information
Type of readings: Electricity, Hourly Energy Consumption, Real energy (Watt-hours), Two-Phase Residential Service.

Summary of Electric Power Usage Information*
*The "Quality" of the meter and information is "var" also that has not gone through the validation, editing and revision process.

Current billing period as of: 2011-10-02 23:29:39
Currency: US Dollar
Cost of usage (US Dollar): 20.6
Consumption: Real energy (Watt-hours): 157

Last billing period: 2011-09-01 00:00:00 to 2011-10-01 00:00:00
Bill for period (US Dollar): 348.2
Cost of usage for billing period (US Dollar): 233.32
Cost of additional last period (flow and other fixed charges) (US Dollar): 14.89

Hourly Electricity Usage
Start date: 2011-09-01 00:00:00 for 32 days

Date for period starting: 2011-09-01 00:00:00 for 24 hours

Energy consumption time period	Usage (Real energy (Watt-hours))	Cost (US Dollar)	Events occurred
2011-09-01 00:00:00 to 2011-09-01 01:00:00	1	0.12	
2011-09-01 01:00:00 to 2011-09-01 02:00:00	1	0.15	
2011-09-01 02:00:00 to 2011-09-01 03:00:00	1	0.12	
2011-09-01 03:00:00 to 2011-09-01 04:00:00	1	0.12	
2011-09-01 04:00:00 to 2011-09-01 05:00:00	3	0.36	
2011-09-01 05:00:00 to 2011-09-01 06:00:00	2	0.24	

Single Data Format: as sequence

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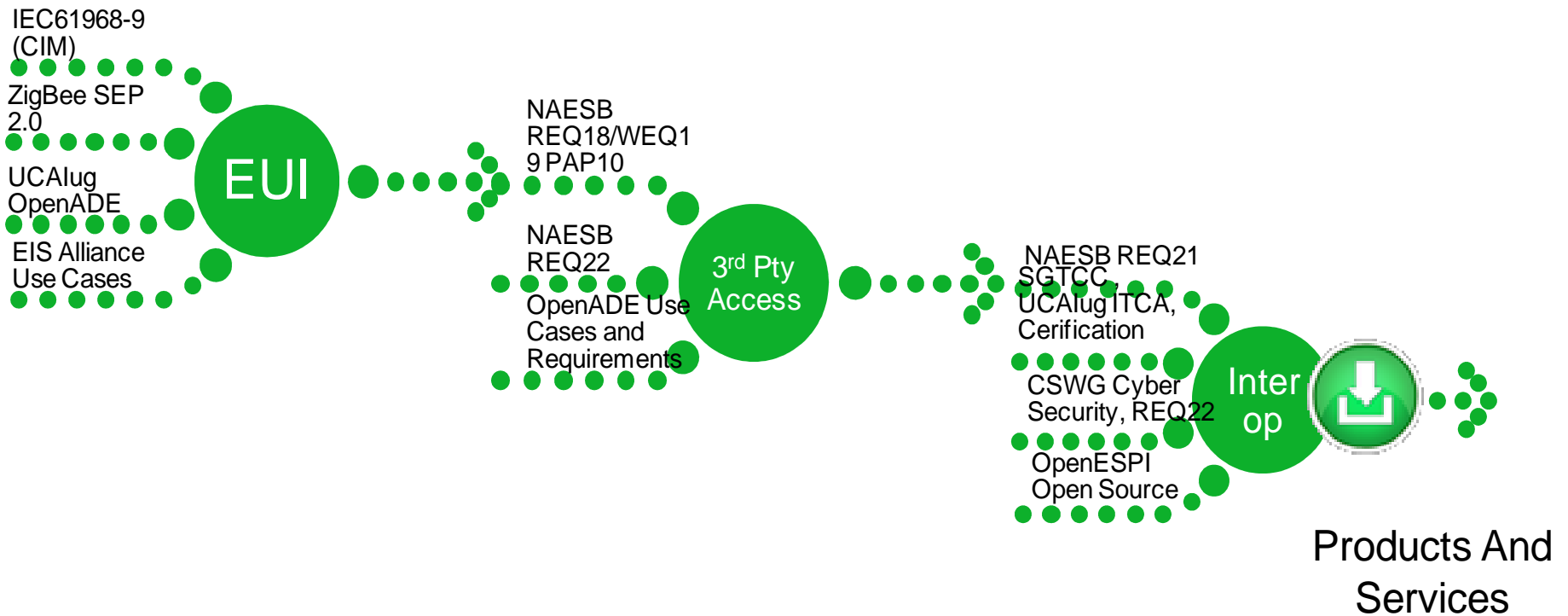
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Uses of EUI





The 'Green Button' has come together very quickly as it rests on three sets of existing interoperability standards:





Standards:

- Green Button standards available and ready for use.

Current implementation examples:

- Green Button data now available to 6 million customers in Pacific Gas & Electric and San Diego Gas & Electric service territories
- Southern California Edison plans to roll out the service to 4 million customers later this year.
- ‘Opower’ building a Facebook application allowing users to compare and share Green Button data
- ‘Tendril’ has an API to support Green Button apps for Apple iPhone and Android phones.



Does Ontario need to pay attention?

Possible 'Yea' arguments:

- Anything that advances competition, open access and product development is directly in line with the Forum's Smart Home Roadmap recommendations
- The issue of third party data access is reaching a critical point at the OEB consultations and now is the time to look at the options.
- The Green Button could really take off and become the de facto standard for a whole new family of smart grid-related products and services.

Possible 'Nay' arguments:

- Ontario LDC's have already been providing customer access to smart meter data (for the previous day at least) for almost 5 years now.
- Ontario is using proprietary AMI systems and therefore the Forum's AMI Sandbox effort will solve more access issues than a "green button" initiative
- The Green Button is only a few months old and has a lot of unanswered questions about security, privacy, customer take-up, ; etc.



Possible next steps for the Forum:

- In-depth consultation with the Corporate Partners Committee?
- Review against related recommendations in the Recommendation Tracking Log?
- A possible topic for a future “Report Card” update report?

Additional Resources:

- NIST Smart Grid Interoperability Panel (SGIP), Priority Action Plan 10 AP10
 - <http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/PAP10EnergyUsagetoEMS>
- North American Energy Standards Board (NAESB) REQ21 Energy Service Provider Interface (ESPI):
 - http://www.naesb.org/espi_task_force.asp
- Tendril site: <http://www.greenbuttonconnect.com/>



Upcoming Smart Grid Events

(near-term)

Upcoming Smart Grid Events

February 22/23	Conference: EV Infrastructure (Toronto)
February 29	First Annual Plug'n Drive Party
TBD	OEB Renewed Regulatory Framework consultation
TBD	Joint meeting: Smart Grid Forum Working Group and Corporate Partners Committee energy storage sub-group
March 20-22	NIST SGIP Plenary meeting Charlotte, N.C.
April 5 th	Corporate Partners Committee
April 10 th	Smart Grid Forum Working Group
Apr. 16, 2012	Smart Grid Forum Meeting



Thank you.