

# Meeting Summary



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## OEB Smart Grid Working Group

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**Meeting Date:** March 1, 2010 **Time:** 9:30 am – 4:45 pm  
**Location:** 2300 Yonge Street, 25th Floor, ADR room  
**Board Staff:** Russ Houldin, Ashley Hayle, Rachel Anderson, Stephen Vetsis  
**Meeting Topic:** Scope of Work, Meeting Conduct, and Questions for Consideration

The purpose of the first Smart Grid Working Group Meeting (SGWG) was to introduce the purpose of the SGWG and the SGWG meetings, discuss meeting conduct, and address questions for consideration. The discussed questions for consideration underlie the meaning of the Minister's Directive. The purpose of setting out these questions was to set a context for the technical issues and discussions that will be examined during the subsequent meetings. These questions form an important base for the development of proposed Guidance regarding development of a smart grid.

***Introductory SGWG Roundtable Discussion:** General concerns, areas of focus, what your organization can bring to the discussion*

### Discussion notes:

<b>Utilities</b>	<ul style="list-style-type: none"><li>• Find that the inconsistency between LDC interpretations of smart grid makes collaboration difficult. LDCs have different "maturities" (technical levels)<ul style="list-style-type: none"><li>○ Prudency check. Benefit-Cost ratio. Focus on having a B-C ratio greater than 1</li><li>○ Customer focus. What is LDC role behind meter? Balance interoperability with competition among vendors, should encourage as many options as possible</li></ul></li><li>• Integration between various automations lacking. Many technologies are already in place but not are as integrated as envisioned by smart grid</li><li>• A smaller LDC would like to get better understanding of scope of smart grid and an understanding of scope of coordination as well</li><li>• Smaller LDCs typically lag larger ones. Unsure how to implement smart grid and resources are limited. Looking to guidance for scope of work. Large territories with few customers</li><li>• Consider good automation as good utility practice. View smart grid as the information that can be provided to customers and way of integrating information. Small utilities may be able to more quickly implement automations</li><li>• Key points: 1. Benefits should outweigh costs. What is the public good regarding capacity? 2. Coordination/timing. 3. Rural communities: avoiding rural/urban technology divide. 4. Unsure what customer side of meter role is. 5. Separation of control from user and LDC. A Smart Grid provides the foundation for the realization of disparate benefits from, e.g. EVs, HANs, DG, etc. which may not</li></ul>
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	<p>accrue to utility making the investments and/or may not be realized in the short term.</p> <ul style="list-style-type: none"> <li>• Have performed pilot tests for various technologies. Trying to balance technology investment with justifying investments to OEB. Need to consider importance of information. Role of utilities regarding new technologies. Would like a definition of an LDC business model. LDC is exposed to all technologies due to size and nature of territory</li> <li>• Have had success partnering with neighbouring LDCs. Consumer engagement, enablers for behind meter technologies. Definition of smart grid vs. good utility practice. Will small LDCs be put at a disadvantage if automation is viewed as good practice?</li> <li>• Still lack of detail in many policy directions. Might be important for Board to focus more on concepts as it will be difficult to cover all technical issues now. Distinguishing between typical capital spending vs. smart grid. Coordination between transmitter and LDC is especially important for distributed generation connections. How does LDC participate behind the meter? Feels vendors will play largest role, how will LDCs be required to integrate? EVs and how they are used.</li> </ul>
<p><b>Technology Vendors</b></p>	<ul style="list-style-type: none"> <li>• Looking to provide information related to current project</li> <li>• Traditionally focused on demand response. Goal is to provide value to consumers and not be intrusive. Should be able to add value in a cost effective manner</li> <li>• Inconsistent definitions of smart grid are problematic. Unless you can identify customer needs/problems, it is difficult to create products. How will smart grid concepts address these issues?</li> <li>• Looking to provide input from technology side and leverage discussions from other committees</li> <li>• Looking to prepare for EV launch and provide feedback from vehicle manufacturer standpoint. Develop vehicle-to-grid interface</li> <li>• Focus on energy efficiency and demand response. Data management will be important to success of smart grid. Consumer engagement is not typically a focus of pilot projects. Important to consider users</li> <li>• Technology vendor is focused more on industry than individual entities. Can provide technical expertise.</li> <li>• Will provide technical and global perspective. How to integrate technologies and upcoming R&amp;D with LDCs. Interested in defining what smart grid is for Ontario. May be even differences between LDCs within Ontario. What to do with information, where does it go, what do organizations have access to information? Try to have a longer than 5 year focus even though there may be gray areas and a lack of information</li> <li>• Information and data connectivity, wireless network development. Insight into wireless networks and making smart decisions about connectivity</li> </ul>
<p><b>Consumer Groups</b></p>	<ul style="list-style-type: none"> <li>• Issues related to grid being smart, green and healthy. Value for customers</li> <li>• Large commercial buildings, smart grid must focus on direct customer benefits, commercial customers already have interval meters and already have access to their usage data need to make better use of the data, level playing field for various options (e.g. combined heat and power, deep lake cooling etc), build open transparent requirements – specific requirements better than ‘guidance’ more clarity</li> <li>• Large industrial, costs, efficiency and rates are important issues. Most large users already effectively have smart grid capability (price signals etc) and can do today what we hope homeowners will be able to do tomorrow. Customer owns usage</li> </ul>

	<p>data – in agreement with Minister’s customer control objectives. Must be careful about heading down the wrong path. Technical guidance must be open and flexible to allow SG to evolve (cannot predict or prescribe how it will unfold). Systems integration is critical, want to avoid guidance leading to a world where LDC s develop systems that are fundamentally incompatible. MDM/R seems to be heading in the right direction in this respect. Differences among LDCs can be accommodated without being perpetuated – focus on collaboration and integration</p>
<b>Agencies</b>	<ul style="list-style-type: none"> <li>• Smart grid will have effects on many different existing safety regulations. Want to ensure up to date standards are up to date for new technologies. Trying to ensure that codes and standards are not an obstacle without sacrificing safety.</li> <li>• Scope of Electrical and Gas Inspection Act might overlap with Guidance. Ensure good communication. Inform legal requirements of decisions</li> <li>• As a systems operator, integration of renewables is key and involves at looking at accurate forecast capability and system flexibility. U.S. system operators receive a great deal of direct funding for initiatives such as storage technologies . ISOs/RTOs are working with NIST and NAESB to advance standardization of communications associated with demand response and other smart grid technologies in wholesale energy markets. Can provide views from other jurisdictions as well as Ontario perspective. As reliability authorities, ISOs/RTOs work with NERC to develop and enforce cyber security and reliability standards and enhance them as the smart grid crystallizes over time..</li> <li>• How to provide customers with real-time data. Research shows customers want real-time data. Want to access historical data from MDM/R. More real-time data repository. Look at codes. Allow marketplace to choose providers and technologies. Provide standard platform. Clear delineation of privacy for customer information. Future generation procurement plans (amount of renewables)</li> </ul>

**Question 1: What does the industry need to know about Smart Grid planning?**

**Key observations from the discussion:**

- a) Specific technologies should not be addressed by the Guidance:
  - To ensure that policies remain relevant over time, the Guidance provided should not be focused on specific technologies but rather on Smart Grid standards and types of technologies
  - Technology used for Smart Grid activities should be determined by market forces, not by Guidance
- b) The level of Guidance provided should be specific to each Policy Objective and Smart Grid Objective
- c) Specific tests need to be provided in the Guidance for each of the objectives
- d) LDCs in Ontario are at different levels of Smart Grid sophistication and so Guidance should be focused on the what LDCs must do to satisfy objectives (tests or thresholds that must be satisfied, what constitutes Smart Grid investments and what does not), not the how to satisfy objectives

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• Who pays and who benefits? How to quantify/allocate? Must build a solid foundation – manage risks involved with system integration. Cost recovery must be accelerated to keep up with pace of software upgrades etc. Data usage, storage and sharing are important considerations. The more information sharing that can occur the better investment management will be (e.g. regional planning,</li> </ul>
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	<p>EV charging etc)</p> <ul style="list-style-type: none"> <li>• Balance interoperability with competition among vendors, should encourage as many options as possible</li> <li>• Traditional grid planning focused on reliability and capacity. Part of this guidance should look at SG technologies as alternatives to both reliability and capacity (e.g. alternatives to building new lines or new generation). How much can/should the guidance be used for managing utility assets? The Board should be very careful about how much the Board delves into specific technologies in its guidance (moves to quickly for policy to keep pace)</li> <li>• How specific does the Board's guidance need to be in relation to technology? IESO's Smart Grid Forum identified 24 benefits which could serve as a roadmap (utilities could pick and choose which to focus – this is somewhat an existing catalogue). Give same confidence in usual capital spending for smart grid from Board in terms of applications and cost recovery (clear requirements)</li> <li>• Struggling to determine where to build 'highways' since FIT and microFit can pop up anywhere. Backbone is required and must reach critical mass for many benefits to be realized</li> </ul>
<b>Technology Vendors</b>	<ul style="list-style-type: none"> <li>• Not every distributor is at the same stage in terms of a baseline or foundation (at different levels of grid intelligence). Direction should include the what, not the how</li> <li>• LDC visibility is key to ensuring grid stability but how do you estimate the cost benefit of this?</li> </ul>
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• Minister's Directive completed some of the SGWG's work for us (objectives are there). Board needs to tell distributors what it takes for the Board to be satisfied that distributor's plans have satisfied these objectives. Avoid prescribing technology – allow market to decide</li> <li>• Three types of information are needed by the customer: usage, market conditions/pricing signals (both can be done via internet), what is happening behind the meter (conservation/load shifting). Software can be used for this to provide information to consumers so that they can make the best choices. What is smart grids contribution to energy management? (Minister's Directive very well thought through)</li> <li>• Behind and in front of the meter should be divided into two separate discussions because investments for each must be paced differently within and among distributors. Guidance must be sophisticated regarding customer data, reliability, and enabling renewables because each carry different levels of importance in different areas of the province. Also vary in terms of current and future policy importance</li> <li>• Behooves us to think of distributed capacity rather than generation. Think of how smart grid might enable us to reduce some of the regulatory 'proxies' we use for settlement etc</li> </ul>
<b>Agencies</b>	<ul style="list-style-type: none"> <li>• Demarcation point between home and infrastructure, need behind the meter guidance. Must infrastructure be standardized to ensure interoperability? But without mandating technology used, market and customers must make those investments. Need a balance of standardization and flexibility</li> <li>• Would it be useful to have a catalogue of types of technologies (in relation to policy priorities) or a catalogue of smart grid objectives?</li> <li>• Should focus on standards to avoid overinvesting in obsolescence</li> </ul>

**Question 2: What is not smart grid? What is the difference between smart grid investments and “good utility practice” in electricity distribution system investments?**

**Key observations from the discussion:**

- a) The definition of a Smart Grid investments depends on the time period:
  - In the long term, what is now defined as Smart Grid should be eventually integrated into good utility practice. A future framework that considers multiple benefits including broader societal and environmental concerns will not distinguish Smart Grid investments from other investments. Utilities supported this view, but Consumer Groups believed that Smart Grid investments should be considered normal utility practice in the long term
  - In the interim, prior to the integration of Smart Grid into good utility practice, Smart Grid investments may need to be treated as separate investments. This view was supported by Utilities, Consumer Groups and Agencies
- b) An interim classification for Smart Grids may be required as traditional prudence tests may not apply to Smart Grid investments. This issue may be addressed by:
  - Assigning a special Smart Grid ‘weight’ to prudence tests
  - Adding a new category for Smart Grid capital expenditures and evaluating separately
- c) Interpretations of Smart Grids should be consistent across utilities within Ontario

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• Normal capex and smart grid expenditures do not differ in terms of risk and benefits (use this to prioritize). What makes smart grid expenditures different from normal capital investment – do they not need to be tested in the same way?</li> <li>• A separate utility agreed with previous comment</li> <li>• Historically the utility stopped at the meter, this is increasingly changing with things like demand response, conservation, EVs etc. Issues include lack of customer interest and utility is point of contact for distributors. Any behind the meter technology should be deployed in collaboration with utility so that the LDC is in a position to assist customers</li> <li>• If left to their own devices, LDCs will generate different answers to the same problem. May have to look to the model with AMI deployment – more coordination to ensure that LDCs all providing similar/the same types of ‘connections’ for vendors etc.</li> <li>• It may be prudent for one utility to undertake a particular expenditure where it would not be for another. Proposed coordination may make sense behind the meter (on the customer side) whereas there will likely be more variability on the line side of the meter</li> <li>• Concerned that there are so many exceptions that may not fit guidelines and so believes that the guidelines should be broad enough to ‘fit’ potential reasonable exceptions</li> <li>• Two tests – is there a net benefit test? And does this further policy? Each may have different prudence tests</li> <li>• Should currently be viewed as smart grid ‘experiment’ and in future will simply be part of normal utility practice</li> <li>• Already have different categories within capex. Smart grid could be just another category</li> <li>• Is the smart grid wish akin to smart meters, in that smart meters are now considered to be good utility practice but as a layer on top of traditional good utility practice? Provincially, where is the money coming from, only so many customers?</li> </ul>
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	<ul style="list-style-type: none"> <li>• Risk of that situation is approval takes a long time (2-3 yrs)</li> <li>• Many smart grid investments will not pass a traditional prudence test on their own and therefore need a 'special' smart grid weight to pass the prudence test.</li> </ul>
<b>Technology Vendors</b>	
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• SG investments should fall under normal utility practice. Hearings where Green Energy Act (GEA) costs have been separated tend to be more complex because than the rules of prudence and justification become unclear</li> <li>• Utilities often complain that the OEB limits their ability to do anything innovative or new. Need to allow freedom to implement what is needed (must allow innovation)</li> <li>• Intent of GEA is not to create a separate set of rules for all things 'green', it might be important to get things going on a special project basis but the sooner they become normal practice the better</li> <li>• The Board may have to break with tradition and look at benefits that may be outside a utility and its customers (e.g. traditionally distributor COS only looks at benefits to that particular distributor and its customers and the same is true for transmission and generation)</li> </ul>
<b>Agencies</b>	<ul style="list-style-type: none"> <li>• Smart grid forum has a list of metrics for each directive</li> <li>• Two tests – one for infrastructure upgrade and one for customers looking to connect?</li> <li>• Do we need different types of evaluation criteria for smart grid? How do we determine the evidence needed?</li> <li>• Should smart grid investments be put forth as separate plans or as part of the regular COS? Do these investments warrant a proceeding of their own?</li> <li>• Is there room for joint proceedings (E.g. groups of LDCs coming forward with one plan)? Potentially a generic hearing? Which forms a longer term regional plan?</li> </ul>

**Question 3:** *How should the Board address privacy and cyber-security in the context of the smart grid?*

**Key observations from the discussion:**

- Privacy and security should be incorporated into Smart Grid from Day 1 and should be viewed as good practice
- Privacy and security systems should be audited on a regular basis to ensure that systems are secure and are operating correctly
- Measurable privacy and security requirements may depend on the type of information being stored, used, and transferred

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• This should be seen as good utility practice</li> <li>• Privacy and security should be embedded from the get go</li> <li>• PBD (Privacy Commissioners' work) will be good starting point, don't bother reinventing the wheel</li> <li>• Must audit to prove that PBD is working (to prove systems are secure). Proof to be provided in applications? Doesn't necessarily mean that the Board needs to go to</li> </ul>
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	<p>the length of certification etc. but should require proof</p> <ul style="list-style-type: none"> <li>• Audits must be ongoing and updated regularly</li> <li>• What specific evidence should the Board require? (Certification). Audit should be sufficient evidence</li> <li>• Self-certification process (independent auditor)</li> <li>• An audit can never be a complete end-to-end review and therefore requires a process for reviewing each area (E.g. standard audit every 5 years unless there have been changes causing risk to security)</li> <li>• There is an opportunity here for cooperation and cost sharing among LDCs (e.g. LDCs with same smart meter systems can be audited at once)</li> </ul>
<b>Technology Vendors</b>	<ul style="list-style-type: none"> <li>• Should be concerned about HAN security in so far as it exposes the rest of the system to potential hackers</li> </ul>
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• Different risks associated with different parts of information (three layers)</li> </ul>
<b>Agencies</b>	<ul style="list-style-type: none"> <li>• The Board should take an extra step and ask distributors how they have dealt with these issues especially in relation to new devices</li> <li>• Should not be the LDC's responsibility if someone hacks into an insecure HAN (e.g. ensuring that security is primarily responsibility of customer). Again behind the meter</li> </ul>

**Question 4: What are the best ways for increased customer control to support smart grid objectives?**

**Key observations from the discussion:**

- a) Communication with customers and access to data are key to achieving buy-in for Smart Grid
- b) To feel comfortable with Smart Grid, customers must be educated on what the benefits are and how they can achieve them
  - Potential education methods include hanging brochures on customers doors or inserting brochures into bills
  - Provide customers with information and data so that they are empowered to make changes, improving efficiency as they see fit
  - Containing benchmarking data on customer bills will provide customers with information on the level of savings they can expect to achieve through conservation, Smart Grid technologies, etc., encouraging use
- c) As customers may not actively engage in Smart Grid on their own volition, LDCs will play a large part in customer control (e.g. in education, establishing utility controlled demand response systems)
- d) Customer benefits may be enhanced by linking Smart Grid activities with other utilities within the home

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• Only 6% of customers will respond to direct feedback, everyone else will prefer utility controlled demand response with customer override (set it and forget it)</li> <li>• Agree that customer education is key component</li> </ul>
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	<ul style="list-style-type: none"> <li>• Many demonstration projects in relation to this area are underway</li> <li>• Customer control must come from LDC, customers won't engage themselves. Must provide the tools and have open engagement. LDC's smart grid strategy must include these plans</li> <li>• Data sharing among customers is useful. (Commercial example: two situations where one customer uses half the energy of a similar customer. Customer using more energy will want to know why this is the case). LDC should be able to provide levels of references – e.g. compared to other similar customers how am I doing? Benchmarks are useful part of customer education</li> <li>• In order to provide that benchmark information there must be the same level of information available across the grid</li> <li>• Bill stuffers not bad but information hung on the door is most useful at getting across to customers</li> <li>• Most customers are on E-billing of some type. Hand delivered door hanger most successful means of communication but need to look at every possible method</li> </ul>
<b>Technology Vendors</b>	<ul style="list-style-type: none"> <li>• Also commented about customer education</li> <li>• Looking for behavioural change and automation but need information to drive that, what is the best way to deliver and manage that information? Customer to customer variation also impacts how a customer might use the information provided (or how that information should be provided)</li> </ul>
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• SG goes beyond houses, look at commercial buildings because they are the large opportunities. 'Smart meters' have been in place for commercial customers for a long time and some still don't take advantage because they still don't understand how they can use it. How can we make better use of all the customer data that the utilities currently have?</li> <li>• Commercial customers are asset managers and have many resources they can tap into if they are given the opportunity (may not need as much work on part of LDC – these customers may be more proactive than residential)</li> <li>• Cannot assume all different types of customers have same needs. Colleges have joint operating systems, Western has similar system for its campus to allow operators to see what level of efficiency buildings are operating at (service supplier worked with LDC on this). Allows customers to better use data, SG should at least do no harm to these types of systems if not encourage them</li> <li>• LDC bill strongest form of communication – may be a useful place to include that type of a benchmark communication</li> <li>• Helps a lot of customers read their bill as a first step. If customers do not know how to read bill they are not aware of the level of opportunity available</li> </ul>
<b>Agencies</b>	<ul style="list-style-type: none"> <li>• Customer control does not necessarily equate to benefits for the grid. Customer control and flexibility are important. Currently most customers do not see benefit from smart meters and won't until they see savings</li> <li>• LDC should provide infrastructure and access to data. Board and LDCs should be educating customers on opportunities available to them. Should not dictate what services and technologies customers use. Should understand market place and impact of this infrastructure</li> <li>• Are there synergies with water and other utilities in terms of customer devices and resource management (within the home)?</li> <li>• Generational differences in communication that should be considered. It may be in best interest to understand where there is overlap with other utilities especially in terms of customer control. Bringing building automation down to residential level.</li> </ul>



	How do we allow customers to manage their whole home without having to choose technology by fuel source?
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**Question 5:** *What type of smart grid investments ensure that systems are flexible to be able to respond to future developments?*

**Key observations from the discussion:**

- a) While the regulatory framework must not constrain technological development, enough guidance must be provided to ensure interoperability. This may be achieved through the use of more prescriptive standards
- b) Future proofing and standards development may be a difficult process as much of Smart Grid technology is IT, which can change rapidly
- c) While future proofing technology will be difficult to achieve, upgradeable technology can mitigate this concern to a degree

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• Goes back to regional planning: where and why do we need to prioritize specific investments on a regional basis? Clear and transparent process for identifying would be useful</li> <li>• Cannot future-proof completely but in some areas (such as EVs), it is important to take it slow; must always look to the benefits (esp. customer benefits)</li> <li>• In practice how do you build that flexibility into a plan when the planning process itself is constrained by regulatory process?</li> <li>• Look at technology foundations for other SG investments. (E.g. Scada and GIS)</li> <li>• Standards aren't set yet</li> <li>• Rapid technological change can be simple but for rate recovery it can cause issues. If OEB does not recognize a higher rate of recovery for electronics, it could cause difficulty for distributors</li> <li>• Do you need specific technology names?</li> </ul>
<b>Technology Vendors</b>	<ul style="list-style-type: none"> <li>• Ensure what happens now does allow for flexibility down the road, be able to make a choice without locking in (think about ability to retrofit down the road)</li> <li>• Relates to standards and interoperability</li> <li>• A lot of investments have already been made which are beneficial but perhaps not perfect, don't let concerns about future proofing prevent deployment altogether</li> <li>• Can control this by buying technologies that can be upgraded</li> </ul>
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• Additional interface to consider is work processes and staff etc.</li> <li>• Extra customization does make integration difficult</li> <li>• OEB by being explicit on needs of smart grid (data access) can help limit LDCs from selecting technologies that can limit adoption</li> <li>• General statements do not always result in proper technology selections. In California they specify pulse outputs, for example. Not consistent across for all LDCs</li> <li>• Typical industrial customers use standardized technologies</li> </ul>

<b>Agencies</b>	<ul style="list-style-type: none"> <li>• A lot of smart grid is IT and therefore the asset life is much shorter – so to what extent is obsolescence less of a concern than with assets that are expected to last much longer?</li> <li>• Some investment will transfer from LDC to customer as technologies get integrated into new homes</li> </ul>
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**Question 6:** *What level of detail should distributors be required to provide in support of an economic case for their proposals?*

**Key observations from the discussion:**

- a) The level of economic case detail will vary depending on the specific category of expense
- b) Traditional economic tests may not be suitable in the short term
- c) An analysis considering economic, safety, and other benefits and costs may be appropriate for some investments, but may be difficult to perform
- d) Benefits for some line items may be passed by achieving a minimum threshold
- e) Electric vehicles are of particular concern considering their large power requirements. As such, non economic considerations may be necessary when evaluating EV investments
- f) The level of detail required for business cases will need to be developed through a review of the specific Policy and Smart Grid Objectives

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• Having standard guidelines for program evaluation is helpful. If guidelines are constantly changing, they lose their meaning. Have \$ benefit per customer per class. Need a way to audit initiatives</li> <li>• Economic tests are difficult. This consultation will provide foundation for future. Evaluations at this early stage will make it difficult for LDCs to make case for projects</li> <li>• Focus on reasonable cost way of achieving a result as opposed to lowest cost way of achieving result. At least initially. Difficult to tie cost to all benefits of smart grid</li> <li>• LDCs don't have ability to know where somebody who buys an EV lives but, it is the first mobile load LDCs will have to deal with</li> <li>• A lot of talk of LDC providing customer with information but the reverse is also true which gets into issues of privacy, etc. LDCs may make decisions based on assumptions of customer behaviour without information which can have consequences. 2-way communication. Controls, rights, etc of LDC for info behind meters</li> <li>• Level 2 charger has ability to overload system</li> <li>• EV is standardizing to level 2 charger, which can be like doubling load. Notion of obligation to serve demand may need to be evaluated by OEB regarding EVs</li> <li>• People come after fact to install chargers. Role of utility for EVs not industry-defined</li> <li>• Maybe can require that chargers operate only under certain conditions that are obtained from utilities. EVs may not be as much of an issue as expected</li> <li>• Issue with both capacity and space. Toronto doesn't always have physical space to install chargers. Also billing system requirements.</li> </ul>
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<b>Technology Vendors</b>	<ul style="list-style-type: none"> <li>• Overall portfolio of cost-benefit being greater than 1. What justifies having part of portfolio as not being cost-effective?</li> <li>• Contract can be tied to liquidated damage. Can ensure technology asked for is what is received</li> <li>• Economic measure of cost. Should be careful as to how to calculate other benefits, especially safety. Example is Ford Pinto</li> <li>• Needs to be something in permit applications to help provide info</li> </ul>
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• If you want investments in customer information to be quantified, it is difficult for LDCs. Build out smart grid where likely uses will be</li> <li>• In building business cases, safety is always built in as a given regardless of economics. Benefits can be difficult to sell to an asset manager who may not place value on them.</li> <li>• Some smart grid investments are based on leap of faith. Must ensure that data return is shared with the appropriate parties. Will allow for more accurate representation of total savings</li> </ul>
<b>Agencies</b>	<ul style="list-style-type: none"> <li>• Low-income DSM has lowered TRC threshold for low-income customers. May have to do something similar</li> <li>• Example of end-users informing the LDC of what they are putting on the grid. Is there a way to knowing this information? This information can help determine if investments are prudent</li> <li>• Depends on speed of market adoption of EVs</li> </ul>

**Question 7:** *Is the following an appropriate list of the benefits of the smart grid? (Increased efficiency of power delivery, reduced operation and maintenance costs, improved system security, integration of renewable energy and distributed resources, enhanced business consumer service) Are there other benefits?*

**Key observations from the discussion:**

- a) Many of the key benefits are captured. The key gaps that exist will be updated in the Board Staff Discussion Paper
- b) The benefits listed are discrete: the shared benefits of Smart Grid are not captured in the list
- c) Consumer benefits could be captured more explicitly
- d) Benefits surrounding renewable energy need to be better defined

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• The word “power” (in benefit “increase efficiency of power delivery”) should be switched to energy. View that power should be combined with heating. Shared benefits of smart grid are not captured. The list contains only the objects within the utility “wall” and may want to capture shared benefits. The enabling function is important</li> <li>• If distributor has to make the case, how do you capture some of the external benefits such as demand response? As a distributor there may not be constraints but, demand reduction for province as a whole may not be captured. Not accounting</li> </ul>
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	<p>for benefits across vertical levels of power system</p> <ul style="list-style-type: none"> <li>• Because renewables are intermittent, they have not avoided capacity investments. Timing of wind can result in higher losses. Based on renewables, economic tests may not always show benefits</li> <li>• Is there a value to green energy? Otherwise there is no benefit to renewables. Current metrics don't always recover costs to integrate renewables</li> </ul>
<b>Technology Vendors</b>	<ul style="list-style-type: none"> <li>• Committee has previously looked at some performance metrics that can be used to show that benefits were provided</li> </ul>
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• Guidelines around Minister's objectives, some are pass/fail, some are qualitative and some are quantitative</li> <li>• Where are the benefits to customers accounted for? Is last line adequate? Real benefits of smart grid to customers and aren't clearly reflected. The majority of the list is benefits to LDCs.</li> <li>• Benefits of customer involvement. Deep water cooling, etc. The innovation and customer involvement should be accounted for more explicitly</li> </ul>
<b>Agencies</b>	<ul style="list-style-type: none"> <li>• Deferred procurement of centralized generation (e.g. avoided capacity costs). Should be able to be captured somewhere as benefits</li> <li>• High level of system reliability historically limits the benefits of increased efficiency to customers as a result of smart grid or at least makes benefits less visible</li> </ul>

**Question 8:** *What is the demarcation point for the development of smart grid by distributors and transmitters? How should the guidance deal with "behind the meter" solutions?*

**Key observations from the discussion:**

- Most SGWG members supported the establishment of the meter as the demarcation point.
- As some LDCs are already behind the meter, many of these organizations believed that the meter should be a demarcation point with some exceptions for LDCs. Consumer Groups supported behind the meter at the consumer's discretion, but believe that this should not be OEB mandated.
- The SGWG supported partnerships between LDCs and 3<sup>rd</sup> parties for behind the meter programs in general, assuming that the competitiveness of the industry remained intact
- Demarcation points may also vary based on electricity and Smart Grid data/information
- A hard demarcation point may be required for specific purposes such as safety standards

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• LDCs are already behind the meter in a sense. Demand response is, in a sense, behind the meter with some programs. As long as LDCs are not impeding on the competitive landscape, should be OK. Argue meter should not be demarcation point if the OEB must approve societal benefits of behind the meter activities in regulatory structure. LDCs are involved to kick start programs and then removed so no demarcation point</li> <li>• Have a soft demarcation point. Have ability to reach behind the meter for programs with customer enrolment. Can involve 3<sup>rd</sup> party vendor technologies</li> </ul>
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	<ul style="list-style-type: none"> <li>• Cannot regulate partnerships which can cause issues. Any issues related to electricity usually on hands of LDCs. Board produce guidelines for how to operate behind meter. Collaboration required. Who pays for what?</li> <li>• Reason to go behind meter is to help start initiative. Haven't invested in "greening" urban centres. Having regulated entities provide the service initially can help bring it to a mass market. Because mandated through policy, can use regulated entities to initiate policies</li> <li>• Mandate for regulated entities to be given responsibility to kick-start programs</li> <li>• Hard demarcation point with exceptions</li> <li>• Look at 2 different demarcation points. An electrical one and a smart grid one</li> </ul>
<b>Technology Vendors</b>	
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• Similar issues with customer ownership have happened in past. Bell used as example</li> <li>• Would welcome LDC partnerships but would prefer to have the option as opposed to a requirement. Sees meter as hard demarcation point</li> </ul>
<b>Agencies</b>	<ul style="list-style-type: none"> <li>• Go back to first principles. Inside home should not be considered a monopolized space. Maintain flexibility of market place to improve technologies and avoid obsolescence. Likes idea of partnerships with LDCs. Have demarcation point though. Reason for soft demarcation because of ongoing CDM/DSM activities</li> <li>• It took time for customers to understand different roles of entities. (e.g. for customers to stop calling about their furnaces.) The confusion will eventually subside as customers understand differences between LDC roles and partner roles/responsibilities. Need data from LDCs</li> <li>• Demarcation needs to be a hard place. LDCs will need to follow safety rules and regulations. Safety rules have meter as a demarcation point</li> <li>• Currently no way of talking to meter directly. Meter as hard demarcation point. How does that change for different situations?</li> <li>• Depends on what is being done with data. Principle is that customer owns data</li> </ul>

**Question 9:** *What roles should Ontario utilities and the Board play, respectively, in relation to international efforts to establish smart grid standards?*

**Key observations from the discussion:**

- a) The OEB's focus should be on ensuring interoperability of its Smart Grids
  - The OEB will need to prescribe standards for processes or technologies in cases where other jurisdictions (namely the US) have already selected standards (following the set standard)
  - The OEB should allow the market to dictate standards for processes or technologies in which a standard is not yet set to avoid aligning with a particular technology that is not selected as an international standard
- b) When a standard is selected, consistent representation across LDCs is critical

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• Take lessons from smart meter roll-out. Closed system, etc.</li> <li>• Enabling standards vs. something or other. Differences in interpretation between LDCs. Example, IEEE 1547/27 standard. With connection to home should be very specific. Need to be careful with standards as Ontario is very different from other jurisdictions. May need to be specific in some cases and enabling in others. Board should require CSA inverters, for example, for behind the meter connections because of safety issues</li> <li>• Eventually standards may evolve to that level. Right now may require more prescriptive standards</li> </ul>
<b>Technology Vendors</b>	<ul style="list-style-type: none"> <li>• There are many initiatives currently underway. Attempting to align the US standards with Canadian standards. Should be watchful of other efforts. Ontario should not be driving standards to avoid resulting in a particular technology. Board should say what LDCs should not how. Against prescribing specific codes/standards. Some examples such as IEEE standards are OK because are internationally recognized.</li> <li>• Focus on interoperability</li> <li>• Focus on interoperability/information and not specific hardware</li> </ul>
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• Difficult to ensure consistent interpretation of guidelines</li> </ul>
<b>Agencies</b>	<ul style="list-style-type: none"> <li>• At a recent technical conference, FERC was advised by various presenters that it was premature to adopt any NIST standards at this point in time,</li> <li>• Board has broader mandate than specifying standards. Provide gateway</li> <li>• These things are already done by ESA. Standards are often industry driven. Can't see why industry would be afraid of regulator adopting a certain standard. ESA codes behind meter have very strict requirements. Before meter is less prescriptive</li> </ul>

**Question 10:** *Are important issues omitted? Are unimportant issues identified? Are the questions focused too narrowly? Are there other questions that should be posed?*

**Key observations from the discussion:**

- a) No topics were unanimously identified as being omitted by the SGWG
- b) A few topics of interest to specific players may be discussed during the course of the following 5 SGWG meetings

**Discussion notes:**

<b>Utilities</b>	<ul style="list-style-type: none"> <li>• Area of controls investment</li> <li>• Trying to look at facilitation of smart grid implementation. Getting down to very specific technologies. Should focus less on optimizing system/specifics due to time frame and fluctuation of technologies</li> <li>• One of key objectives of IESO Smart Grid Forum was to determine value of technology to Ontario vision of smart grid</li> <li>• Operation excellence or efficiency with guidance. What to do with storage for example? Because NPVs are still muddy, need guidance how to deal with certain services such as allowing LDCs to have control over solar facilities at night.</li> </ul>
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	Mechanism to allow entities to use each other's resources to provide overall efficiencies and benefits and how to compensate. Questions from R&D activities
<b>Technology Vendors</b>	<ul style="list-style-type: none"> <li>• More discussion about operation of distribution grid. Example, voltage reduction</li> <li>• Lack of benefit to some utilities in Ontario to do voltage reduction investments to avoid the cost of coal plant, etc.</li> </ul>
<b>Consumer Groups</b>	<ul style="list-style-type: none"> <li>• Challenge with some specific technical discussions is that they can be very time consuming. There are many good technologies out there but, may not be known by all entities. Good opportunity to inform people/entities</li> <li>• How can constant communication between LDCs and industry partners to help identify barriers and opportunities be ensured? Enabling mechanisms for efficiency might be OPA tier 1 programs. Where do people go to find out about those programs?</li> <li>• Load forecasting. Smart grid will improve ability to do load forecasting</li> </ul>
<b>Agencies</b>	

**Next Scheduled Meeting:**

- March 15, 2010