

# Meeting Summary



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## OEB Smart Grid Working Group

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**Meeting Date:** April 12, 2011 **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:** Power System Flexibility Objectives identified in the Minister's Directive

The purpose of the fourth Smart Grid Working Group Meeting (SGWG) was to discuss each of the four power system flexibility objectives identified in the Minister's Directive.

### *Objective i) Distributed Renewable Generation*

#### **Key observations from the discussion:**

- a) Members suggest that the Board should avoid prescribing technologies, burdensome procurement requirements, or requirements for economic development but should consider interoperability guidelines for DG.
- b) Members suggest that the Board should investigate cost recovery guidelines for DG, on topics such as DG connection, monitoring, and control.
- c) Storage is a key component of optimizing renewable distributed generation and the Board's Guidance should provide a clear approach to incorporating storage on the grid. Issues exist around cost recovery to incent storage investments and the location of storage with respect to DG loads. Storage should not be discussed only within the context of DG however, as issues around storage apply to other types of generation.
- d) LDCs should have some control (i.e. dispatchability) of DG.
- e) Integrated Resource Planning is an important tool for optimizing DG and ensuring that DG placement on the system does not result in de-optimization of the existing system.

#### **Discussion notes:**

<b>Utilities</b>	<b>Written Comments</b>
	<ul style="list-style-type: none"><li>• Control and dispatchability of DG for a distributor is important (to ensure distribution level reliability etc).</li><li>• The Board should encourage storage. This could be achieved using a mechanism similar to FIT.</li><li>• The Board should allow CAPEX for grid upgrades/modernization to enable DG connection. The Board should allow LDCs to recover all costs associated with</li></ul>

	<p>connecting DG through rates and connection charges including CIS changes, data links to HON and the IESO, SCADA upgrades etc.</p> <ul style="list-style-type: none"> <li>• The Board should promote full visibility among LDCs/IESO of relevant DGs.</li> <li>• The Board should promote regional planning of DG proposals.</li> <li>• Direct system enhancements to support new DG, should specify some timing/schedule as a goal.</li> <li>• Require specific protection philosophies by DG size/type.</li> <li>• The Board should allow thorough analysis of the distribution system (planning and modeling). Resources needed to accomplish this include software tools.</li> <li>• The Board should provide clear cost recovery guidelines and clear security, privacy and interoperability guidelines.</li> <li>• LDCs should have real-time control and dispatch capabilities for LDCs.</li> <li>• The Board should promote safety.</li> <li>• The Board should not prescribe technical details or enforce economic objectives (e.g. job creation etc.)</li> <li>• The Board should not specify equipment/technology, procurement (i.e. local content rules) or interoperability methods.</li> <li>• The Board should not impose tight tolerances on LDC's load forecasts that may be impacted by the variable uptake of DG.</li> <li>• The Board should not implement overly complex/onerous reporting requirements or accounting requirements for rate applications.</li> </ul> <p><b>Discussion Comments</b></p> <ul style="list-style-type: none"> <li>• The directive talks about enabling DG. In the long term, distributors need to be able to control DG (may not be necessary at the outset) but eventually will need that capability in order to optimize DG uptake and use on the grid.</li> <li>• Rights to carbon credits/offsets for DG are handed over to the OPA.</li> <li>• Without specific direction, LDCs are reluctant to get into storage applications (even though there is enormous potential for storage in tandem with renewables). LDCs need the Board to encourage this in some way.</li> <li>• If deferral accounts for smart grid investments will continue, then clearer guidelines for storage are needed (for example, the filing requirements could explicitly encourage storage demonstration projects which would send a positive signal to industry).</li> <li>• Maybe storage should be encouraged in much the same way the FIT program encouraged renewable. See storage and renewable going hand in hand. Maybe a bit extreme, but literally commercialize it. If you install the storage, you can sell it back at X, it's up to you to figure out the technology</li> <li>• We need to move beyond pilot projects– without storage, DG will not work. Therefore a financial incentive for storage could be key.</li> <li>• The issue of charge/discharge ratios must be built in (no storage solution operates at 100% efficiency). The 10 megawatt rule currently in place is not actually clear.</li> <li>• With regard to planning and coordination, using the wires for the public good requires us to be more creative with storage and DG.</li> <li>• The storage market should be as open as possible; the Board should let everyone</li> </ul>
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	<p>who wants to get involved participate.</p> <ul style="list-style-type: none"> <li>• Load balancing and aggregate control are important considerations for the IESO but there are also local implications of DG to consider (such as impacts on individual transformers etc.). Therefore the OEB should allow LDCs to have local network control over DG to some extent (this would require LDCs to have a control room).</li> <li>• One could carry this idea (LDC control of DG) further to make LDCs responsible for some other IESO tasks such as forecasting (since they're closer to the data anyway). If you had this control, it would enhance functionality of DG today. The Board's guidance should perhaps encourage this.</li> <li>• In order to really take advantage of renewables, we must also incorporate DR (this will allow optimal use of renewables); the Board should move in the direction of integrated resource planning (IRP).</li> <li>• With smart meters we could have load profiles easily (for IRP) but data storage is the issue; we would need requirements for data storage (e.g. how long historical data must be stored etc.)</li> <li>• Some larger distributors are already storing smart meter data for at least 2 months. But this is not necessarily consistent across the province.</li> <li>• The regulator is an economic courthouse, the regulators of the future will be forced to follow a trend line and specify how much they are deviating from that line. In Ontario we have to deal with directives constantly and the regulator's direction has been determined by policy. The Board should be given legislative authority to have more control over the direction/timing of the regulatory process (e.g. cost recovery, the current two year window is limiting and the regulator should have the ability to address this).</li> <li>• Someone must first buy the 10 yr plan in order to incorporate 'milestones' in the framework.</li> <li>• Question of interoperability at high level, there should be a common platform to be interoperable. But the notion of what technology you pick could be specific to a certain jurisdiction. Use interoperable at the higher level. Coming down to which option you pick should not be forced on anyone</li> <li>• With respect to procurement rules (e.g. local content or interoperability requirements) they can work counter-intuitive to other policies due to cost issues. Take solar as an example, local content rules have created essentially 2 prices; the market price and the Ontario content price.</li> <li>• In a distributor's last COS the LDC spent considerable time getting the load forecast model to work and ended up finding that the model was inaccurate anyway due to incorrect estimates of DG uptake. Load forecasts are over-scrutinized given that there are so many variables.</li> </ul>
<p><b>Technology Vendors</b></p>	<p><b>Written Comments</b></p> <ul style="list-style-type: none"> <li>• In the long term, distributors may need to be able to control DG (though this may not be necessary at the outset).</li> <li>• The Board should ensure LDCs can recover costs to connect, monitor and potentially control DG to ensure safety and reliability.</li> <li>• For residential solar DG, what controls are required to enable this resource to be dispatchable?</li> <li>• The Board should require DGs to specify CO2 offset (this will shed light on</li> </ul>

	<p>environmental benefits of renewable DG and prepare for carbon credit trading).</p> <ul style="list-style-type: none"> <li>• Cost efficiencies can result from intelligent management of renewable generation.</li> <li>• The Board should create a framework for load balancing i.e. DR, storage, backup generation, UPP concept. It could be that every MW of renewable generation must be offset by backup ‘negawatts.’</li> <li>• The Board should specify standards for real-time, near-real-time, and historical data exchange with consistent and appropriate data formats. Where standards don’t exist or are insufficient, the Board should develop them and publish them openly.</li> <li>• The Board should not specify equipment (e.g. RTUs) or software solutions.</li> <li>• The Board should promote interoperability testing and coordination among LDCs.</li> <li>• Intermittency and variability of DG creates inherent planning management and visibility issues which must be addressed.</li> </ul>
<b>Agencies</b>	<p><b>Written Comments</b></p> <ul style="list-style-type: none"> <li>• Distributors and transmitters should be required to post their ‘conditions of service’ for generation connections.</li> <li>• The TSC should be amended to clarify the requirement for a connection authorization from the ESA (the DSC is clear as is).</li> <li>• The DSC should be amended to clarify that the requirement for connection authorization applies to all generation facilities (consumer owned, licensed generator, distributor owned).</li> </ul> <p><b>Discussion Comments</b></p> <ul style="list-style-type: none"> <li>• This consultation is an opportunity to change that two year COS window to support smart grid deployment and smarter investment.</li> <li>• With regard to economic development (and procurement requirements) the Minister’s Directive mentions it specifically. Even if the group is opposed to such requirements, can Board ignore this part of the directive?</li> </ul>
<b>Consumer Groups</b>	<p><b>Written Comments</b></p> <ul style="list-style-type: none"> <li>• The IESO should provide forecasts to LDCs to enable LDCs to predict distributed renewable generation (DRG) output.</li> <li>• LDCs should maintain and make available DRG connection capacity and plans.</li> <li>• The Board should not specify integration requirements (e.g. DRG capacity per feeder etc.)</li> <li>• Integrate specification with IESO market rules (e.g. don’t use one size fits all approach)</li> <li>• The Board should implement an open ‘inviting’ framework that encourages participation from all sources e.g. storage</li> <li>• The Board should allow cost recovery for generators for communication and control equipment.</li> <li>• The Board should implement Time of Use pricing for stored energy and capacity.</li> <li>• The Board should ensure there is a simple structure for DG that recognizes international competition.</li> </ul>

- The Board should not create a system that fails to provide the dynamic response that the market requires.
- The Board should not specify technology/equipment or attempt to pick 'winners' - the market should decide.

**Discussion Comments**

- If renewables are not replacing coal than they are not offsetting any carbon emissions.
- Under the current framework the Government's policy to phase out coal was driven by social value, but after coal is phased out the issue of who owns credits arises.
- There is an opportunity for LDCs and generators themselves to incorporate storage into their facilities. We may want to explore different rates for storage power to reflect when it is most valuable (on peak vs. off peak etc.) price signals are important for either party. Storage must be designed with respect to DG and efficiency; we need to plan locations carefully.
- Technically speaking storage is a necessity (especially for enabling/optimizing DG). It's not clear that LDCs are the best R&D outfits for figuring out storage solutions. LDCs are fundamentally delivery agents of power (with generally conservative cultures) therefore this activity may be best suited to another agency or agencies.
- Ontario has the LTEP but we don't have local IRP which is the missing piece. With IRP everyone optimizes their piece. The overall balance for the province would be better. Right now, we run into situations where the LDCs can't do loadload saving in the winter even if it makes sense for their service area.
- One of the best tools for IRP is data. What we're finding now is there is no load profile (by customer class and down to more specifics such as a particular area etc.) and customer data. Who provides the data will be an interesting conversation.
- We're not getting the right signals in the market place so we end up having a lot of DR that doesn't get used (then why are we paying people to enable it?). Without local control (LDCs calling DR events etc.) DR will never be optimally used (i.e. used for local, regional and provincial needs).
- Using same one size fits all process, we've ended up with a second best system. We need to provide a mechanism and decision criteria that allows the long term decisions to be made (even where the benefits don't all accrue to the applicant/LDC alone). CDM has already made a start at valuing things that go beyond the COS timeframe, the opportunity is there to use that methodology to value costs and benefits for longer term investments. Not everything can be done on a lifecycle basis but it could help to provide a more robust BC test.
- If we're going to see the smart grid mature there has to be investment, the Board should provide an open framework that allows flexibility but such a framework needs clear milestones. Milestones can give confidence that plans are on track and may also help us overcome the restrictive two year framework.
- But how can we forecast a 10 yr plan (in order to incorporate milestones)? Smart grid will evolve more quickly than that. Like the internet did.
- We should be thinking about how we can accelerate that transition from smart grid being a unique entity to being business as usual.
- SG is an IT project layered on top of the electric grid. Businesses that make IT investments sometimes do so without having detailed quantification of benefits.

	<p>Real benefits reveal themselves eventually. Therefore in evaluating smart grid investment we must take some benefits as “hard” benefits and take the rest on faith. There have been distributor hearings in the past that demonstrate the use of milestones and review over time as the distributor moves toward its goals.</p> <ul style="list-style-type: none"> <li>• There is always a regulatory risk that the Board may “cut your knees” out from under you with respect to your investments if they feel that funds are not being properly/prudently invested.</li> <li>• The GEA included ground source heat pumps as renewables. Yet there are no incentives for them stemming from the GEA. 90% of the value of ground source heat pumps is in its local content. Here we are propping up solar/wind generation instead of supporting industry that already existed here due to loss of incentives.</li> <li>• Speaking as an intervenor looking at a distributor’s load forecasts, it would be good to remove regulatory incentives that can cause a bias on the load forecasts one way or another. If these incentives were removed and we had some form of true up system in place than we would eliminate a form of gaming of the system.</li> </ul>
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**Objective ii) Visibility**

**Key observations from the discussion:**

- a) Greater visibility is critical to increasing grid efficiency and optimizing the use of DG. Some SGWG members believe that the board should establish requirements for visibility on a functional, but not technical, level.
- b) Members suggest that the Board should consider the role of regional initiatives and LDC cooperation when developing requirements for visibility. This could be an important opportunity for resource and information sharing.
- c) LDCs currently have widely varying levels of grid visibility capabilities.
- d) Members suggest that the Board should consider providing guidance on cost recovery to clarify who bears the cost of providing visibility data.
- e) It is important to convey grid information to consumers, especially regarding the best and worst places to locate DG.

**Discussion notes:**

<b>Utilities</b>	<p><b>Written Comments</b></p> <ul style="list-style-type: none"> <li>• The Board should encourage regional initiatives (e.g. SCADA and control room services shared among distributors)</li> <li>• The Board should establish reporting requirements for renewables and system performance.</li> <li>• The Board should ensure there are clear cost recovery guidelines and adopt standards for connectivity and interoperability.</li> <li>• The Board should allow increased monitoring and control capability of DG for LDCs.</li> <li>• The Board should define ‘distribution automation’ as a CAPEX spending type</li> </ul>
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within discretionary category — 'required' activity by LDC.

- The Board should promote SCADA system implementation.
- The Board should promote the ability to get data from DG and use it to optimize distribution systems. Increased visibility will allow more DG to be connected.
- The Board should encourage/require transparency of grid conditions to promote optimization of DG and storage etc. (in terms of location etc.).
- Costs incurred by LDCs providing data required by either the IESO or HON should be passed on to those entities. In this way the entities requesting the data will bear financial responsibility for its collection and put the onus on them to demonstrate the need and value of the requested data.
- The Board's guidance should recognize that different LDCs are at different starting points in terms of smart grid.
- The Board's guidance should recognize that there will be costs involved in collecting, aggregating and analysing data and that these costs and benefits will likely be spread over years.
- The Board should avoid specific technical or procurement requirements (such as minimum local content etc.)
- The Board should avoid requirements for economic development.
- The Board should not specify what information must be displayed.

**Discussion Comments**

- From a small LDC perspective, we should be aware that not all LDCs have any network visibility or SCADA.
- This is a great opportunity for LDCs to promote regional planning. Promoting visibility could be a tool to bring LDCs together and realize efficiencies. For example, a distributor's control room was only operated 8 hrs a day, overnight it was operated by another distributor in this way both LDCs saved money and increased efficiency, it's a win-win. SCADA system may be a tool for groups to work together to realize efficiencies.
- Due to the large volume of renewables connecting to the network, some distributors may need a step above current SCADA products (which are operator intensive) some may need algorithms to increase automation.
- This raises the issue of what level of automation is best? It's either feedback and manual response or feedback and automated response. Full automation can cause problems, for example one risk is that IT systems need constant debugging. Often, large networks may need a hybrid model or distributed architecture (keep some data/automation at substation level as opposed to centralized control room).
- With regard to FIT and Micro-FIT there is still some mystery involved. The application process is linear but perhaps some parts of the process could happen in parallel. Information to LDCs is vague making planning difficult.
- In 2007, under RESOP, the key question was: are distributed generators optimizing the wires or not? A study found that in most instances they are de-optimizing wires. It's not out of the realm of possibility that ten years down the road distributors will want to recover the costs of this decreased optimization (e.g. wires get choked by poor placement). Therefore it may be better if DG locations are planned rather than left entirely to the market. The premise of smart grid is that by having more definitive information about the system we can push the system limits much higher.

	<ul style="list-style-type: none"> <li>• In terms of choosing types of DG and promoting CHP with IRP, LDCs can work with other parties to determine which option is best for the system locally and provincially.</li> <li>• Looking at the impact of EVs in Toronto, congestion on the grid must be relieved to accommodate EVs because there is no headroom as is.</li> <li>• The trend is doing things at a local level rather than an aggregate level and the Board should adapt to this.</li> <li>• The notion of aggregation takes away from DG and DG management at the wires level (DG should be under LDC rather than IESO control). If you want to push green power to &gt; 30% penetration, you have to address reliability of power quality (the system cost of introducing green power). We also need to acknowledge that intermittent and variable are two different things.</li> <li>• The flutters of the distribution level are ignored at the aggregate level (at the Dx level you are on a bumpy road but at the Tx level you are on a freeway). If you want a lot of penetration of green power at the DX level something's got to give otherwise power quality is degraded. More investment required. \$90,000 per megawatt rule doesn't begin to cover the real costs.</li> <li>• If DR is an essential component of DG, how much of a tolerance will the customer have regarding reliability? Storage back up could be required to promote stability from renewables (output).</li> </ul>
<b>Agencies</b>	<p><b>Written Comments</b></p> <ul style="list-style-type: none"> <li>• The Board should not mandate installation of communication infrastructure in existing generation facilities connected at high voltages; such as requirement could present a safety concern since the Ground Potential Rise (GPR) studies for the existing substation grounding did not account for communication wires.</li> <li>• Visibility can make an important contribution to maintaining system reliability. Dispatchability of DG raises system integration costs (such as software modelling tools, forecasting, and ancillary services) and associated cost recovery.</li> </ul> <p><b>Discussion Comments</b></p> <ul style="list-style-type: none"> <li>• We should look at DG in terms of reliability. Good forecasting leads to planning. The next level is dispatchability. Can we use DG to help with reliability? We're looking at data requirements to see if DG can help with reliability. Another level is the market. How could DG participate in the market to meet our operational needs?</li> </ul>
<b>Technology Vendors</b>	<p><b>Written Comments</b></p> <ul style="list-style-type: none"> <li>• The Board should adopt interoperability standards to ensure cost effective consolidation of data and systems.</li> <li>• The Board should enable cost recovery of devices (such as PMUs) that have positive impacts beyond OEB jurisdiction (e.g. some SG benefits accrue to parties other than the applicant).</li> <li>• The Board should allow distributors to recover costs of tools that bring greater visibility to the grid which in turn will help to address regional constraints etc.</li> <li>• The Board should consider requiring SCADA and RTUs (at all substations and any circuits with DG).</li> <li>• The Board should improve distribution system models and standards for sharing information.</li> </ul>



	<ul style="list-style-type: none"> <li>• The Board should set minimum system visibility requirements to ensure safety and reliability.</li> <li>• The Board's guidance should be technology neutral.</li> </ul>
<p><b>Consumer Groups</b></p>	<p><b>Written Comments</b></p> <ul style="list-style-type: none"> <li>• The Board should require 'rate-payer' investments to be shared.</li> <li>• The Board should provide location-specific adders or discounts to generators (to encourage DG where it is best for the system as a whole or in part).</li> <li>• The Board should encourage DG/load pairings</li> <li>• The Board should require visibility (i.e. make publicly available) of feeder/station capacity for DG and load. The frequency at which this data is updated must also be specified by the Board.</li> <li>• The Board should reduce barriers to renewable technology that can displace electric or gas loads.</li> <li>• The Board should ensure transparency of investment plans.</li> <li>• The Board should specify functionality not technology.</li> <li>• The Board must allow customers to access data.</li> </ul> <p><b>Discussion Comments</b></p> <ul style="list-style-type: none"> <li>• What about locational adders or discounts to promote DG in a particular area? If the costs are higher to connect a particular generator due to the location those additional costs should be reflected in the price to connect.</li> <li>• We've used the wrong tool for the wrong job (i.e. CHP being limited in terms of location when solar and wind are not).</li> <li>• For example, a client with a small industrial load (large user class) was trying to add a few megawatts of load but would end up overloading a town feeder. The customer was told they cannot increase load without stressing the transformer station. At the same time no one in town can get a FIT contract due to the same limitations of the current transformer station. Instead of replacing the transformer station local solar could be used to offset the impact of the new industrial load but this is not allowed under the current framework. All the most creative solutions seem to be precluded by existing rules.</li> <li>• Getting back to the framework, there are more players in the market than just LDCs. We should allow these players to play the game. The OEB should remove barriers and that would spark innovation. For example, the silos around the gas and electricity markets should be removed so the two can integrate where appropriate.</li> <li>• Denmark did not get to their current state without a regulatory regime that required CHP.</li> <li>• It may be that technically and in a regulatory sense it would be useful to require LDCs to justify the level of independence they apply when controlling and upgrading their system (e.g. justify why haven't they piggybacked on someone else's system).</li> <li>• The more information about feeder capacity etc. that is available up front the faster DG connections can be made.</li> <li>• If the information is available than there is the opportunity for the market to handle these situations (many players currently denied access). For example, in Alberta</li> </ul>

	<p>the customer has to commission a system impact assessment for connecting but does not necessarily have to go through the LDC to do so. The regulator could prescribe a standard instead.</p> <ul style="list-style-type: none"> <li>• At the transmission level DG must meet IEEE standards (IESO market rules) perhaps we need to go this route for the distribution level too.</li> </ul>
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### **Objective iii) Control and Automation**

#### **Key observations from the discussion:**

- a) Some group members believe the Board should adopt interoperability standards while others believe the Board should avoid any procurement requirements including specific standards.
- b) The 'right' balance of control and automation will vary by distributor. This is another area where distributors could benefit by working together.
- c) Members suggest that the Board should consider identifying minimum levels of automation and control, but should specify technology (e.g. functionality but not technology).

#### **Discussion notes:**

<b>Utilities</b>	<b>Written Comments</b>
	<ul style="list-style-type: none"> <li>• The Board should provide guidance around cost recovery for distribution automation.</li> <li>• The Board should define reliability measures.</li> <li>• The Board should require evidence from applicants of improved reliability for proposed investments.</li> <li>• Customer benefits include power quality, reliability, and security of supply.</li> <li>• The Board should identify what level of automation is considered the 'minimum requirement' to implement smart grid.</li> <li>• The Board should require improved reliability and adopt common interoperability standards.</li> <li>• Control and automation should be part of any regional planning initiatives where applicable.</li> <li>• The Board should encourage modernization of network equipment such that equipment isn't just 'like for like' when replaced.</li> <li>• The Board should allow LDCs to invest in distribution automation without having to demonstrate a traditional cost/benefit argument since most of the benefit is on the consumer side of the meter (less downtime) while cost is on the LDC side.</li> <li>• The Board should not specify equipment sourcing or procurement (e.g. minimum local content requirements).</li> <li>• The Board should not expect or require immediate benefits with equipment upgrades. Such upgrades may require several ancillary components for benefits to be realized (e.g. might need a modernized control centre and training for real benefits.)</li> </ul>

- The Board should avoid prescriptive policies/procedures with respect to technology.
- The Board should define when smart grid technology simply becomes 'good utility practice'.
- The Board should require a good business case to support automation and control initiatives.
- The Board should not set requirements for economic development or detailed specifications for technology.
- The Board should avoid defining automation and control because it will have different meanings to different LDCs.

**Discussion Comments**

- The context here is what is your return for increasing automation? The answer here is its limited, eventually there is decreasing rate of return because at some point further automation is unnecessary.
- Think of a scenario where EVs have significant market penetration and there is a power outage. Automated delays on EVs before they start to charge again after an outage would be required to give system time to stabilize again, if they all began charging immediately after power was restored they could easily overwhelm the system.
- The substation will eventually become a mini-automated control room.
- With a model such as *A Better Place's*, where there is visibility of all chargers in the province it would be possible to liaise with LDCs and the IESO to make sure that EVs don't overload system.
- It's not as easy as it sounds to control DG because its very difficult to judge which end point is actually 'causing the problem'. It's not always as easy as one would think to pin-point the problem from the control room. Modelling capability is important. Distribution modelling is not done in the same way as transmission modelling so there may be a deficit in the market for the relevant product.
- It's important to be cognizant of the fact that levels of SCADA among distributors varies because SCADA is designed for each LDC's specific needs (of course with costs in mind).
- You can't have segmented automation, LDCs should work together to make sure that there are no wasteful investments (in terms of one distributor's automation having an impact on other distributors they should work together).
- Automation and data capture and ODS is another element – what level of data is required? Managing the database is a whole other issue. Would contract out construction of the database but not the management of the database.

**Agencies**

**Written Comments**

- Substation automation should only occur where needed.
- The Board should require evidence from applicants of improved reliability for each proposed investment.

**Technology Vendors**

**Written Comments**

- The Board should set standards for data exchange and protocol.
- The Board should provide guidance on voltage regulation and capacitor placement to reduce losses and provide cost recovery for these

**Consumer  
Groups**

devices/equipment.

- To promote reliability, the Board should allow LDC control of DG resources; provide guidelines for cost recover for auto-restoration schemes with safe operating practice guidelines.
- The Board should allow distributed control for DR programs to respond to localized circumstances.
- The Board should set guidance on trade off benefits between energy savings and reliability and cost efficiencies.
- Is there an opportunity to determine priority classes (framework) to manage congestion?

**Discussion Comments**

- Automation may need to evolve to recognize disparity among different geographic regions.
- It's possible to direct DR to types of load or locations etc. EVs will create issues related to localized demand concerns that are not necessarily province wide.
- System integration issues come up. To have control capability and aggregation compatibility among systems is required.
- Good utility practice is to simply upgrade to better equipment when old equipment must be retired, therefore, is there a need for the Board to encourage planning here?

**Written Comments**

- The Board should specify minimum functionality and interoperability requirements for smart grid.
- Smart grid enables data driven solutions rather than reliance on averages or statistical diversity.
- The Board should provide greater regulatory certainty for shared use of resources among LDCs.
- The Board should promote sharing of information.
- The Board should not assume direct control by the LDC itself (e.g. control solution choice requires a business case).
- The Board should not prohibit functionality above minimum requirements.
- The Board should be careful not to equate smart grid with improved reliability (one does not necessarily lead to the other).

**Discussion Comments**

- Reliability is already fairly high how can it be improved? How much can it really be improved?
- Reliability is value for customer and whether they get it from smart grid or some other means is a business proposition – therefore we don't necessarily need to increase reliability standards (as long as we maintain current levels).
- Envision DR specific to one feeder as opposed to a province wide basis. DR should be more local.

**Objective iv) Quality**

**Key observations from the discussion:**

- a) Members suggest that the Board should avoid setting requirements to increase current power quality levels (current levels are sufficient) instead, the Guidance should focus on maintaining those levels as smart grid devices and DG are integrated into the system.
- b) The group is divided as to whether distributors should be allowed to charge premium rates for premium service (i.e. increased quality) or if customers should seek these services elsewhere (given that increased quality services are currently available through third party providers or on-site equipment upgrades).
- c) The group is divided on whether the Board should establish power quality metrics/targets.
- d) High levels of power quality are generally a more important concern for commercial and industrial customers.

**Discussion notes:**

<b>Utilities</b>	<p><b>Written Comments</b></p> <ul style="list-style-type: none"> <li>• The Board should establish a high level definition of power quality setting out expectation for outages, harmonics, and unbalance.</li> <li>• The Board should establish service quality metrics/targets for power quality.</li> <li>• The Board should adopt recognised standards rather than developing Ontario specific ones.</li> <li>• Policies and rates should be consistent across customer classes and among LDCs.</li> <li>• The Board should focus on maintaining existing power quality levels as smart grid and DG etc. are deployed.</li> <li>• The Board should allow for premium and interruptible rates.</li> <li>• LDCs should be required to enhance reporting of power quality in rate filings.</li> <li>• The Board should allow cost recovery for investments related to power quality.</li> <li>• The Board should avoid specific targets for quality factors.</li> <li>• The Board should not specify methods or technologies for achieving power quality requirements.</li> <li>• The Board should avoid implementing hard improvement requirements.</li> </ul> <p><b>Discussion Comments</b></p> <ul style="list-style-type: none"> <li>• In terms of the Board establishing power quality standards, we should be cautious, these levels could be situational as opposed to constant, it's more dynamic than one might think. For example, voltages should fall within a range and going forward we'll likely be looking at stability within that range. Perhaps this is an opportunity for coordination or sharing experience.</li> <li>• Now that AMI has been chosen, the limitation of allowing customers to request meter upgrades would be compatibility with the distributor's system but should still be able to provide any functionality sought.</li> <li>• Customers will demand power quality metrics (in order to ensure accountability).</li> </ul>
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- Do we need a penalty for power quality?
- Could we not just develop wording that would address power quality on a high enough level without getting into specifics on harmonics, shelving, etc.? For example, make a statement that from the regulator's point of view this is the expectation with respect to power quality.
- If they put words like that, LDCs would come for cost recovery, and how would the OEB evaluate this?
- We need to consider whatever network architecture we have. Can't compare jurisdictions that are physically and institutionally different from Ontario and expect to get the same results like we have done in the past.
- Look at actual complaints about power quality. How many people take up this issue? Less than 0.1% of customers file complaints. With that kind of uptake, is there really a need to educate these customers on power quality issues? Where do you put your efforts?

### **Vendors**

#### **Written Comments**

- Guidance should foster power quality investments appropriate for a particular distributor given its size, environment and service area.
- The Board should promote the use of sensors at the substation level/feeder head for power quality and event monitoring.
- The Board should allow cost recovery and work with the OPA to incentivise controllable/automated VAR resources such as DG and storage.
- The Board's guidance should recognize that power quality is more important to commercial and industrial customers (for example 3 phase voltage balance) and allow for cost recovery of assets that improve power quality with a weighting to those customer classes.
- The guidance should clarify whether LDCs can charge more for higher quality power and if these costs would be passed on through rates or via a one time charge to a particular customer for special equipment.
- The Board should define minimum acceptable levels of power quality in terms of harmonics and voltage level etc.

#### **Discussion Comments**

- Power quality is not always caused by equipment issues. Ex. 3 phase, could be caused by unequal loading even though high quality equipment is used. SG could help with this because the utility doesn't know what the loading is on the 3 phases. Much more important for commercial and industrial for customers b/c 3 phase problems could damage equipment. Cost recovery should be more heavily weighted towards commercial / industrial customers. Residential customers will be annoyed, but the cost impact of poor quality power is less.

### **Consumer Groups**

#### **Written Comments**

- Current power quality is good; the Guidance should focus on maintaining current levels as smart grid and DG develop.
- Utilities should focus on utility-related power quality issues. Customers should focus on customer-related power quality issues. In other words, the utility should not have to cater to power quality needs of specific customers when those customers can buy protection equipment independently. The Board's Guidance should be clear as to how utility quality issues and customer quality issues are

differentiated.

- The OEB should require LDCs to ensure power quality standards are met by new DG connections.
- The Board should require MAIFI reporting.
- The Board should provide greater regulatory certainty for regional cooperation.
- The Board should avoid a 'one size fits all' approach.
- The Board should avoid arbitrary standards beyond IEEE and CSA.
- The Board should not force 'correction' of existing situations.
- The Board should specify functionality not equipment or technology.

#### **Discussion Comments**

- Power quality is nebulous from customer side, but OEB should encourage ability for customer to upgrade to higher quality meter in order to get more power quality information (at customer's expense).
- Enhanced service, people are asking for it but high costs mean customer uptake may be limited (and customers can do this without going to LDC). For smaller LDCs, this may be onerous may want to go with a third party service provider instead.
- One of challenges identified previously in talking with LDCs is different people have different definitions of reasonableness. How do we come to terms with this considering 80 + LDCs in Ontario? What level of power quality is reasonable?
- There have always been regions that don't meet normal quality standards where people have been getting by for years regardless. Prescriptive requirements for quality may cause unnecessary investment in regions that may not have a real need.
- The Board is going to have to understand difference between SCADA and SG when reviewing programs. SG should be able to handle intermittent issues related to DG.
- By way of example, there are aboriginal/remote communities with real power quality issues that have caused significant equipment damage. These are good examples of what happens where there is no such protection. A worst case scenario.

#### ***Next Scheduled Meeting:***

- April 27, 2010