Meeting Summary

OEB Smart Grid Working Group

Meeting Date: April 27, 2011 **Time:** 10:00 am – 4:45 pm

Location: 2300 Yonge Street, 25th Floor, ADR room

Board Staff: Russ Houldin, Ashley Hayle, Rachel Anderson, Stephen Vetsis

Meeting Topic: Adaptive Infrastructure Objectives identified in the Minister's Directive

The purpose of the fifth Smart Grid Working Group Meeting (SGWG) was to discuss each of the four adaptive infrastructure objectives identified in the Minister's Directive. Case studies on lessons learned from the smart meter deployment and electric vehicles were used to facilitate the raising of issues, questions, and concerns for the Forward Compatibility and Flexibility Objectives respectively.

Case Study 1: Lessons Learned from Smart Meter Deployment

Key observations from the discussion:

a) Many smart meter functions that would enable future capabilities were ruled out in the early stages of the smart meter deployment due to cost, and this may result in expensive retrofits in the future.

   Lesson: Smart grid capabilities that may be required in the future should not be ruled out simply because of cost. Rather, a longer-term view that considers costs, benefits (economical and societal) and/or performs a business case analysis of potential future applications should be taken when determining functionality.

b) The minimum smart meter functionality requirements specified were limited and resulted in the installation of smart meters with few capabilities and a lack of forward compatibility.

   Lesson: Smart grid functionality specifications should ensure that smart grid technology installed can sufficiently facilitate future potential capabilities.

c) While important to ensuring that the smart meter rollout occurred in a timely fashion, the imposition of an implementation deadline resulted in stranded meter assets and drove up costs.

   Lesson: The effects of setting deadlines on the deployment of certain smart grid technologies should be considered when establishing the deadlines. Furthermore, the *deployment of smart grid technology should utilize and build on existing grid assets where appropriate.*

d) The lack of a clear roadmap from the launch of the smart meter initiative and the introduction of new requirements mid-initiative was problematic.

Lesson: Time should be taken to establish a clear and comprehensive roadmap for the deployment of certain smart grid technologies. This will provide clarity for electricity industry constituents who are considering implementing smart grid technologies, encouraging investment and understanding.

e) Inaccurate messaging regarding the benefits and purpose of the smart meter initiative may have reduced consumer adoption.

Lesson: Clear messaging for future smart grid technology rollouts should be ensured to reduce customer uncertainty and raise adoption.

Discussion notes:

Utilities	**Written Comments** • Place more emphasis on selecting a system with flexible communications for bandwidth (real-time) and AMI applications. Encourage more rigorous evaluation during pilot programs. • Develop detailed data mapping and requirements for future applications. • The (smart meter) procurement process was too complicated; minimum functionality was too limited; and the program was poorly communicated to consumers. • The fixed deadline on smart meter deployment forced the replacement of meters that were not at the end of their useful life. This also drove the costs up significantly and limiting cost recovery to the minimum functionality drove any LDCs to install meters that are already obsolete. • Introducing major requirements after deployment has started is problematic (e.g. MDM/R). Timing regulatory initiatives with maturity of technology is critical. Establishing deployment goals and schedules is important. • Higher resolution of data is needed. Billing software systems are much more complex that predicted. Customer expectations where higher than warranted. • More data processing and efficient use of data for the benefit of the utility and customers is important. Optimize use of resources. • The SMI did not include commercial 50kW – 200 kW these customers still require manual meter reading. • Specifically excluded HAN capabilities due to costs. • Centralized MDM/R does not address all LDC's needs; duplication is required at the LDC level. **Discussion Comments** • In early discussions about deploying smart meters, many ideas for future uses of smart meters were proposed but immediately shot down due to the costs. We should not strictly rule things out simply due to cost. We should think more long

	term with respect to uses. Functional specification for smart meters had a very narrow scope. • How do you get information to people when and where they want it? A display for example, is useless during day while at work. Some people willingly participate due to interest but this is unlikely to be the case for the average customer. There is no killer app yet. • While there may be no “killer app” now, how will we allow for it in the future? That functionality was disabled in the specifications for smart meters. • Until pricing dynamics shift to a 4x to 5x split between on and off peak, there will be no incentive for the average customer to participate with displays, etc. • The AMI network is low bandwidth. There will likely be a need to couple AMI network with some form of high speed broadband network in order to enable more functionality. • There are two different internet models to discuss. The social media model shows that people can be very careless with their data. Internet banking on the other hand is different. Banks only allow access under very limited circumstances. The difference is the value placed on privacy of each type of data. If usage data is viewed as extremely valuable then perhaps the banking model is better, if it isn’t, a social media model might be more appropriate. • There still does not seem to be a business case for smart meters. There is a need to bring societal benefits into discussion, which one can’t do right now. The Minister’s forward compatibility statement is broad. It is important to be careful about the costs that will result depending on the approach taken. Some LDCs took a bare bones approach and are now limited while others took a broader approach and were criticized for resulting costs. The OEB needs to paint a road map and the utilities will fit within that road map. • In terms of what the OEB needs to do, simply make data available and let the market decide what is done with the data.
Technology Vendors	**Written Comments** • A lack of communication standards poses challenges for technology vendors creating solutions that span jurisdictions suggesting the need for ‘open’ accessible infrastructure (particularly smart meters). • Data inaccuracy will exist even with smart meters. Smart meters are typically not as physically robust as their electro-mechanical predecessors. Allowance should be made where LDCs opt for more robust products (at a higher cost). • The ownership of smart meter data should be clarified. • Multiple meter vendors with different communication protocols have increased the complexity of province-wide initiatives. • The advantage to having smart meter deployment driven by government policy is that LDCs can move forward with projects with a cost case but a limited business case allowing for tangible and intangible benefits. • In terms of lessons learned, better communication of the actual benefits of smart meters is important. Customers have unrealistic expectations of rate reductions from TOU. • Less lag between when a smart meter is installed and when it becomes used/useful and when the data becomes available to the end user is important. This is partly due to the lack of communication infrastructure in place prior to

	deployments. • Avoid vendor specific solutions and promote standardization. Open interfaces will promote innovation. Build upgradeability into devices. • Delayed electricity consumption information is not as useful as real-time or near-real-time information. **Discussion Comments** • Returning to the question of real-time vs. near real time data right now data is not easily available to customer and it's unavailable until following day. • There is no contradiction between application programming interface (API) and putting controls around data. Just need access to the way to access data. Without having API would have a controlled pilot which could limit potential developments. • Earlier discussion focused on making data available once it arrived at utility but this will result in a significant data lag. The Board may need to enable a more direct access point for more immediately required data.
Agencies	**Written Comments** • Narrow view/short term goals are problematic (i.e. TOU billing deadline) there is a need for a regulatory forum to deal with longer term decisions such as data requirements and retention beyond TOU billing, 3rd party access, and telecommunications. • Smart grid implementation will involve the same degree of technology, cost, performance and risk. Implementation may evolve differently from initial top-down policy objectives since critical decisions are made on a project by project basis. • Lack of clear business case with smart meters was problematic. The cost benefit ration was dependent on government policy support. System benefits/costs were not assessed. We're now experiencing difficulty conveying to consumers that their already increasing bills would have been higher but for smart meters. **Discussion Comments** • There is a need for a business case. In the case of smart meters the government essentially did that but it wasn't taken any further. Many times we just think of consumer benefits but, smart meters also provide system benefits that weren't necessarily discussed during roll out and had they been considered we may have had different minimum requirements. • Functionality was tied around TOU billing and restricted functions around that. In addition there was no regulatory forum to deal with future benefits during smart meter roll out. Now that the OEB is doing smart grid consultation, there is an opportunity for forward-thinking discussions which did not occur with smart meters.
Consumer Groups	**Written Comments** • Customers are not able to take advantage of smart meters by accessing real-time meter data. • Proprietary technology was not avoided. • Direct consumer access to data did not occur therefore customer enablement is delayed. • MDM/R did not deliver as much functionality as it could have. **Discussion Comments**

	• Don't just look at costs. Focus on potential benefits for future uses. If an in-home display was provided with meters, the current AMI might be different. Think of benefits to end user. • A distributor piloted in home displays for some customers and saw average of 3% reduction in consumption. • The utility is the source of data but its business hours (8 am -4 pm) can limit access to that data. That's how home display can help some customers. • Publishing an open API (application programming interface) would be the way to go in terms of access to data. This is how IT typically operates and allows for companies to participate. Lowfoot is a company that is aggregating DSM credits. Possibly giving close to real-time monitoring. Don't try and sell hardware or interface. Just publish an open interface that can allow others to join. With the future of social media ahead, it's not impossible that we may see games with people competing with neighbours for lower energy usage. • Typically in IT systems one would build capability in from the start; even if there is no immediate need it is important to allow flexibility moving forward. • Storage of data is cheap, relatively. • With functional specification and API a trusted application (real-time or non real-time in spec) with verified users would be determined through some minimum information. Once verification has happened then you can send data full throttle. • Don't think you can build a business case for fundamental infrastructure. We're no longer in a time where costs are declining. Costs are rising and we cannot determine what future benefits might be. It seems that electricity is becoming a substitute for other fuels as well. In this case it is difficult to predict future results and, as such, tough to put together BC analysis. • Some BC analysis is good. Costs would be in writing specifications and server infrastructure. Extra data capability costs are not nearly as material as other hardware investments. • It is important to reinforce that we don't want to lose the pulse output capability on the meter in anticipation of what will happen in the future. We don't want to remove any current functionality but rather augment it.

Case Study 2: Electric Vehicles

Key observations from the discussion:

a) LDCs face many challenges regarding the deployment of EVs, including:
   - Location of EVs in grid (e.g., distributed or concentrated loading)
   - Managing charging of EVs (e.g. when does charging occur: off-peak or on-peak? Do the low power requirements of EVs warrant metering in public locations?)
   - Upgrading infrastructure to accommodate EVs (e.g., who bears the cost, where in grid to upgrade based on demand, landlord issues)
   - Multi-jurisdictional dynamics (e.g., owner of EV living in one jurisdiction but requiring a charge in another)
   - Use of EVs as energy storage devices

b) As the proliferation of EVs will likely occur at a fairly slow rate – if hybrid vehicles are any indication – LDCs and regulators will likely have a substantial amount of time to upgrade the grid infrastructure, which will assist with the addressing the above challenges.

Discussion notes:

Utilities	**Written Comments** • There is a need to optimize charging schedules (in home charging). • Key issues for EVs include: high demand for EV chargers, metering across jurisdictions, developing interoperability standards so EVs and utilities can communicate (cost signals, inverter shutdown etc.) • Expect an increase in LDC costs for O&M and unplanned capital as more EVs are placed on the system and transformers and secondary wiring need to be upgraded to accommodate increased load, even with ‘smart chargers’. • With the current rate model, LDCs will receive only a slight increase in revenue from EVs, but costs to accommodate EVs could be much higher. The OEB should clarify if these costs should be socialized (spread across all rate-payers) or should the EV owners pay? • Charging stations need to be smart so as to minimally impact the grid while providing proper feedback to the customer. • Power quality issues with EV to grid discharge and control for utility to protect distribution system vs. charging convenience and expectations of consumer are two key issues. • This is a non-linear load. Power quality should be observed. Costs associated with implementation and monitoring should be considered. • Some key issues include: warranty limitations by car manufacturers for using the battery as energy storage to sell back to the grid; keep billing simple, LDCs billing systems are not capable of multiple billing elements; registration of EVs would help LDCs with network planning; charging standards are not yet cohesive ‘smart charging needs to evolve”. **Discussion Comments** • DC is good if you’re starting from scratch but in the context of AC infrastructure it may be problematic. • It seems car manufacturers are converging on AC charging. • If EV charging can be limited to off-peak and therefore not require additional investment in wires than it may not be so bad. • In terms of charging, why would an LDC incur costs for infrastructure used by another LDC’s customer? This room is not the room to debate charging types etc. We need to focus on policy and costs. Policy will dictate what investments LDCs get cost recovery for. • In terms of various charging levels etc. and the impact on the distribution system, we do not really have to answer yet. Similar to a predominantly electric-heated area where the power goes out and all the heating systems try to come back online at same time, transformers etc. are easily overloaded. We just don’t know yet, need more time to investigate. • If 1 house in 20 evenly spread out have EVs, it’s no big deal, but if adoption is

	concentrated than we'll have issues. We need to have an idea of what the distribution will be like. An individual home is wired to run everything at once (has that physical capability) but distributors rely on diversity (the assumption that not everyone will do everything at once) to size distribution equipment. • It's probably reasonable that EVs will be concentrated/clustering (since people naturally cluster in socio-economic groups). • We need good information on where EVs are (e.g. people register with the regulator) or LDCs will show up at OEB with proposals to upgrade their entire system to accommodate potential and unknown EV deployment. • Registering EVs and planning for EVs everywhere are extremes. Like other load growth, LDCs will make forecasts and learn where to reasonably expect EVs. • As long as charging is staggered/managed, clusters of EVs may not be as problematic as envisioned. Lots of coordination is involved but the issue isn't as simple as can we get that amount of energy to houses? • Wiring in the home is rated for a huge capacity so that the home could run everything at once if they wanted to do that. But you may have 200 amps inside the home, but you don't have enough capacity in the street to allow every house on the street to run 200 amps at the same time. We rely on differences in when power is used to size our network • Regulated businesses should avoid electrical work in the home (e.g. installing charging station) because the affiliate relationship code and possibility of lawsuits (i.e. risks) make that problematic. In terms of preparing for EVs, if part of the grid is upgraded to accommodate known EVs and an EV owner moves than the network may be oversized resulting in stranded assets. • That's why instead of resizing the network we need to think of better management of the existing network and management of EV charging. • Experienced load growth over the past few years, it is more revenue at the end of the day. SG will give us visibility into these residential systems. Can monitor an area, and if we see the load growing, we can proactively replace the transformer with a larger one. • Historically, networks have been used to shift energy over space, and anybody who wants to take energy can take it whenever they want. We are used to that now. What we need to move towards is moving energy in time rather than space. We could probably manage 6 EVs within a cul-de-sac, but just not at the same time. Either need to stagger charging or store charging (when they aren't charging). Issue is not whether we can get that much energy into the houses, it is about getting the energy in a point of time.
Agencies	**Written Comments** • Charging of EVs at the same time is an important consideration. • Customers with only one EV are unlikely to invest in infrastructure that allows them to store power and sell it back to the grid. **Discussion Comments** • In terms of Measurement Canada's role, MC has been getting questions about time-based charging and companies setting up charging infrastructure. The meters for any of this do fall under MC regulation but if the amount of electricity used to charge a vehicle is so little, it may not warrant measuring the actual electricity used and incurring the cost of metering infrastructure and complying with all relevant

	codes etc.
Technology Vendors	**Written Comments** • Key EV issues include load concentration (geographically as well as on/off peak), power quality (harmonics due to AC/DC interface), cost allocation of infrastructure across all customers or only EV owners • Who should pay for grid upgrades to accommodate EVs? EV owners, manufacturers, individual LDCs or provincially shared? • Should EV buyers be required to enter into a ‘charging agreement’ to place conditions on charging activities (location, time of day/week, frequency etc.)? • Adoption of standards for a communication interface between the AMI and the on-site charging station is important. **Discussion Comments** • A study of 30,000 cars and where they are located in a 24/7 cycle identified where charging opportunities are . . . realistically the prime opportunity is at home. The time when users are at home is ideal for off peak charging. And from a consumer perspective it’s the best opportunity for low cost charging. In terms of public charging, work is the next best option as opposed to shopping mall parking lots for example. However, work is not ideal from a peak/off-peak perspective. Some provinces have been focusing policy on charging in public places which is a less important piece of the puzzle. Policy should facilitate charging at home, which is both better for the consumer and for infrastructure. In the US there is a tax incentive (50% up to $2000 tax rebate) for installing a charger at home or work. By encouraging home charging you are indirectly encouraging off peak charging. This has been recommended to Canadian policy makers but so far there has been no uptake. The typical cost at a residential location for a 240v charger is in the range of $1500. Whereas, the cost of charging units and delivery of electricity for the private sector (which would be passed on to consumer) will be order of magnitude higher than charging at home. Therefore, the private sector may not see much value here. • In terms of public charging, one should prioritize charging based on locations where people leave their car for a long enough period of time to reasonably charge. Essentially, that would be work (therefore most public/company parking lots could be encompassed). Underground parking would be a priority in that sub-set because there is an advantage to having the vehicle in a somewhat moderated climate. Otherwise some electrons will be wasted regulating temperature in order to facilitate charging. • In a public parking location where you pay to park, trying to measure how much electricity was used by charging a car in order to pass through those costs to the customer probably costs more in and of itself than the actual electricity used to charge the vehicle (a vehicle uses minimal amounts - a few kilowatt hours – in order to charge). It would make more sense to charge a premium on the spot rather than actually passing through the real costs. In a work location scenario (not a paid parking lot) it would be up to the corporation to decide if free charging is their way of encouraging staff to drive EVs or to develop their own method of remuneration. It’s different though on residential side. EMC has done work on codes etc. to have infrastructure built in condos and other new buildings (e.g. new building code requires wiring to garage to have forward capability of charging or for condos x% of parking spots must be able to accommodate EVs.) Who are the potential early adopters of EVs – probably condo dwellers – but once a condo is built, enabling charging is a huge challenge whereas pre-building in that capability

is cheaper and easier.

- Average charging time depends on the battery, the level of depletion, and the level of charging. It takes 16 kWh to fully charge the (GM) Volt. Pure EVs need 240v charging and the time from 0 to full would be 7-8hrs. With the Volt, the vehicle controls the charging: there are 3 ways to charge: immediate, delay (essentially a timer, must tell the vehicle when you're planning to use it next so it can charge accordingly) and TOU charging (must be pre-programmed?).
- Every PEV announced would be able to take 120v or 240v charging. Some have additional capability for DC charging.
- A key question is what will distribution of vehicles be at neighbourhood and higher levels?
- There will be a long lead time on EVs; history has told us that the adoption of EVs is not going to be overnight in huge percentages. There will be some reaction time available. Use and needs of the vehicle will be big drivers so clustering is an important issue but not the only factor to consider. EVs are part of the diversification strategy but no one is expecting to them to replace gas vehicles completely. Don't want to overreact to how fast the vehicles will enter the market and what the proliferation will be. Akin to the advent of home air conditioning, it happened overtime and EVs will likely be similar. Part of the reason for the Volt's charging algorithm's three inputs (noted above) is that GM hoped that would facilitate staggered charging. At a minimum the start of the charge time will vary.
- With regard to discharging back onto the grid (EVs as storage capacity) the Volt does not have that capability and the flexibility coming to EVs in the short term is not envisioned because a) the total amount of energy stored is not as significant as people think b) most consumers with range anxiety are probably not going to be keen on that option. In the long term this capability should not be ruled out.
- EVs are variable load unlike pool pumps etc. where we know more about when they will be coming on and off. EVs are harder to predict.
- In terms of V2G communications, currently there is a research project in Oshawa to determine what the potential is for V2G communication. At the moment there isn't a lot to communicate to. The Volt has some capability though OnStar. Wireless communication is built in.
- Right now we have a legacy system where every L of gas we consume has taxes built in. The theoretical idea is that the more vehicles you have, the more tax you are paying to rebuild the road. Do you see a policy down the road whereby taxes could be collected to fix road from electricity vehicles?
- If you try to encourage the adoption of the green vehicle technology, to put it in context, even with Ontario's current fuel production mix, the Volt running in EV mode, is generating 1/8th to 1/9th the carbon of the best hybrids on the market, and that includes the carbon in the generation. From a car manufaturer's perspective, the Ontario and Federal governments have already complicated the tax system because it's based on taxing on litres for fuel. They still do this whether its compressed natural gas or ethanol, and so people are being taxed at higher rates considering the amount of energy being provided by these fuel sources. Should there be some taxation on the fuel for EV vehicles? Makes assumption that the gas tax is actually being used for roads. Would hope that the government takes a wider view to encourage EV use rather than trying to offset what they've lost in gas tax with new electricity taxes. EVs have significantly lower operating costs, and that is one of the methods. Estimate that EV mode fuel costs are 1/3 to 1/6 that for a gas vehicle. Want to have that differential in the near term (e.g. don't tax electricity for EV's) to promote EV use

	• During last 2 to 3 years, there has been a collaboration with EPRI to try to understand what effect EV's would have on the grid. At a high level, on the overall CDN grid, even 1M vehicles would have a minimal impact. But at a local level, it has more of an effect. How are we going to see the EV's come into effect, one on a street, or more dispersed?
Consumer Groups	**Written Comments** • Direct DC connection to renewables would boost renewables as well as limit line losses etc. • If EVs are used as an indirect storage source do the owners get paid? • Identify major public places for charging and socialize the costs of the infrastructure. Perhaps partner with parking operators. • Current EV issues include: uncertain pace of deployment, rural/urban differences, fixed or programmable charging rates, communications and control. • Customer expectation versus LDC's actual capability to deliver is an important issue. • Requirements on landlords for accommodating EVs need to be developed. **Discussion Comments** • Direct connection from renewables to EV's (charge directly from renewable power) should be facilitated. This could reduce losses from converting to and from AC-DC. And this would appeal to people who buy electric vehicles because they would want to charge from renewable sources. This may be a common application in some places such as California. • Let's broaden the discussion of EVs to transportation,n not just cars. We don't want to restrict the market place in anyway. We want it to be open to innovation without putting the onus on LDCs to do so. • Policy is not cost (necessarily); policy needs to be strategic and visionary. • What is the expectation of buildings in terms of providing charging? What about landlords, and commercially owned charging etc.? • Did not realize that such a small amount of electricity is used to charge a car. What about length of charging time? And does it have to be continuous? Could one interrupt with a demand response event for example? • The problem I think we're discussing is how does a utility face new load coming on and how does the smart grid fit into that? (Pool heaters and pumps and hot tubs could have same impact as EVs). A utility's water heater control program for example, smart grid can allow more interaction with load, more aggressive demand management can help support adoption of new load. The mobility issue is not as great as it seems – smart grid could maybe deploy smart management tools to deal with this. It would be unfortunate if EVs were to become the next load challenge for LDCs.

Objectives i) Flexibility and ii) Forward Compatibility

Key observations from the discussion:

a) Ruling out devices and functionality that could enable future functionality simply on the basis of cost should be avoided. Rather, technology installed should facilitate future potential applications or requirements (e.g. real-time requirements, different types of data visibility)

b) Open standards should be promoted. Ontario should become more actively involved in standards development.

c) As new technology will need to be replaced at faster rates than past technology, shorter depreciation periods for assets should be allowed.

d) A vision or roadmap document would help guide investments without prescribing them.

Discussion notes:

Utilities	**Written Comments** • Do not dictate technology. • Provide guidance on business case elements or prudence measures in assessing submissions. • Provide a roadmap to end state parameters so that technology investments are not short sighted. • The Board should allow LDCs cost recovery for IT infrastructure needed to harvest data from smart meters and other devices to they can monitor transformer loading, implement more sophisticated demand response programs (neighbourhoods, specific transformers). There may be a high up front costs to get this started which LDCs will not incur until there is greater certainty on cost recovery. • Provide encouragement/incentive for R&D and standard development related to interoperability (Ontario and Canada are not at the table for NIST's process currently).
Agencies	**Written Comments** • Don't discount other technology too much (DC houses, Bloombox, fuel cell vehicles, natural gas vehicles etc.) • Should ensure any policy's main objectives ensure we use our limited capacity for distribution and generation of power effectively for rate-payers. Other concerns are secondary.
Technology Vendors	**Written Comments** • Different AMI networks provide different levels of capabilities (bandwidth, signaling and control options etc.). Trying to make them equivalent/compatible is a major challenge. • Allow the internet to play a more significant role. • Do not hinder market-driven technologies (e.g. on-site energy management solutions) by discouraging or ignoring the need for on-site access to metering/pricing data. • Accept that new technology will need to be replaced sooner than past technology, allow for shorter depreciation of assets. • Do not limit rate filing to meet only present requirements. Allow for benefits

	realization or anticipation of future benefits to a reasonable amount. • Ensure adopted SG technologies facilitate open (standards-based) access to both near-real-time (on-site) data as well as utility-gathered consumption data. • Facilitate near-real-time access through standardized hardware communications modules to the smart meter (could be done on an as needed basis with costs incurred by consumer). Facilitate access to entity-gathered data with an open API then let the market work with the data and develop innovative solutions.
Consumer Groups	**Written Comments** • Do not allow proprietary designs that 'capture' either the LDC or the customer. • Open standards at high level layers will promote flexibility. • Maintain meter pulse output. • Open to functionality versus picking a winner. • Open APIs and functional specifications for all data (smart meters, EV batter management, grid renewables status etc.) • Don't lock into one vendor's data solution especially if there is a cost associated. • Limit data definitions. • Do not be vague in any requirements.

Objective iii) Encourage Innovation and iv) maintain a pulse on innovation

Key observations from the discussion:

a) Collaboration among electricity stakeholders will help achieve innovation, and could be achieved by establishing a forum for the sharing and discussion of ideas related to smart grid. This forum or working group could meet on a regular basis during the deployment of smart grid technologies, should involve multiple stakeholders (regulators, LDCs, technology vendors, consumer groups, agencies, etc.), and should consider smart grid activities in a global context.

Discussion notes:

Utilities	**Written Comments** • Introduce DC wiring into houses. • There is a need to provide a forum for information sharing and endorsement of ideas. This could provide guidance for investment. • Provide encouragement /incentive in the area of the Affiliate Relationship Code to enable LDCs to become involved with investments related to customers' applications. • Don't take a reactive approach (wait and see) with EV deployment. Mobile load is not the same as stationary load and is a big concern. • Actively participate in recognizing LDCs or other organizations that have made advances in innovation/technology/compatibility/flexibility (similar to EDA annual

	innovation awards). • Sponsor/support/initiate regular conferences where innovation and best practices can be shared. **Discussion Comments** • One idea would be to leverage the EDA forum. The forum is not the issue. The regulator and the Minister need to get up and make meaningful statements and back them up. Conferences are currently not that meaningful. What if the regulator came out with a vision business case? (i.e. this is what we're looking for). Give something people can anchor themselves on. There is a need to give clear direction in order to move the market. Industry Canada spectrum 2020; New Zealand regulator of how the spectrum market should unfold. Gives parameters. • EDA is a convenient vehicle rather than a conference (where the discussion is more guarded). Need to have real discussions. This forum has been great for that. Dialogue is needed. • We're only discussing 'smart grid' right now because we're now at the end of asset life broadly speaking. Going forward, reliability is not a luxury we will have if we do nothing (aging assets) so in this context innovation is not necessarily a quantum leap its just up until now LDCs have been required to replace like for like and that option is no longer available so we have to start thinking outside the box. • For example, Enwave, and the Toronto District Heating Corp., used to be part of THESL -- where LDCs do get involved in innovation it gets taken away because of the regulatory framework.
Vendors	**Written Comments** • Don't stipulate how to enable smart grid. • Technology changes rapidly, and much is gained from ongoing stakeholder interaction. Therefore, a regular/ongoing working group such as this one should be put in place and meet once or twice a year to stay abreast of issues. • Ensure potential uses of data are considered and allow utilities to recover costs of enabling future uses as they deploy smart grid. • Promote collaboration with other LDCs, research groups and other jurisdictions (e.g. Canada-wide discussions). • Promote open interfaces to enable competition. • Take a 'light touch' approach to regulation. • Get comfortable with risk and the possibility of failure. • Coordinate development of activities across LDCs. • Allow flexibility in cost recovery. • Do not overemphasize specific technical standards. **Discussion Comments** • It's not just about collaborating within Ontario in order to innovate we need to look outside Ontario too. Ontario's market is small compared to rest of the world. • A leadership statement is required, and the backup needed is financial. In its purest sense innovation involves activities not currently being undertaken. LDCs need flexibility on cost recovery to acknowledge the need for true innovation and allow LDCs to undertake some projects that are a bit 'out there'.

	• Utilities are not necessarily 'not-innovative' they simply haven't been allowed to be innovative. We have private companies who are doing this R&D. But the directive is new, it's about letting utilities be innovative with consumer money and we need a new framework to allow this to happen. • An applicable example from the not too distant past: AMI changes in past 5 yrs. South Cal Edison embarked on AMI in 2004 and in 2006 they started meeting with meter manufacturers and their specifications were well beyond what was being built at that time. PG&E was ahead of them and SDG&E was behind in terms of roll-out. If it wasn't for regulatory support South Cal Edison would not have been able to work with vendors to develop a better product. There is a need for collaboration and there may be some existing examples we can look to for ideas.
Consumer Groups	**Written Comments** • Allow customer-LDC communication outside of smart grid infrastructure. • Do not be prescriptive, let the market decide (and the market goes beyond the LDC). • The SGWG is a good initiative, allowing customer input is important. • Community power and community based solutions can spark innovation. E.g. seed and leverage community groups for smart car sharing. • A FIT rate for innovative solutions could promote and reward innovation. • Allow LDCs to define data interface and their general strategy. • **Discussion Comments** • LDCs are not known for innovation and relying on EDA to spawn innovation is a mistake. There is a need to hear the customer voice. Customers are so diverse that it's difficult get the customer voice heard in OEB processes. Some decisions have been made to get input into the OEB but the whole process is very challenging (and this is for people who are informed on energy sector) therefore customers always need a proxy to represent them. What's the mechanism for getting customers involved? • We should not lose sight of the fact that LDCs are very good at doing a lot of things – we do not want to take away from what utilities do (and do well). The OEB's role should be to build on strengths but when it comes to innovation we need to invite new players and not expect utilities do take this on. • In terms of institutional innovation, a good example is Enwave district heat and cooling in Toronto – it took thirty years to get there. One cannot expect any one group to produce all the innovation we're looking for. We need to have different parties involved. Currently there is no mechanism to have these conversations. How can the OEB be the catalyst to let this to flourish? • By way of example, a client is wrestling with a capacity problem and the client has developed a solution which from an engineering perspective would work. In terms of local utility capability it's a perfect solution. But regulatory barriers will prevent it. This is a problem. Need to bring in new players who will see new and different opportunities and solutions to leverage smart grid and really get the best possible use of energy. • CHP will not come from LDCs. We need third parties; that's where other innovations will come from as well.

Next Scheduled Meeting:

- May 10, 2010