**REVISED DRAFT BOARD STAFF PROPOSAL**

***For Discussion with Smart Grid Working Group***

The following is Board staff’s proposal with regard to development of guidance for utilities as contemplated by the *Minister’s Directive* (see Appendix A). The Directive expects the Board to take a number of steps in relation to the establishment, implementation and promotion of a smart grid, including providing guidance to regulated entities for their activities including the preparation of plans for the development and implementation of smart grid. Further, the Board should provide the regulated entities with an understanding of how it will evaluate those plans. The Minister’s Directive provides twenty-four objectives to guide the Board in developing its direction to licensed distributors and transmitters and other regulated entities whose fees and expenditures are reviewed by the Board. The purpose of this document is to solicit the views of the Smart Grid Working Group on staff’s proposal.

It is important to remember that the context for meeting the requirements in the *Minister’s Directive,* as well as the objectives that are set out is set by the [Report of the Board – A Renewed Regulatory Framework for Electricity Distributors: A Performance Based Approach](http://www.ontarioenergyboard.ca/OEB/_Documents/Documents/Report_Renewed_Regulatory_Framework_RRFE_20121018.pdf) and the performance outcomes therein:

* *Customer Focus*: services are provided in a manner that responds to identified customer preferences.
* *Operational Effectiveness*: continuous improvement in productivity and cost performance is achieved; and utilities deliver on system reliability and quality objectives.
* *Public Policy Responsiveness*: utilities deliver on obligations mandated by government.
* *Financial Performance*: financial viability is maintained; and savings from operational effectiveness are sustained.

The Board might use any of the following regulatory documents to provide guidance to licensed entities:

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| **Regulatory Document** | **Nature of ‘Evidence’** |
| Filing Requirement | Evidence in Rate Applications |
| Code Requirement | Documentation requirements set out in RRR (including certification, record-keeping for audit purposes, and regular reporting to the Board) |
| Condition of Licence | Documentation requirements set out in RRR (including certification, record-keeping for audit purposes, and regular reporting to the Board) |

The main issue for the Smart Grid Working Group’s consideration is two-fold:

1. What should the Board expect utilities[[1]](#footnote-1) (and potentially other licensees[[2]](#footnote-2)) to do in order to reflect the twenty-four objectives set out in the Directive as part of their plans? (i.e. what is the underlying policy?)
2. How might utilities demonstrate that they have met an objective(s) as a result of their plans? (i.e. what evidence must be provided and how will the Board evaluate proposals to meet the objectives?)

The questions above must be answered for each of the objectives which staff is proposing be grouped into five categories:

1. Customer Focus: Energy Services and Education
2. Operational Effectiveness and Network Evolution
3. Innovation
4. Economic Development
5. Privacy and Cyber-security

Categories one and two include objectives that to varying degrees have always been considered in the review of utilities’ core business activities as part of applications. These categories mirror the set of objectives for smart grid (Appendices A &B of the Directive). These objectives also seem to fit within the scope of two of the Board’s Performance Outcomes, *Customer Focus* and *Operational Effectiveness*.

Categories three and four encompass objectives that might not be considered “traditional” utility objectives and thus warrant a separate discussion. However, both innovation and economic development will occur within the context of meeting the objectives in categories one and two.

The objectives in the fifth category are certainly not new for utilities however, given that these objectives are of critical importance, as well as the interaction of evolving technology and increased data flows that smart grid development entails, there is a renewed emphasis on maintaining and, where needed, increasing privacy and cyber-security.

| 1. **Customer Focus: Energy Services and Education** |
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| **Objectives:**   * *Customer Control* – Access (to customer data) * *Customer Control* – Visibility (of general information/usage) * *Customer Control* – Control (over consumption) * *Customer Control –* Customer Choice (electricity service providers) * *Customer Control –* Education (participation and control over consumption) * *Customer Control* – Participation in Renewable Generation * *Policy –* Customer value * *Policy –* Efficiency (cost-effective improvement in grid efficiency) * *Policy –* Coordination (e.g. information sharing, common procurement) * *Policy –* Interoperability (adopt standards) * *Policy* – Environmental Benefits (conservation, efficiency, clean technology) |
| **Discussion:**   * How might utilities ensure consumers have the information they need in order to best manage their consumption, including: * direct customer access to personal usage data; and * authorized third party access to usage/billing data to enable behind-the-meter energy services, such as load management and other new services? * How should utilities’ role in regards to customer education fit in with a utilities’ overall plan? * By facilitating access to customer data, how might distributors enable environmental benefits as described in the Directive? What is the relevant data? * How might utilities demonstrate (through a COS rates application, record keeping, and/or annual reporting) that proposed investments[[3]](#footnote-3) achieve these objectives? What are the relevant metrics? * Beyond current requirements for utilities to connect renewable generation, how should utilities engage smart grid development as a means to increase customer participation in generation?   Other considerations. . .   * The Board has already determined that any behind-the-meter services are non-utility activities. * It is important for utilities to retain the ability to respond to customer preferences. * The Board has existing requirements related to *environmental benefits* of customer oriented activities ([Guidelines for Electricity Distributor Conservation and Demand Management (CDM)](http://www.ontarioenergyboard.ca/OEB/_Documents/EB-2012-0003/CDM_Guidelines_Electricity_Distributor.pdf). * The Board has established timelines and requirements for connection of customer owned generation. These rules are under review as part of a consultation relating to micro-FIT generation. * Cost-benefit analysis is part of the review of utilities’ applications, and in particular capital plans. Given new types of initiatives related to data access, customer control through DR and generation, customer savings and appropriate assessment periods may need to be developed. * Different customers (e.g., residential v. commercial) have different needs (e.g., shifting time of use, generation, efficiency improvements, demand response) regarding education, control, and data. * Provincial Government has launched Green Button initiative (with its own working group) |
| **Proposed Expectations:**  Maintain [current approach](http://www.ontarioenergyboard.ca/OEB/_Documents/Regulatory/Retail_Settlement_Code.pdf) whereby utilities must provide historical data to customers upon request. Utilities must provide access to hourly billing quality data (not real-time) to customers and any third party with customer authorization.  That a mechanism be developed to facilitate real-time data access for the purpose of providing customers with the ability to make decisions affecting their electricity costs. And that appropriate education to achieve the maximum benefits of such programs should be undertaken.   * + *Utilities must provide access to real-time data to customer authorized third parties (standard/method to be determined e.g. green button, zigbee, etc.).*   + *Maintain current approach whereby authorized third parties use ‘external’ devices to access real-time data from meter at the customer’s and/or third parties’ cost.* * SME-MDM/R may provide access to impersonalised, generic data to third parties for planning, research, and customer benchmarking purposes (e.g., how does my consumption compare to my neighbours?) * Where appropriate, utilities should make available customer education materials, recognizing that different customers will have different needs. * Development of necessary and appropriate benefit calculations, including time frames to assess proposed expenditures. * Utilities be required to meet performance measures related to the delivery of customer data access and connection of generation. |
| **Example Regulatory Documentation:**   * To facilitate *access, visibility, customer choice and control*, codes (*may require code amendments*) would require utilities (and perhaps the SME) to provide historical, real-time and billing quality interval data to customers and authorized third parties.      * *Review of* [*Electricity Reporting and Record Keeping Requirements*](http://www.ontarioenergyboard.ca/OEB/_Documents/Regulatory/RRR_Electricity.pdf) *may also be needed to determine if complementary changes should be made there.* * In COS rates applications the Board might evaluate to what degree utilities’ proposed investments will enable access to data. * In COS rates applications, utilities might describe any *environmental benefits* associated with investments, regardless of to whom they accrue. * *Customer education* plans may be included in COS rates applications (*may* *require amendment to filing requirements*) subsequent applications might include updates on the plan as it evolves and any available analysis on the impacts of the plan. * Reporting on customer focused performance metrics that reflect new programs. |

| 1. **Operational Effectiveness and Network Evolution** | |
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| **Objectives:**   * *Power System Flexibility –* Visibility (of network status) * *Power System Flexibility –* Control and Automation * *Power System Flexibility* – DRG * *Power System Flexibility* – Quality * *Adaptive Infrastructure –* Flexibility (accommodate evolving needs of the grid) * *Adaptive Infrastructure –* Forward Compatibility (“future proof”) * *Policy –* Efficiency (cost-effective improvement in grid efficiency) * *Policy –* Customer value * *Policy –* Coordination (e.g. information sharing, common procurement) * *Policy –* Interoperability (adopt standards) * *Policy* – Reliability (maintain and improve where practical/cost effective) * *Policy* – Safety (ESA) * *Policy* – Environmental Benefits (conservation, efficiency, clean technology) | |
| **Discussion:**   * What should be expected of utilities’ to ensure cost-effective operation and evolution of the grid (i.e. pace and prioritization of investments), including: * reasonable levels of grid *visibility, automation and control*; * increasing *efficiency* including physical (reduce energy losses within and amongst network operators), operational (streamline processes and staff resources), and market level (economic efficiency within and among utilities)[[4]](#footnote-4); * more efficient use of existing technologies and data; * identification of *environmental benefits*; and * *coordination* with other LDCs both to better inform investment decisions, share investments where appropriate and reduce procurement costs? * What should utilities do to ensure grid investments made today avoid lock-in and will not soon become obsolete, un-interoperable, or require significant upgrades/revamps in order to accommodate emerging technologies (e.g. EVs), including: * *interoperability* standards; and * *coordination* with other LDCs both to better inform investment decisions? (e.g., regionalization of network evolution; information sharing) * How might utilities demonstrate (in a COS rates application and annual reporting) that these objectives have been met? For example, what are the relevant metrics (e.g., power quality, reduced outages, customer satisfaction)?   Other considerations . . .   * Based on the characteristics of each service area not all LDCs will need to accommodate all emerging technologies (e.g. EVs, DG integration, or advanced communication platform) to the same degree. It is important to respond to identified customer preferences. * Awareness of risks associated with codifying *interoperability* standards is important. * The Board has existing requirements related to *environmental benefits* that should be taken into consideration (obligation to connect distributed generation - [Distribution System Code](http://www.ontarioenergyboard.ca/OEB/_Documents/Regulatory/Distribution_System_Code.pdf)) * Providing more generation downstream as well as more CDM will reduce the power delivery through the bulk system and as a result *lower system losses.* | |
| **Proposed Expectations:**   * To accommodate distributed downstream *generation* and more *complex loads*, there will need to be more feeder segmentation and more switching points located on the feeders. * These additional switching points will require connected communication channels along with instrumentation, control and other intelligent devices so as to provide *visibility, control, and perhaps automation* in the LDC Control Rooms. * With the additional *visibility* regarding downstream *generation* in the LDC Control Rooms this will assist the overall high voltage dispatch on the IESO Controlled Grid. * In addition, devices providing controlled VAR support may be needed at these switching points to provide suitable voltage delivery when using intermittent *distributed generation.* * By using intelligent devices on the system (associated with circuit breakers and relays) conditions such as fault current magnitudes and times can be captured, stored and analyzed and maintenance can be targeted and paced to where and when it is needed (Condition Based Maintenance) and*operational efficiencies* can be achieved. * Next generation Distribution Control Systems with GIS linked to COS linked to SCADA can also provide d*istribution automation*with an enhanced *outage management* approach * Apart from the **Regional Infrastructure Planning** process (under development by a separate working group), evidence of voluntary coordination will strengthen applications. Where appropriate, utilities should consider coordinating amongst each other in ways that might include (but are not limited to) information sharing, common procurement and shared investments (e.g. CIS, web-presentment). * Utilities be required to meet applicable performance measures |
| **Example Regulatory Documentation:**   * In COS rates applications (*may* *require amendment to filing requirements*) applicants could describe with specificity: * how particular investments and the functionality they enable, alone or in conjunction with one another, support one or more of the objectives for network operation and evolution and respond to identified customer preferences (e.g., power quality); * whether investments meet internationally recognized *interoperability* standards (*not yet clear how/whether Board will identify specific standards*) or explain why particular investments do not need to meet those standards; and * any *coordination* with other utilities and transmitters. * When evaluating COS rates applications evidence of *environmental benefits*, regardless of to whom they accrue, may be considered by the Board. * Report on performance metrics established as part of the Board`s implementation of the RRFE. |

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| 1. **Innovation**   *(in relation to Energy Services and Education for Customers and Network Evolution and Long Term View of Investment)* |
| **Objectives:**   * *Adaptive Infrastructure –* Encourage Innovation * *Adaptive Infrastructure –* Maintain Pulse on Innovation (awareness of best practices) |
| **Discussion:**   * On page 61 of the [Report of the Board – A Renewed Regulatory Framework for Electricity Utilities: A Performance Based Approach](http://www.ontarioenergyboard.ca/OEB/_Documents/Documents/Report_Renewed_Regulatory_Framework_RRFE_20121018.pdf), the Board indicates it will, eventually, consult on the establishment of *incentives to encourage innovation*. * How might utilities consider innovation in Ontario without compromising the cost-effectiveness of investments? In the case of utilities, appropriate “innovation” appears to be adoption/commercialization of new technologies/processes rather than primary R&D. * How should the Board evaluate utilities’ proposals (in COS rates applications) to incorporate innovative processes and technologies into their operations, while balancing risks for both utilities and consumers? How should “innovation” be measured? * What is best way for maintaining a pulse on innovation and sharing information? (e.g., industry groups, regional cooperation, continuing SGWG, Ontario Smart Grid Forum, linkages between utilities/universities/entrepreneurs) |
| **Proposed Expectations:**   * Where applicable, utilities should consider adopting innovative processes and technologies into their operations when planning investments. * Utilities demonstrate that they are engaged in maintaining an awareness of best practices (e.g., continuation of SGWG, regional/industry forums). |
| **Suggested Regulatory Documentation:**   * When evaluating COS rates applications evidence of innovation (and any associated benefits) could be considered by the Board. * *Option 1: continue to make smart grid deferral accounts available for utilities who decide to carry out pilot and demonstration projects.* * *Option 2: eliminate deferral accounts and require distributors to include any plans they may have for pilot and demonstration projects in capital plans.* * *Review existing filing requirements for smart grid demonstrations and pilots to determine if updates are needed.* |

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| 1. **Economic Development**   *(in relation to Energy Services and Education for Customers and Network Evolution and Long Term View of Investment)* |
| **Objectives:**   * *Policy* – Economic Development (encourage growth and job creation in Ontario) |
| **Discussion:**   * How might utilities consider economic growth and job creation in Ontario without compromising the cost-effectiveness of investments? * How should network efficiency and cost-effectiveness be considered with respect to economic development? * How might utilities demonstrate (in a rates application) that this objective has been considered and how much the Board evaluate proposals that provide economic benefits? How should “economic development” be measured? |
| **Proposed Expectations:**   * Without compromising cost-effective, prudent, long-term view investment, utilities might consider economic growth and job creation (e.g. network expansion to support growth in certain areas and Ontario procurement where appropriate) when planning investments. |
| **Example Regulatory Documentation:**   * COS rates applications (*may* *require amendment to filing requirements*), might discuss whether investments will support economic development. * When evaluating COS rates applications evidence of broad economic benefits for Ontario might be considered by the Board. |

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| 1. **Privacy and Cyber-security** |
| **Objectives:**   * *Policy* – Privacy * *Policy* – Security (physical and cyber) |
| **Discussion:**   * What should utilities’ do in relation to meeting appropriate standards for *privacy and cyber-security*? What standards are appropriate for *privacy and cyber-security*? * How might utilities demonstrate (by self/third party verification and maintenance of appropriate records) that such standards have been met? * Cyber-security risks will vary across utilities. * Are amendments to the Affiliate Relationship Code (ARC) required? * Adoption of “Privacy-by-Design”? * What is the role of other bodies in cyber-security (e.g., national security via the federal government) |
| **Proposed Expectations:**   * Board would adopt/defer to an existing cyber-security standard rather than developing its own standards * With an ‘end-to-end’ view of the grid (i.e. from the consumer interface to “back office”’ utility data management systems), meet [NIST cyber-security requirements](http://csrc.nist.gov/publications/PubsNISTIRs.html#NIST-IR-7628.) in order to, among other matters, continue to protect consumer privacy (in accordance with existing privacy laws and [code requirements](http://www.ontarioenergyboard.ca/OEB/_Documents/Regulatory/Standard_Supply_Service_Code.pdf)) as the network evolves and more information is shared across it. * Maintain current approach to privacy concerns through requirements for protecting data and only authorized sharing of data. * Adoption of “Privacy-by-Design” |
| **Example Regulatory Documentation:**   * Cyber-security may become a condition of licence or code requirement. Self-certification of cyber-security systems would be required. * *May require universal change to licenses for all utilities and transmitters as well as potential changes to one or more codes.* * *RRR may need to be updated to ensure auditable records maintained*. |

**Appendix A:**

**MINISTER’S DIRECTIVE**

**TO: THE ONTARIO ENERGY BOARD**

I, Brad Duguid, Minister of Energy, hereby direct the Ontario Energy Board pursuant to section 28.5 of the *Ontario Energy Board Act, 1998* (the “Act”), as described below.

The Board shall take the following steps in relation to the establishment, implementation and promotion of a smart grid:

1. The Board shall provide guidance to licensed electricity distributors and transmitters, and other regulated entities whose fees and expenditures are reviewed by the Board, that propose to undertake smart grid activities, regarding the Board’s expectations in relation to such activities in support of the establishment and implementation of a smart grid.
2. For licensed distributors and transmitters, the guidance referred to in paragraph 1 shall be provided in particular to: (a) guide these regulated entities in the preparation of plans for the development and implementation of the smart grid, as contemplated in subparagraph 70(2.1)2(ii) of the Act (“Smart Grid Plans”); and (b) identify the criteria that the Board will use to evaluate Smart Grid Plans.
3. In developing the guidance referred to in paragraph 1, and in evaluating the Smart Grid Plans and activities undertaken by the regulated entities referred to in that paragraph, the Board shall be guided by, and adopt where appropriate, the parameters for the three objectives of a smart grid referred to in subsection 2(1.3) of the definition for “smart grid” as provided for under the *Electricity Act, 1998*, where such elements of said objectives are set out in Appendices A through C.
4. Further, in developing the guidance referred to in paragraph 1 and in evaluating the smart grid activities of the regulated entities referred to in that paragraph, the Board shall be guided by the following policy objectives of the government:
   1. *Efficiency***:** Improve efficiency of grid operation, taking into account the cost-effectiveness of the electricity system.
   2. *Customer value:* The smart grid should provide benefits to electricity customers.
   3. *Co-ordination*: The smart grid implementation efforts should be coordinated by, among other means, establishing regionally coordinated Smart Grid Plans (“Regional Smart Grid Plans”), including coordinating smart grid activities amongst appropriate groupings of distributors, requiring distributors to share information and results of pilot projects, and engaging in common procurements to achieve economies of scale and scope.
   4. *Interoperability:* Adopt recognized industry standards that support the exchange of meaningful and actionable information between and among smart grid systems and enable common protocols for operation. Where no standards exist, support the development of new recognized standards through coordinated means.
   5. *Security:* Cyber security and physical security should be provided to protect data, access points, and the overall electricity grid from unauthorized access and malicious attacks.
   6. *Privacy:* Respect and protect the privacy of customers. Integrate privacy requirements into smart grid planning and design from an early stage, including the completion of privacy impact assessments.
   7. *Safety:* Maintain, and in no way compromise, health and safety protections and improve electrical safety wherever practical.
   8. *Economic Development:* Encourage economic growth and job creation within the province of Ontario. Actively encourage the development and adoption of smart grid products, services, and innovative solutions from Ontario-based sources.
   9. *Environmental Benefits:* Promote the integration of clean technologies, conservation, and more efficient use of existing technologies.
   10. *Reliability***:** Maintain reliability of the electricity grid and improve it wherever practical, including reducing the impact, frequency and duration of outages. The Board may consider such other factors as are relevant in the circumstances.

The Board may consider such other factors as are relevant in the circumstances.

1. In furtherance of the government’s policy objective as described in item (iii) of paragraph 4 above, the Board shall undertake a consultation process with licensed electricity distributors and other relevant stakeholders for the purpose of developing a regional or otherwise coordinated approach to the planning and implementation of smart grid activities by licensed electricity distributors that promotes coordination amongst them having regard to, among other things, cost-effective outcomes.
2. Nothing in paragraph 5 shall be construed as limiting the ability of licensed electricity distributors to engage in smart grid activities or the authority or discretion of the Board in exercising its responsibilities in relation to the smart grid activities of licensed electricity distributors pending the development of the regional or coordinated approach referred to in that paragraph.

***APPENDIX “A”***

***CUSTOMER CONTROL OBJECTIVES***

For the purpose of providing the customer with increased information and tools to promote conservation of electricity, which will “expand opportunities to provide demand response, price information and load control to electricity customers”, in accordance with subsection 2(1.3)(b) of the Electricity Act, the following objectives apply:

* **ACCESS:** Enable access to data by customer authorized parties who can provide customer value and enhance a customer’s ability to manage consumption and home energy systems.
* **VISIBILITY:** Improve visibility of information, to and by customers, which can benefit the customer and the electricity system, such as electricity consumption, generation characteristics, and commodity price.
* **CONTROL:** Enable consumers to better control their consumption of electricity in order to facilitate active, simple, and consumer-friendly participation in conservation and load management.
* **PARTICIPATION IN RENEWABLE GENERATION:** Provide consumers with opportunities to provide services back to the electricity grid such as small-scale renewable generation and storage.
* **CUSTOMER CHOICE:** Enable improved channels through which customers can interact with electricity service providers, and enable more customer choice.
* **EDUCATION:** Actively educate consumers about opportunities for their involvement in generation and conservation associated with a smarter grid, and present customers with easily understood material that explains how to increase their participation in the smart grid and the benefits thereof.

***APPENDIX “B”***

***POWER SYSTEM FLEXIBILITY OBJECTIVES***

For the purpose of “enabling the increased use of renewable energy sources and technology, including generation facilities connected to the distribution system,” in accordance with subsection 2(1.3) (a) of the Electricity Act, and recognizing the need for flexibility on the integrated power system, the following objectives apply:

* **DISTRIBUTED RENEWABLE GENERATION:** Enable a flexible distribution system infrastructure that promotes increased levels of distributed renewable generation.
* **VISIBILITY:** Improve network visibility of grid conditions for grid operations where a demonstrated need exists or will exist, including the siting and operating of distributed renewable generation.
* **CONTROL AND AUTOMATION:** Enable improved control and automation on the electricity grid where needed to promote distributed renewable generation. To the extent practical, move toward distribution automation such as a self-healing and self-correcting grid infrastructure to automatically anticipate and respond to system disturbances for faster restoration.
* **QUALITY:** Maintain the quality of power delivered by the grid, and improve it wherever practical.

***APPENDIX “C”***

**ADAPTIVE INFRASTRUCTURE OBJECTIVES**

For the purpose of “accommodating the use of emerging, innovative and energy saving

technologies and system control applications,” in accordance with subsection 2(1.3)(c) of the Electricity Act, the following objectives apply:

* **FLEXIBILITY:** Provide flexibility within smart grid implementation to support future innovative applications, such as electric vehicles and energy storage.
* **FORWARD COMPATIBILITY:** Protect against technology lock-in to minimize stranded assets and investments and incorporate principles of modularity, scalability and extensibility into smart grid planning.
* **ENCOURAGE INNOVATION:** Nest within smart grid infrastructure planning and development the ability to adapt to and actively encourage innovation in

technologies, energy services and investment / business models.

* **MAINTAIN PULSE ON INNOVATION:** Encourage information sharing, relating to innovation and the smart grid, and ensure Ontario is aware of best practices and innovations in Canada and around the world.

1. Throughout this document ‘utilities’ refers to both transmitters and distributors. [↑](#footnote-ref-1)
2. Not all requirements will necessarily be imposed only on distributors and transmitters. Some might also appropriately be applied to other regulated entities such as the IESO/SME. [↑](#footnote-ref-2)
3. Throughout this document ‘investment(s)’ is intended to encompass capital, or OM&A expenditures, or both. [↑](#footnote-ref-3)
4. Pg 8 of Staff Discussion Paper [↑](#footnote-ref-4)