

# Ontario Smart Grid Forum



To: The Honourable Brad Duguid, Minister of Energy

From: Paul Murphy, Chair  
Ontario Smart Grid Forum and  
President and Chief Executive Officer of the Independent Electricity System Operator

Re.: **Draft Smart Home Roadmap**

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Dear Minister Duguid,

It was a pleasure to have you as our guest at the November 9<sup>th</sup> meeting of the Ontario Smart Grid Forum. During that meeting, recall that you asked the Forum to outline the directions the province might take in regards to promoting the concept of a “Smart Home” to Ontario energy consumers, and also to suggest what roles the Forum might play in promoting that effort.

To develop a Smart Home Roadmap the members of the Ontario Smart Grid Forum, the Corporate Partners Committee of the Forum (which includes a wide spectrum of Ontario-based companies providing products and services in the smart grid domain) and the Forum’s Working Group held a workshop. The outcome of that workshop along with some subsequent fine tuning by the Forum members represents our view of a desirable roadmap for development of Ontario’s Smart Homes. We purposely adopted a model for this roadmap made up of: a vision, goals, and desired end state, supported by a proposed development path. As you will note, discussion led to three parallel paths to achieve the vision; loosely characterized as the ‘what’, the ‘how’, and the ‘why’ of the way forward.

You will note that this path to a Smart Home is inherently different than the Ontario Smart Metering initiative, and this warrants some consideration.

As you know, over the course of the coming year, Ontario will be completing investment in the Ontario Smart Metering Initiative. To date over 4 million smart meters have been installed across the province and the number of customers on Time-of-Use rates is targeted to grow to over 3 million by the summer of 2011. The Smart Metering Initiative has been a very specific public infrastructure investment project aimed at unlocking the financial, operational and societal benefits of smart metering. For the public utilities sector, this investment has included the procurement of Advanced Metering Infrastructure (AMI), meter data management, and customer information system (CIS) assets meeting the specific functions set out in regulatory instruments of the Ontario government and the Ontario Energy Board.

In contrast, the development of the “Smart Home” in the province of Ontario will involve choices made principally by Ontario’s residential electricity customers. Utilities in the province will play an important role of enabling those choices; however, most investment decisions for the Smart Home will be on the balance sheet of the home owner – not the local distribution company. Investments in Smart Home functionality will largely be market driven – encouraged and guided but not driven by policy and regulation.

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This is not to say that policy development will not play an important part in the development of the Smart Home in Ontario, but it will by necessity involve policy initiatives that are clearly discernable to homeowners as consumers and purchasers of products and services within the marketplace.

On behalf of the Forum I am pleased to provide you with a high-level roadmap for Ontario Smart Homes (attached). We have combined both immediate and longer term perspectives to arrive at the roadmap including a succinct Smart Home vision statement, the intended goals in each of the three parallel paths noted above ('what', 'how', and 'why'), some of the major challenges that this province must meet in order to realize those goals and specific milestones that should be targeted over a 20-year development path. Finally, you will see at the bottom of this roadmap, we have included a set of desired end-states that help describe what all of this should mean to consumers in terms of the sort of tangible Smart Home benefits enabled by the broader smart grid.

As you may be aware, before the end of the first quarter of 2011 the Forum will be publishing its second report to industry on the progress of investment in the smart grid with respect to the objectives set out in the *Green Energy and Green Economy Act*. The work undertaken to develop the Smart Homes Roadmap fit well with the work of the Forum in other areas and the importance of the development of Smart Homes to consumers will be at the forefront of a series of discussion topics in this year's report.

As always, we look forward to working with you and your Ministry in advancing the interests of Ontario energy consumers as the smart grid develops across our industry.

Respectfully yours,

A handwritten signature in black ink, appearing to read "Paul Murphy", with a long horizontal flourish extending to the right.

Paul Murphy, Chair  
Ontario Smart Grid Forum

# Ontario Smart Grid Forum

## Smart Homes - Vision

*"Smart homes will improve the lives of Ontarians. Served by a marketplace that provides the tools, information, and incentives, consumers will be easily able to make intelligent energy choices that are in their interest. In the process, they will provide valued services to the electricity grid and benefit society."*

### Goals

Secure exchange of usable information with and within the smart home.	A deep and vibrant marketplace providing a wide range of technological options for consumers.	Recognize and reward customer choices that benefit themselves, the system and the economy
<b>Associated Smart Grid Principles:</b> <u>General Principles:</u> Security and Privacy <u>Customer Control:</u> Access, Visibility, and Control Participation in Renewable generation Customer Choice, Education	<b>Associated Smart Grid Principles:</b> <u>General Principles:</u> Interoperability, Safety, Security and Privacy <u>Adaptive Infrastructure:</u> Flexibility and Forward Compatibility	<b>Associated Smart Grid Principles:</b> <u>General Principles:</u> Economic Development, Environmental benefits <u>Power System Flexibility:</u> Control and Automation <u>Adaptive Infrastructure:</u> Encourage Innovation, & Maintain Pulse on Innovation <u>Customer Control:</u> Customer Choice, Education

### Challenges

<ul style="list-style-type: none"> <li>• <b>Distributed decision-making:</b> decisions will be made by individual consumers. Result: less control by gov't or utilities.</li> <li>• <b>More points of failure:</b> Multiple parties and systems accessing data presenting security and privacy challenges</li> <li>• <b>Emerging interoperability standards and related technologies</b> are still evolving.</li> <li>• <b>Data access:</b> LDCs and non-utility 3<sup>rd</sup> parties will need to access the necessary data while maintaining security and privacy and fund these activities.</li> <li>• <b>Readiness disparity:</b> New-build vs. existing homes, LDC readiness, geographic differences, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Emerging interoperability standards and related technologies</b> are still evolving. What about mobile customers?</li> <li>• <b>Proprietary Infrastructure:</b> The Smart Metering Initiative will leave the province with several proprietary AMI networks, each with their own data access challenges (and costs) for home area networks.</li> <li><b>Alignment of interests:</b> Do vehicle and appliance manufacturers have the same incentives to achieve full interoperability?</li> <li><b>Around the edges of the electricity industry:</b> How will electrical devices in the smart home enable fuel switching, interact with components from other utilities, home entertainment systems, etc.?</li> </ul>	<ul style="list-style-type: none"> <li>• <b>The competition question:</b> How should 3rd party providers be enabled to compete?</li> <li>• <b>Economic spinoffs:</b> Translating the development of the smart home into economic growth.</li> <li>• <b>A concerned customer base:</b> the smart home vs. a backdrop of rising energy costs.</li> <li>• <b>Aligning the benefits:</b> pricing and program designs need to create the right incentives.</li> <li>• <b>Communications and bringing the smart home case to consumers:</b> varying levels of education and needs.</li> </ul>
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### Development Path

<b>2012</b>	<ul style="list-style-type: none"> <li>• Security and privacy framework in place</li> <li>• Substantial take-up of the microFIT program</li> <li>• Real-time info available to consumers and tied to more price sensitive demand</li> <li>• Electric Vehicle pilot projects complete</li> </ul>	<ul style="list-style-type: none"> <li>• Resolve smart meter data access question for consumers in terms of who pays.</li> <li>• Initial standards and systems in place to accommodate 1<sup>st</sup> generation electric vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>• Consumer offerings emerge beyond current initial offerings, providing consumers with more tangible, and real-time results</li> <li>• Completion of Smart Metering Initiative - all (or most) on a TOU price schedule</li> </ul>
<b>2015</b>	<ul style="list-style-type: none"> <li>• Smart home technology embedded in most consumer appliances.</li> <li>• More intensive use of real-time information for automated control and response of energy use.</li> </ul>	<ul style="list-style-type: none"> <li>• Every home is enabled to have technology with interoperable energy mgt. devices.</li> <li>• Established and adopted interoperability standards for most types of smart home technologies including electric vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>• Developed market for third party service providers.</li> <li>• More robust products and services offerings emerge with customized features.</li> </ul>
<b>2020</b>	<ul style="list-style-type: none"> <li>• 1 in 20 cars are electric vehicles (Ministry of Transportation target)</li> <li>• Residential consumers fully integrated into the operation of the grid and accrue the benefits of their decisions.</li> </ul>	<ul style="list-style-type: none"> <li>• Smart homes able to support the integration of intelligent fuel switching and other energy storage options.</li> <li>• Proliferation of smart appliances and home area networks</li> </ul>	<ul style="list-style-type: none"> <li>• A comprehensive slate of electricity consumption, production and DR services.</li> <li>• Residential consumers fully integrated into the operation of the grid and accrue the benefits of their decisions.</li> </ul>
<b>2030</b>	<ul style="list-style-type: none"> <li>• Smart Homes able to make use of multiple source of energy (wind, solar, geothermal and hydrogen as storage).</li> </ul>	<ul style="list-style-type: none"> <li>• Proliferation of micro-grids</li> <li>• Smart homes able to support integration of energy storage and non-electric (water? Gas? Other?) utility functions</li> </ul>	<ul style="list-style-type: none"> <li>• Smart Homes automatically optimize demand response, storage, dist. gen. &amp; other functions to the customer's benefit as well as the grid.</li> </ul>

### Desired End States

<ul style="list-style-type: none"> <li>• Every consumer has access to their home energy information, controls access to it, and is confident that their information is secure.</li> <li>• Consumers, approved service providers and their smart home devices can easily access relevant, reliable and timely external information to support their energy use decisions.</li> </ul>	A wide range of competitively-priced technical components of the smart home are readily-available in which vehicles, appliances, home generation and other components can interoperate with each other. These components are easily deployable by consumers with little or no assistance.	Every consumer has the option of choosing from many products, services and pricing options, and understands and receives the value of these choices. The value of these individual choices are aligned with the needs of the system and the economy.
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