November 26, 2004

To:	Ontario Energy Board
Attention:	John Zych, Board Secretary
Email:	BoardSec@oeb.gov.on.ca
Fax:	416 440 7656

Re: RP-2004-0196: Smart Meter Initiative – Draft Implementation Plan

From:	NRGen Inc.
Address:	29 Commercial Road, Suite 202 Toronto, ON M4G 1Z3
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Fax:	416 365 7712

Dear Sirs/Madam,

NRGen Inc. is pleased to provide the following response to the OEB Smart Meter Initiative (RP-2004-0196) Draft Implementation Plan. NRGen is an Ontario-based company providing real-time, automated demand response solutions to electrical energy consumers of Ontario.

In general, we are very encouraged by the move in Ontario to smart metering. In particular, we are encouraged by the decision to have all electricity customers using smart metering technology. Our research over the past year and a half, in partnership with the University of Waterloo, has clearly demonstrated that smart metering is the first and most critical step towards achieving a more efficient and responsive electricity energy market.

Further, we are very encouraged by the aggressive timelines proposed for roll-out of the new metering technology. While this timeline imposes significant logistical issues, the proposed timelines will help ensure the overall benefits can be realized as quickly as possible.

The plan to couple the implementation of smart meters with variable rates is excellent. Timing rates of electricity to periods of system strain, including seasonal, time-of-day and other influences will lead to greater responsiveness on the part of customers. Further, it will provide opportunities for energy conscious consumers to maximize costs savings through prudent management of their usage based on prices in effect at any given time. In fact, NRGen believes that with the application of advanced demand response technology implemented on a comprehensive energy communications network, it will be possible to have all customers subject to the standard open market pricing.

However, we are concerned about several detailed aspects of the proposed plan. In particular, NRGen believes the following aspects of the proposed plan require urgent

attention in order to achieve the maximum economic benefits from the proposed roll-out of smart metering:

1. The plan should be divided into three key product deliverables:

    a. An Energy Communications Network
    b. Metering device
    c. Energy Applications

    The standard architecture of the plan should be based on open standards that allow each component to be selected and installed in a manner that does not limit the choice, functionality, source and price of the other components in any way. We recommend that the solution be based on a state-of-the-art, open-standards communication network standard upon which the meter is a device that plugs into an open standards communication module. Applications would be based on these open standards, allowing for a multi-vendor, competitive selection of best-of-breed solutions.

2. The RFP process should be based on this three-tiered architecture, allowing for a 'best-of-breed' solution to be built, whether through independent vendors, industry consortiums and partnerships or through single-source, end-to-end solution providers. Regardless, the selected vendors must be required to meet the state-of-the-art open standards selected to integrate the various system modules. Further, the RFP process could be run in three sets – for example, RFPs could be issues for the network on a regional basis, the energy application on a customer segment basis and the meter devices by distributors (ideally in groups).

3. The implementation and procurement processes should allow for more and broader involvement of private industry. For example, based on the 3-tiered architecture and process outlined in point 1 and 2, private enterprise might be charged with building, managing and owing the communications network and system applications; distributors could be charged with all responsibilities associated with the metering device; and distributors and private enterprises could partner to manage systems integration and overall management. The plan should allow for the procurement process to define the best mix based on the needs of each territory or region. Further, private enterprise can be more involved in education and other soft services associated with the metering roll-out.

4. The proposed plan should not settle for standards lower than what are available and supportable today. For example, the proposal to roll out metering technologies that do not provide in-meter time stamping or tracking of usage on programmable intervals will limit the efficacy of the solution for a large set of consumers. Further, the cost of interval meters, especially for a project of this size, can be comparable to less advanced meters, effectively negating price as a reason to settle for less advanced standards. Programmable interval meters can be

setup to act in the same manner as less advanced meters without limiting their use for more advanced solutions.

5. The proposed plan should not require that the overall system chosen have a minimum install base. The plan should allow for blends of communication standards, meters and applications that have previously not be implemented in an integrated fashion. This will help ensure that the implemented system(s) will not be out-of-date before the implementation is completed and truly establish Ontario's smart metering initiative as a world leader.

We understand that the working groups providing input into this report are concerned that a blended, or 'custom', solution will impose valuation delays inconsistent with the target deadlines for the project. It is our contention, however, that through use of proven, open industry standards, the chosen solution can leverage existing and well established, best-of-breed technologies that will not, on a component basis, require additional evaluation. Further, this approach may in fact accelerate the rate at which the solution can be implemented as it allows for a multi-vendor approach at all levels and in all regions of the system implementation and should encourage increased innovation and competitiveness..

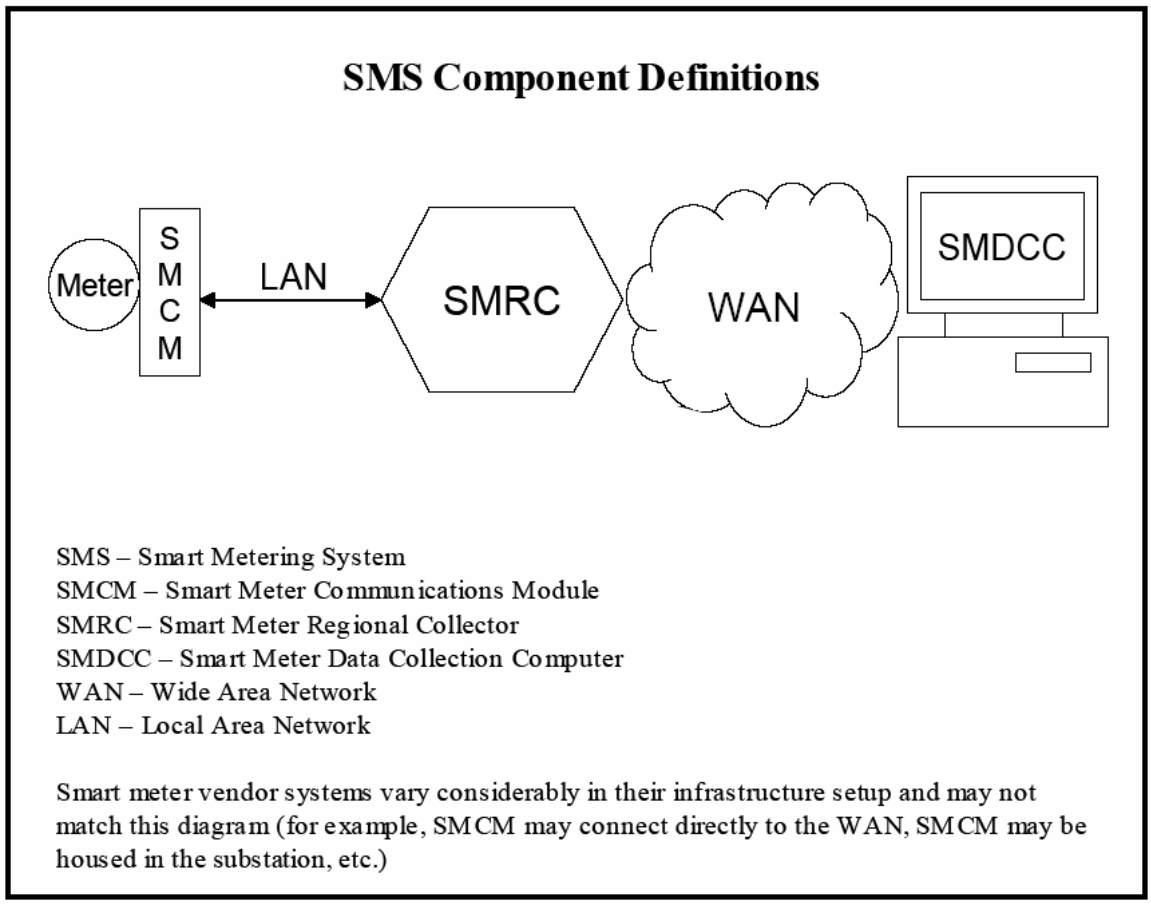
Thank-you for the opportunity to respond to this report. We at NRGen are encouraged and excited by the plan to rollout smart meters and variable rates for power across the province, in particular because of the opportunities for energy and costs savings. We believe the Board has the opportunity through the plan proposals to create a world-leading infrastructure that will support vibrant and effective change in Ontario's energy markets.

Sincerely,

John C. Thomson
CEO, NRGen Inc.

Addendum: Detailed Comments

1. The Draft Smart Meter Implementation Plan provides a definition of smart meter terms and system components. This architectural overview, copied below for reference, demonstrates a multi-tiered architecture blending meter devices, communication and networking protocols and application software.



The proposed plan treats these components as a single solution, with the meter driving the overall system design. We believe this all-in-one design approach is somewhat flawed. It is akin to designing a business computer system based on the capabilities of a keyboard. By viewing the system in its component parts, a more flexible system design is possible that is based on state-of-the-art technologies at each point.

We believe the project should be based on a three-tiered architecture based on open industry standards. In this manner, the system design will not be limited by the capabilities of individual components as found in most all-in-one solutions. Rather, the system will be based on the use of best-of-breed solutions for each tier. NRGen proposes that the proposed plan recognize and be built upon the following three distinct product deliverables:

a. An Energy Communications Network (aka the "Energy Internet")
The basis of this system should be the communications network. The document title, "Smart Meter Implementation Plan", can lead to the conclusion that the meter is the defining component of the solution. We believe that the meter should be viewed as a device on a network, not the solution on its own.

The energy communications network should be open standards based, delivering on the following base capabilities:

i) Bi-directional, point-to-point communications. This is the current baseline standard for virtually all current communication media, including telephone, cable, satellite communications, cellular and public radio networks (e.g., Blackberry).

ii) Use of IP-addressing standards. Current IP addressing standards are in use for device addressing, from personal devices through computer networks to modern 'smart' appliances. This uibiquitous addressing standard will ensure a flexible platform for both current and future energy applications.

iii) Provision of an open standards communications gateway into the home/building to enable energy applications. The communications network should provide the communications bridge into the home / building, connecting the upstream network with in-home communications protocols. For example, the communications module installed at the home/building could include radio technology for the upstream link bridged to power line carrier protocols for the in-house/building communications. We recommend that the in-house/building component be a set of open ports available for use as the home/building owner sees fit.

These baseline communication protocol standards can be implemented on a wide variety and mix of communications media, reflecting the complex mix of communication channels available throughout the province. The standards can be implemented using fibre, wireless communications, power line carrier technologies, licensed radio-bands, cable, satellite uplinks and even standard telephone lines. For example, the last mile of communications could be delivered through low-voltage, high-speed power line carrier protocols, linked to fibre backbones through short-range wireless protocols such as blue-tooth.

Basing the proposed plan on these open standards will ensure that the entire network of meters is interconnected province-wide through a network that can be accessed without geographical limitations and applications can be provided by any vendor who is savvy to current internet standards.

b. Metering device
Based on the view of the meter as a device or appliance on a communications network, we believe the standards for the metering device can be focused on the functionality of metering, independent of the communications and application standards that will be used. This model is consistent with the current requirement for meters to be based on ANSI plug standards, wherein individual manufacturers must conform to a plug standard for connection.

Today, most metering technologies equipped for smart metering applications are pre-configured with communications technologies and sold as an all-in-one package. However, even for these meters, the communications technology is a module provided by other 3rd party firms specializing in communication technologies. We contend that the metering technology chosen for this project should not be constrained simply by the partnerships these metering firms have established to-date. Basing the standards for the metering device on the specific requirements for electricity usage metering will allow metering companies to focus on their core competencies – i.e., usage metering. By employing open, industry standards for communication, meters could be delivered on a plug-and-play approach, allowing for one meter to be compliant with any number of communication media.

We believe that the baseline standard of the smart meters should provide the following for *all* customer segments:

i) in-meter time stamps
ii) at least 15-minute interval data tracking
iii) IP addressability for remote programmability via the implemented communications link

This baseline standard provides for all proposed metering needs from time-of-day rates through to real-time wholesale pricing, eliminates the need for on-site servicing except in the event of physical device failure and provides a standard that allows each customer to choose how they are billed and how they will manage their energy costs and consumption. To settle for a lower metering standard will introduce barriers to entry for many energy applications, restrict customer choice and create a case of have and have-not communities based on the choices of their local distributors.

c. Energy Applications
The proposed plan specifically addresses the requirement for several energy applications motivated by the objective of providing customers with an infrastructure that promotes and facilitates behavioral changes in the use of electrical energy. The baseline applications include:

- Variable rate plans reflecting price changes based on time-of-day, seasons and other influencing factors. The proposed plan allows for these rate

plans to be changed on a regular basis and to accommodate variability on both commodity and non-commodity charges.

- Regular upload of usage data, at a minimum on a daily basis, to the centralized repositories.

- Presentation of usage data via web-based applications to enable customers to monitor and analyze the energy usage profiles.

We believe these minimum application requirements are a solid start for the smart metering project. Other applications that should be considered in the baseline standard include price presentation at the meter and remote device management for load limiting, service shut-off and meter configuration.

Based on our proposal to base the system design on a multi-tiered, open standards approach, energy applications will be device independent. Under this approach, all applications will be based on these open standards, allowing for a multi-vendor, competitive selection of best-of-breed solutions.

2. The proposed plan outlines a procurement process using RFPs from local distributors working individually or, ideally, in groups. The RFP structure proposed seems to be based on the concept of selecting a vendor who will provide an all-in-one, end-to-end solution. We believe this approach is limiting and advances the concept of all-in-one solutions, rather than a tiered approach. Further, this approach when employed by groups of LDCs will likely result in solutions that address the lowest common denominator within the group. For example, an LDC may fit in one group based on their communication needs, another based on their customer segment mix and yet another based on their customer service philosophies.

   Based on our proposal to design the system using a multi-tiered (3-tiered) architecture, we believe the RFPs should be structured in the same manner. This allows for a number of strategies, including:

   - Single RFPs from individual buyers / buying groups that ask for distinct solutions to each system tier. Responding vendors would be invited to answer 1, 2 or all 3 of the system requirements.

   - Separate RFPs for each tier from individual buyers / buying groups. Vendors would answer each RFP separately, resulting in open competition for each component effectively removing device-dependent, proprietary solutions.

   - Separate RFPs for each tier from different buying groups, organized based on the common needs within each tier. For example, a communications network RFP could be issued by all LDCs currently in possession of

licensed radio bands that could be used as the communication media; an applications RFP could be issued by a group based largely on low-income residential customers.

This multi-tiered RFP approach will support the implementation of a 'best-of-breed' solution, whether through independent vendors, industry consortiums and partnerships or through single-source, end-to-end solution providers. Regardless, the selected vendors will be required to meet the state-of-the-art open standards selected to integrate the various system modules. The proposed three-tiered approach will allow for the organization of RFPs reflecting the complex interrelations of the underlying technologies: for example, RFPs could be issued for the network on a regional basis, the energy application on a customer segment basis and the meter devices by distributors (ideally in groups).

3. The proposed implementation and procurement plan leaves the bulk of responsibility for the smart metering initiative with the local distributors, modeled on the current regulatory structure that has distributors responsible for procurement, logistics, resourcing, deployment and communication. While we are very supportive of the ongoing role of the local distributor, the proposed plan does not deal with the increased technology complexities and the non-geographical aspects of smart metering.

   We contend that the implementation and procurement processes should allow for more and broader involvement of private industry. For example, based on the 3-tiered architecture and process outlined in points 1 and 2, the following scenarios could be supported:

   - Private enterprise can be charged with building, managing and owning the communications network. Individual distributors with communication assets (e.g., fibre, licensed radio bands) can lease back bandwidth to the communication providers or even sell these assets to the proponents. The proposed system infrastructure will require expertise in communications that will stretch the already stretched resources of the LDCs. There are many organizations focused on building and managing complex communication networks and supporting the use of complex system applications across them. Individual vendors could be selected based on expertise in specific communication channels, including radio, fibre or wireless links.

   - Distributors could be charged with all responsibilities associated with the physical metering device. Essentially the current metering responsibilities of LDCs are restricted to the physical meter, with very limited communications and application responsibilities.

   - Applications can be provisioned and managed by specialists in information technology. The new metering standards will raise the bar

considerably in terms of data volumes, transactional frequency and the volume and complexity of system applications. Already, many distributors outsource the operation, administration and management of many application systems, including settlement, web sites and web-based energy management tools. There are a large number of firms who specialize in information management and complex application outsourcing.

- Distributors and private enterprises can partner to manage systems integration and overall management.

The plan should allow for the procurement process to define the best mix of vendors and technologies based on the individual needs of each territory or region. Further, private enterprise can be more involved in education and other soft services associated with the metering roll-out.

We believe this approach will allow for experts in each field to provide the best price and best level of service for each system component. Further, it will allow for the separation of geographically and non-geographically bound technologies and services, ensuring the most economical model for system implementation, operation and ongoing management.

4. The draft document points out that the smart metering initiative will establish Ontario as a leader in North America by being the first to automate meter reading in a region with multiple distribution areas; by ensuring the system records hourly data for every customer; and by providing customers access to their previous day's usage via the web. However, the proposed plan is based on minimum technology standards that are not representative of current information technology standards.

   The proposed plan should not settle for standards lower than what are available and supportable today. For example, the proposal to roll out metering technologies that do not provide in-meter time stamping or tracking usage on programmable intervals will limit the efficacy of the solution for a large set of consumers.

   We contend that the proposed minimum standards will be out-of-date before the completion of the implementation, not to mention before the anticipated 20-30 year life of the project. The proposed minimum standards will impose immediate limits on the capabilities of sites employing these lower standards. It will create a climate of haves and have-nots, based on the decisions made today by individual distributors. It will, in many instances, result in single-vendor solutions requiring the buyer to obtain all application and system upgrades through the same vendor or require application vendors, for example, to build and maintain device-specific versions at highly increased costs.

By setting the standards for each system component based on proven, widely used, open industry standards, the system implemented today will provide the flexibility to adapt to the future for some time to come. Further, we believe that by leveraging a multi-tiered system architecture and procurement strategy, the cost-per-point can be maintained at the desired levels while realizing a higher baseline standard for all components.

5. The proposed plan imposes a system selection criteria that a system must have a working installed base of 10,000 units in order to qualify. This restriction when based on the all-in-one system design approach, requires that the chosen combination of communications, metering device and applications must be in operation *in combination* at 10,000 end-point sites.

   Rather than ensuring increased competition, we contend this approach, in fact, limits competition. First, it imposes significant limits on the combination of technologies that can be employed. For example, an application that has been previously installed only with phone-based communications would, in theory, be excluded for consideration in environments that plan to employ radio-based communications; a meter that has previously been installed in mesh radio networks would be excluded in regions planning to employ power line carrier communications.

   We believe that by selecting best-of-breed solutions for each system tier, a new blended, state-of-the-art solution can be implemented. By using open industry standards as the baseline for all technologies and technology interconnections, we believe the integration of these components can be tested and delivered within the project timelines.

   The proposed plan should not require that the overall system chosen have a minimum install base. The plan should allow for blends of communication standards, meters and applications that have previously not been implemented in an integrated fashion. This will help ensure that the implemented system(s) will not be out-of-date before the implementation is completed and truly establish Ontario's smart metering initiative as a world leader.