January 10, 2005

Mr. John Zych
Board Secretary
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, 26th Floor
Toronto, Ontario, M4P IE4

Subject: *Comments on the Smart Meter Initiative - Further consultations*
(RP-2004-0196)

Dear Mr. Zych:

EDS is pleased to have the opportunity to provide further comments on using two-way communications for the Smart Meter Implementation Plan.

We understand that the Board's ultimate business objective is to reduce energy consumption and costs by enabling consumers to make smart choices about the power they use, and what they use it for. Our experience with similar programs suggests that success will come from an informed client base who are given constant feedback on the positive and negative results of their conservation efforts. Only a business solution based on two-way communications technology will allow this to happen, and we are gratified that it is now under active consideration.

Please find enclosed our comments and recommendations regarding the questions raised in your December 20, 2004 correspondence. Our observations are based on our unique experience as a change agent, designer, implementer, and operator of large complex solutions in the public sector.

We strongly believe that the most successful programs are a result of a strong partnership with an enthusiastic and engaged consumer. Give them the feedback, the information and the tools, and it will create voluntary compliance and change behaviour. Furthermore, our experience suggests that the small incremental price for two-way communications will quickly pay itself.

Thank you for the opportunity to contribute to the process. We look forward and hope to continue participating in the ongoing dialogue. Should the Board have any questions or require any clarification, please feel free to contact me.

Yours sincerely,

Original signed by

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1. What are the benefits and drawbacks of mandating a two-way communication network?

EDS has considerable experience in managing both one-way and two-way communication networks across a wide variety of platforms. We have close associations with the manufacturers and suppliers of hardware and software that enable both types of solutions. *We have used their products to design, implement, manage and operate complex communication networks for clients including the Province of Ontario, the US Navy, Bank of America and General Motors plants around the world.* Specifically in the automated meter-reading arena, we have tested most forms of local area network communication and wide area network communications including the use of telephone modems, paging network (REFLEX-50), RF, RF-mesh, cellular, power-line carrier, one-way and two-way satellite communications and we understand the advantages and disadvantages to each type.

One-way Communications

A one-way communication system, as its name implies, communicates in one direction only. Typical Automated Meter Reading (AMR) systems that use one-way communication have the remote metered device transmit information from the meter location to a central receiver. In some cases, one-way systems might have a "wake-up" that alerts the remote devices to turn on and begin transmitting, in other cases, the end units transmit all the time.

While it is difficult to generalize, the cost of a robust one-way transmission system with some form of communication path (telephone modems, paging systems, and one-way satellite systems) is normally about 70-80% of a full two-way system, depending on the type of communication networks and data collection devices involved. A simple walk-by or drive-by solution is the easiest to implement and may appear to be the lowest cost option, but it will limit many potential cost savings and energy-savings benefits. For example these would flow when an informed consumer has sufficient information to take proactive steps to reduce energy use because they have been forewarned that rates will double that day, or a smog alert has just been posted.

One-way systems are commonly used for applications that require only very basic information to be communicated. This is due to two key factors. First, they have been primarily used for water-meter reading solutions where only a once-a-month meter read is required, the quantity of the data is small (50 bytes a month), and the only data managing requirement is to measure demand at the macro-level (total demand on the system); and second, until about 5 years ago, two-way communication were much more expensive and less reliable than they are today.

Two-way

Two-way systems permit the communication of information from a remote meter location to the receiver, as well as, from the receiver to the remote meter location. These systems offer far more functionality, including on-demand meter reading, retariffing of the meter remotely, recharging of a pre-payment metering, immediate power failure alerts, remote connect and disconnect services, in addition to other advanced service options.

One need only think about the differences in the quantity, quality, and responsiveness between a simple one-way communication system (e.g. a televised presentation at a fixed time) compared to a virtual real-time two-way exchange of information (e.g. dialogue).

Many of the benefits of two-way systems can be used by the utilities themselves to improve their operations, lower their costs, and to create alternative revenue streams. Since the two-way communication is more robust, the same infrastructure could be used for other meter-reading applications (gas meters, water meters, parking meters, propane tanks, etc.). The same infrastructure can be used for other applications such as load curtailment programs where a customer would agree to a reduced rate in exchange for having their air conditioning unit controlled by the utility to reduce peak load period demands. The two-way system would also assist the utility in helping to minimize the impact of outages by faster location and detections of system failures.

EDS envisions other futuristic uses of this infrastructure that could be potentially revenue-generating opportunities. This gateway into the home could enable applications such as remote diagnosis and repair services of smart appliances, medical alert services, home security monitoring services, and even video on-demand services.

Summary

Given that the primary goal of this project is reducing overall demand by providing consumer's incentives to lower their peak and overall demand for electricity, two-way communication enables real-time analysis of load profiles (consumer can see how much it costs to turn on their air conditioner at 4:00 PM), automatic load shedding programs (remotely disconnects HVAC systems during peak load conditions), and dynamic peak price adjustments. Many of the key stated objectives of the Board can only be effectively met through a two-way communication system. For instance, the only way a voluntary compliance model will work is to give the consumer relevant and almost immediate feedback on their usage and the cost associated with that usage. This puts the consumer in control and makes them a full and enthusiastic partner of the Board in its quest to conserve energy use. A simple display, either on the electric meters or as a stand-alone unit, located in the home living space could be used to inform

consumers of price alerts, load curtailment program alerts, current cost of their usage and so on. This level of sophisticated voluntary compliance would make Ontario a world leader in energy conservation programs.

The latest data from Chartwell indicates that over 70% of the new Automated Meter Reading installations use some form of two-way communication. Of the remaining 30%, the vast majority of these installations were implemented by water utilities. EDS sees ample evidence that one-way communication systems are fast becoming obsolete in the smart electric meter arena, where the stakes are too high to ignore the benefits and the superior return on investment of two-way systems.

2. In the event of Province-wide two-way communication, should electricity distributors be responsible for operating the communication network?

Because the communication network will require multiple communication media involving multiple communication vendors to be integrated together to work effectively, EDS would strongly recommend that there be one "entity" responsible for the entire network to ensure that it would be designed, implemented and operated in the most effective manner. As we see it, the best option should be driven by the business needs rather than the technology needs. If there is a interest in a full two-way solution that is to be expanded into an integrated energy management solution, then a single entity, experienced in such tasks would reduce risk. If a simple metering solution is required, it may be desirable to make the distributors responsible. In real life there will be situations where shared responsibility to manage the network may be optimal, as long as there is a strong central authority setting standards and managing future plans. Here are three primary options that can be considered:

a) Make each distributor responsible for their portion of the communication network. They currently have responsibility for the overall process from meter-to-cash. The network is just a replacement for a piece of that process today (manually collection of meter data through meter readers). Since the utility could use the network for other applications that could potentially result in operational savings or generate new revenue, they should be responsible for the design, implementation, management and operation of it. There are some disadvantages to having the distributors responsible for the network.
   - Each distributor could choose non-standard solutions for the network that could cause some interoperability issues.
   - Each distributor would have minimal buying leverage. This would be mitigated somewhat through the use of buying groups.
   - Although distributors have great expertise in managing electrical grids, they do not have a core competency in managing large, diverse communication networks involving a wide variety of technologies and

thousands of nodes. The distributor could decide to subcontract this to network management to substantially mitigate this risk.

- The cost to mange these communication networks might vary widely across the Province depending upon the expertise within the distributor.

b) Make an experienced system integrator responsible for the communication network**.** A system integrator mitigates many of the risks listed above while maintaining the appropriate level of accountability to both the Ontario Board of Energy and the individual utilities.

- A systems integrator could assure consistent standards across the province.
- Network management would be a core competency of the systems integrator. The integrator would be in the best position to leverage large volume discounts and control costs as well as identify cost reduction opportunities.
- There would be easier coordination with central decision-making authorities.
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Other (future) applications (like water-metering) would be facilitated through the systems integrator.

c) Implement a complete meter-to-cash subcontract**.** This would be structured to have a separate entity responsible for the processing from the reading of the meter to the generation of the bill to the receipt of the cash. See question 4 for a more complete description of this financing option.

3. If not, how should a communication operator or operators be selected?

We would suggest the following selection criteria:

- A demonstrated ability to implement and manage large-scale networks;
- A demonstrated ability to integrate different communication media into one network solution (telephone modems, paging solutions, radio-frequency, radio-frequency mesh, cellular, and satellite network);
- An ability to manage large complex networks across multiple applications;
- An ability to manage multiple vendors;
- An ability to act as a thin integrator where the integrator would manage all the vendors supplying the service but would not actually provide the service themselves.; and
- An ability to manage transactions on behalf of distributors.

4. How would rates for the communication operators be set and/or collected?

There are two components of cost to consider: the capital costs required to initially set up the network and the ongoing costs to operate and manage the system.

Capital cost recovery

Option 1 - Include this network component as part of the project cost and recover it from the rate increase associated with the new meter. The state of California has determined that even when they included the cost of the network infrastructure into the project, the new tariffs would still be lower than existing tariffs.

Option 2 – Contract system integrator to design, build and operate the network. The integrator would finance the cost of the infrastructure. This would result in no capital requirements for the project on the part of the distributor or the Board of Energy. The cost recovery mechanism would be the rate increase for the distributors and the integrator would charge the distributor a fixed price per read to recover the cost of the infrastructure.

Ongoing costs

The ongoing costs of a two-way communications network must also be considered. There will be some maintenance costs but the failure rate of these electrical components is usually very small across the life of the products. The cost of moving the data from the meter to the host is usually less than the current cost of manually reading the meters.

Option 1 - The utility could potentially absorb this cost. The elimination of manual meter-reading would more than cover this ongoing cost. This might be especially attractive if the utility had plans to use the network for other cost savings or revenue generating opportunities.

Option 2 – As previously mentioned, the additional costs associated with the network management would be minimal compared to the cost of the implementation of this program. Thus, this ongoing cost would be a negligible increase in the rate and could easily be included in the rate increase associated with the capital costs of the program.

In the event a systems integrator also operations the network, an invoice for this work could also be forwarded to each utility or other entity as dictated by the board.

5. If there is a two-way communication network, would an open data protocol aid the development and availability of end-devices and services?

EDS believes that a proprietary protocol significantly reduces the flexibility required to chose low-cost, high-functionality electric meters. Choosing a proprietary protocol by definition would limit the number of vendors that would support the protocol. This, in turn, might foster anti-competitive behavior on the part of the meter manufacturers.

EDS believes strongly that open protocols and open software standards will further drive down the cost of meters to the lowest market price. Since over 60% of the program cost relates to the meters themselves, this is the largest opportunity for cost savings in the project. The same is true for the communication network – using open protocols will encourage strong competition between telecommunication providers.

Additionally, open standards protects against problems with changing vendors, changing proprietary standards, and being left with a network based on an obsolete technology. The costs to change vendors would be greatly reduced by forcing communication vendors to compete aggressively for the business.

In the future, as commercial appliances, medical alert devices, security devices and other advanced custom needs begin to populate the network, they will require the use of open communication standards (or at least the ability to interface with them). An open protocol positions the organization for the future and for growth.