ACHIEVING ENERGY CONSERVATION GOALS WITHOUT THE BROAD APPLICATION OF "SMART METERS"

ONTARIO FEDERATION OF AGRICULTURE

Background

The Ontario Federation of Agriculture is a voluntary membership organization. Over 40,000 Ontario farm families belong to the OFA. Farming and food processing are Ontario's second largest industry. Abundant, reasonably priced electricity is one of the competitive foundations of our industry. Farmers require low cost abundant electricity to stay competitive. Without it growth in farming and food processing in Ontario will be severely constrained.

There is a real concern that although Smart electricity metering may appear sensible for the electricity sector, substantial economic harm could be done to farm families, food processing and other crucial sectors.

OFA recognizes that the electricity price freezes which began in 1993 and controlled prices since (except for May to November 2002) have isolated consumers artificially, ensuring Ontario's electricity consumers have become unaware of true electricity costs. The OFA agrees this must end.

OFA believes price pressures, current metering technology and education can be harnessed to create a situation where consumers will contribute to the health of the electricity system without creating pressure on family budgets, farmers or Ontario's economy. OFA proposes a sensible approach to electricity metering in Ontario, one that will help conserve at low overall costs, achieving the government's goal.

In implementing an improved consumer metering system in Ontario, OFA believes the following variables should be considered:

1) General Meter Options, their potential and limitations
2) Technical Modifications to Load Use
3) Consumer Responses to Market/Price Information

Meter Options

All meters are Smart meters in that they record, display and communicate electricity use and potential demand, electricity quality and outage information. The more attributes they measure, the frequency with which they take measurements and ease and speed with which they communicate all contribute to the meter's relative "smartness."

Interval Meters vs. “Smart Meters”

Interval Meter Benefits

The Smart Meter is a variant of an interval meter.

A fully functional interval meter will:

- record electricity use and demand at least hourly and could be programmed to record every five minutes
- communicate all recorded information to a billing or metering agency at least once every billing period
- communicate electricity quality (low voltage, out of frequency) or outage information to distribution managers
- provide information to accurately reconcile electricity losses or thefts with metered stations

Smart meters typically have fewer functions than interval meters. They may or may not record demand or note and communicate electricity quality or outage information. Some Smart meters will communicate only with the resident or owner. These meters display use and cost information for the customer but do not provide such information to the billing agency. Some Smart meters accept payment and track electricity use and funds remaining on a pre-payment card or memory. These machines can charge at a flat rate per kwh and at the hourly market rate or according to rates that vary by time of the day and day or month of the year.

Time of use meters are an early version of an interval meter. They are normally two regular meters, one of which records peak hour (day time) use and the other which records off-peak (night) use. The two meters are read and consumers are charged at a separate rate for each.

Conventional meters can be made “Smarter” in several ways. This may be done by adjusting electricity rates month-to-month or perhaps bi-weekly and by volume. The billing system provides customers with more and useful information about their electricity use.

Several approaches or combinations of them are possible. For homes and small businesses a simple conservation tariff might provide the first 750 kwh per month at a cost of $35. Each additional 50 kwh, or part thereof, might be billed at $4.00.

Alternately, rates could also be adjusted seasonally so that spring and fall, when demand is low, would be less costly than summer and winter when demand is higher. The volumes sold at a lower base rate can be adjusted seasonally to encourage greater conservation when demand is high.

As meter reading is low cost, meters could be read more often and bi-weekly price adjustments introduced. Billing could still be monthly.

Smart Meter Limitations

Some LDC's have experienced failure rates of between 10% and 20% with newly installed Smart meters. This adds greatly to their cost.

Communication lines to facilitate Smart meters are limited. In most areas, phone lines would have to be expanded.

Smart meters cost approximately $400 each plus a monthly service or reading fee of about $3.00 to cover the high cost of bill preparation and related hardware. Over a 25 year operating period a Smart meter could cost $400 to buy and install, $1000 to read and $100 to service, for a total of $1500. Interval meters of the kind presently used have a comparable cost of $100 to buy and install, $500 to read and $10 to service, for a total of $410. The approximate $1090 difference in cost could buy greater conservation and system improvement.

Existing simple meters combined with other technical modifications could accomplish the pricing and conservation goals of government without new burden on residential consumers, farmers and small businesses.

Technical Modifications

The following measures could bring about conservation and positive load profile changes with limited price adjustments and at a lower overall cost.

- Centralized control of hot water heaters
- Shifting hot water heaters from electricity to gas when practical
- Installing motion or heat detecting switches to turn on the "auto-on" features of TV's, stereos, and other similarly equipped appliances
- Installing timers and/or limited thermostats for air conditioning units
- Phasing out or taxing inefficient light bulbs
- Placing commercial lighting for advertising on separate meters and in a separate rate class
- Installing motion detector switches on equipment such as escalators and conveyor belts
- Re-wire office buildings so night lighting loads are reduced
- And many similar measures

Changes of the above kind save electricity automatically and without any change in metering. If the emphasis is on metering first, then funds available to facilitate other technical changes will have been reduced by the costs of the metering charges.

These technical changes should precede metering changes. It would then be possible to determine worthwhile improvements that metering changes might achieve. A universal metering first program will be needlessly waste money and will delay important technical and behavioural changes.

Consumer Responses to Meters

Individual consumers will be exposed to and respond to Smart meters differently.

Smart meters may induce behavioural changes in consumers, but it is not certain that they will be the expected or desired changes.

There are a significant number of consumers for whom electricity, whether it is 5 cents a kwh or 20 cents a kwh, is an inconsequential cost. Prices and conservation measures will influence only some of them to reduce their use.

Many people will buy flat price contracts because of their simplicity and predictability. For this, they will pay a premium. Smart meters will not change the behavior of these consumers.

Generally, small volume users will not be able to reduce their use enough to save $150 a year or 3,000 kwh that would be needed to obtain a ten year break-even point on the cost of a Smart meter. The benefits of Smart metering will be indirect and cannot be counted as a benefit if the benefit would have resulted from a change through technical measures. For small volume consumers, smart meters are a waste.

Other consumers will alter their electricity use in response to Smart meter pricing and information. Typically these consumers will be large electricity users who will save money after already making the investments for technical modifications needed to save money. Again, the savings such consumers make could not be attributed to Smart meters.

Smart meters are as likely to contribute to rational magazine purchases as to rational power buying for many people.

Currently, sufficient indirect or price responsive changes warranting the change in metering are only possible on accounts large enough to achieve a 3000 kwh a year or more of conservation and price beneficial load shifting.

How Big or Small an Account Warrants a Smart Meter?

After the savings from other technical shifts in demand, an account should have at least 5000 kwh or $250 per year in potential savings from conservation or load shifting. This would provide a crude break-even period of seven years for an account going from their present meter to a new one and 5 years for a new

account in a new building. With an allowance for 10% savings from Smart metering after the earlier savings from other sources, this suggests that only accounts with, at least, 50000 kwh a year of use, after other savings, be considered for Smart meters. Cautiously, Smart meters may be useful for accounts using 75000 kwh and more.

The 75000 kwh/yr threshold applies generally for fully configured Smart meters. There is, however, a clear exception and that is for hot water heaters and homes heated with hot water and those, perhaps, heated with electric hot air.

Time of use meters have long been used in northern Europe and the United Kingdom to encourage load shifting. Hot water for home heating, washing etc. can be heated at night and stored. Possibly heat for electric hot air can be stored safely in rocks, bricks or under pressure. If so electric hot air heating could also be subject to time of use metering regardless of the annual kwh volume used.

Farms and Smart Metering

Farmers have difficulty in financing and affording capital investments and Smart meters will impose added costs.

Although there is not a single typical farmland profile, it is clear from the farm use load profile available on the IMO website that the overall farm electricity use in Ontario reflects about 15% more off-peak electricity use than the average.

The results from the following features of the farm profile:

- farm use falls in summer
- farm use is relatively stable over weekends
- farm use starts earlier in the day and ends later

Impact on Farm Operations and Farmers

Farmers are concerned that imposing a single system of metering on a one size fits all basis will not work for most farms.

Individual farm use varies from under 5000 kwh per year on small cow/calf operations to over 10,000,000 kwh per year in larger greenhouses and mushroom farms. Electricity costs represent less than 10% of operating costs on most farms, but up to 35% in greenhouse farms.

For Ontario's 6,500 dairy operations, electricity costs about $450 per cow per year. Take home earnings vary between $500 and $1500 per cow per year (depending largely on feed and other operating costs). Increases in electricity costs create serious problems on all margins for dairy farmers.

The over 3000 egg and poultry farms in Ontario face costs of about 70 cents for each unit of bird capacity. Margins are in the order of $1 to $2 for each unit of capacity again heavily influenced by feed and debt costs and also animal mortality.

On larger cattle and grain operations electricity costs are generally under 10% of operating costs. It is nonetheless a crucial input. The margins on these farms are typically extremely low and for many of them negative one year in five or more. Electricity that costs $10,000 runs machines that do the work of a dozen men.

For most greenhouses, energy is the single largest cost and a crucial determinant of unit margins. In fact, many greenhouses had time of use meters prior to their removal due to changes to the Electricity Act. Re-instating all former time of use meters and extending them to farms, greenhouses and others that wish to install them would promote load shifting while allowing farmers to know and control their costs.

Farms tend to use electricity more at off peak times than other users. Low volume farm electricity users will not be able to recoup costs of change to Smart meters. Higher volume farm users may achieve substantial savings using technical methods that do not require Smart meters. For most farms the residual savings after non-meter driven changes will not warrant the cost of Smart meters.

OFA believes that Smart meters can be used for hot water heating especially in conjunction with centrally controlled hot water heaters.

OFA believes Smart meters should only be required on accounts where the electricity use is so large that the residual potential conservation and load shifting gains after non-meter driven savings have been implemented are sufficient to cover the costs of new meters and billing systems.

Again, the technical, non-meter driven savings should be implemented first to avoid the additional costs of Smart meters.

Smart Meter Benefits to Local Distribution Companies (LDC)

Smart meters may assist LDC operators. If they do, LDC’s should contribute to the costs.

However, total “customer” monitoring is only practical in rare circumstances, such as prisons and Intensive Care Units. Everywhere else monitoring is limited to a cost effective level of date gathering.

LDC’s will also find that they can only monitor a limited number, perhaps 15 or 20, Smart meters downstream of metered transformers. This limited number

would be as useful as total monitoring in terms of finding line losses, power thefts, and voltage problems.

Universal Smart meters should not be viewed as a customer financed system monitoring tool. The “total” information approach inherent in universal Smart meters is not needed to make system improvements or rapidly track problems.

Improving Existing Meters - Benefits

Existing meters can and should be made “Smarter” at no or little cost by introducing tiered seasonally adjusted rates. Such rates would protect low-income consumers while penalizing wasteful electricity use. They could be made a feature of the first 11000 kwh or electricity use each year thereby extending enhanced benefits of Rural Rate Assistance to all customers rural, remote, or urban, whether residential or not.

This can be achieved by offering the 11,000 kwh per customer per year a base or “heritage” rate with the electricity divided up by month as follows:

January	1300	**July**	1000
February	1300	**August**	1000
March	1200	**September**	600
April	800	**October**	600
May	500	**November**	900
June	500	**December**	1300

This approach reflects the needs of summer and winter peaks. It would or could be available to all classes of customers. Electricity use in excess of the monthly allocation could be charged at a premium rate for customers on an ordinary meter or at a contract or HOEP rate for customers on a Smart meter. For customers with time of use meters, the allocation would apply to their peak use portion.

Such pricing has strong conservation benefits but weak load shifting forces. However, load shifting for small customers apart from centrally controlled hot water is not a significant option so little is foregone.

For OFA the implementation priorities for metering are:

1) make existing meters more intelligent with monthly adjusted prices for the first 11000 kwh used each year and premium, contract or HOEP prices for greater use.
2) Implementing direct conservation and load shifting measures such as centrally controlled hot water on a cost effective basis
3) Re-introducing time of use meters to greenhouses and introducing them for hot water heating generally

4) Require very large customers (e.g. 5,000,000 kwh plus per year) to install their choice of time of use or interval meter
5) Pending a review of the possible benefits following steps one and two above, require customers using more than 500,000 kwh/yr to install their choice of a Smart or time of use meter

With these steps, nearly half of the electricity use and less than 15% of customers would be rationed by Smart meters. These proposals would likely achieve over 75% of possible gains from Smart meters at just 15% of the cost of a universal Smart meter approach. The proposals would almost totally eliminate the disastrous costs of foregone production and closures on farms and small business that would come with universal Smart metering.