

**A Presentation by**

**Paul Shervill**

**Vice President, Conservation**

**Ontario Power Authority**

**to the**

**Joint CEA Customer Council and Corporate Partners Committee Workshop**

**“The Smart Grid and its Impact on Electricity Customers”**

**November 24, 2009**

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ONTARIO POWER AUTHORITY

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Title slide

Good afternoon, everyone. Thank you to Dan Goldberger and the CEA for inviting me to be part of today's agenda.

I've been asked to talk about Ontario's target to reduce peak demand by 6,300 megawatts by 2025 and how we're going to achieve it. In fact, the Ontario Power Authority has a plan to exceed the target. So I'll take you through the main elements of the plan and then touch on the important connection between conservation and the smart grid.

# Ontario Power Authority

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- Mandate: ensure a reliable, sustainable electricity supply for Ontario

- long-term planning
- procuring new supply
- coordinating conservation



## Slide 2

First, let me give you a brief introduction to the Ontario Power Authority.

The Power Authority's mandate is to secure a reliable, sustainable electricity supply for the province.

We don't own any generating facilities. We don't operate transmission or distribution systems. And we're not an energy regulator.

Our role is that of a planner and facilitator, working closely with industry partners like the Independent Electricity System Operator, electricity transmission companies, local distribution companies and the Ontario Energy Board, as well as our many stakeholders across the province.

Our activities are mainly focused on three key areas:

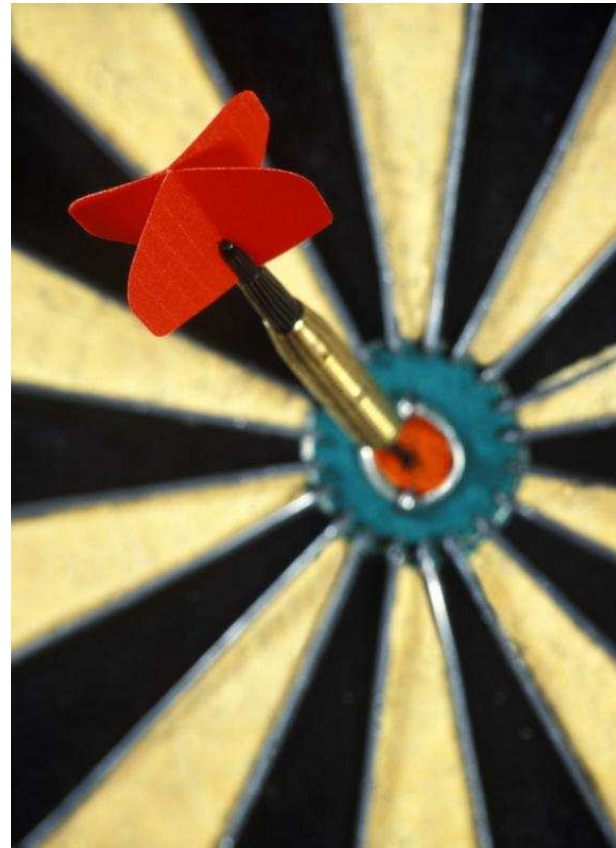
- planning the electricity system for the long term
- procuring new electricity supply
- coordinating conservation and energy efficiency.

So let me give you an overview of our conservation efforts.

# Conservation Target

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- Reduce peak demand by 6,300 MW by 2025
  - Removing 1 in 5 electricity users from the grid
  - Interim targets:
    - 1,350 MW reduction by end of 2007
      - Target met
    - 1,350 MW reduction by end of 2010



### Slide 3

As I mentioned earlier, Ontario set a target to reduce peak electricity demand by 6,300 megawatts by 2025 – or offsetting 75 to 80 percent of forecast load growth over the next 20 years. This is equivalent to removing one in five electricity users from the grid. It's an aggressive target – one of the most ambitious conservation initiatives in North America, and some say the world.

The Power Authority was tasked with coordinating province-wide activities to achieve the target, along with some interim targets along the way. We developed a long-term plan for conservation and incorporated it into a long-term Integrated Power System Plan, or IPSP, for the province.

The first interim target – a 1,350 megawatt reduction in peak demand by the end of 2007 – was achieved. It was actually exceeded by a small amount. So the good news is that we are making progress.

The next target is another 1,350-megawatt reduction in peak demand by the end of next year. And we're working hard toward that goal. Over 400 megawatts for the 2008 calendar year is in the bank.

A few important things have happened during the past year that will have an impact on our conservation efforts.

# Recent Developments

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- OPA directed to revisit certain elements of long-term plan
  - including looking into accelerating conservation target
- Green Energy and Green Economy Act passed
  - Energy efficiency a key purpose of Ontario Building Code
  - Leading energy efficiency standards for appliances
  - Energy audits for homes being sold
  - Energy efficiency programs and demand management plans
  - Protection from price increases for low income consumers
  - LDCs to set conservation targets
  - OPA to remain central coordinator of conservation, responsible for target



#### Slide 4

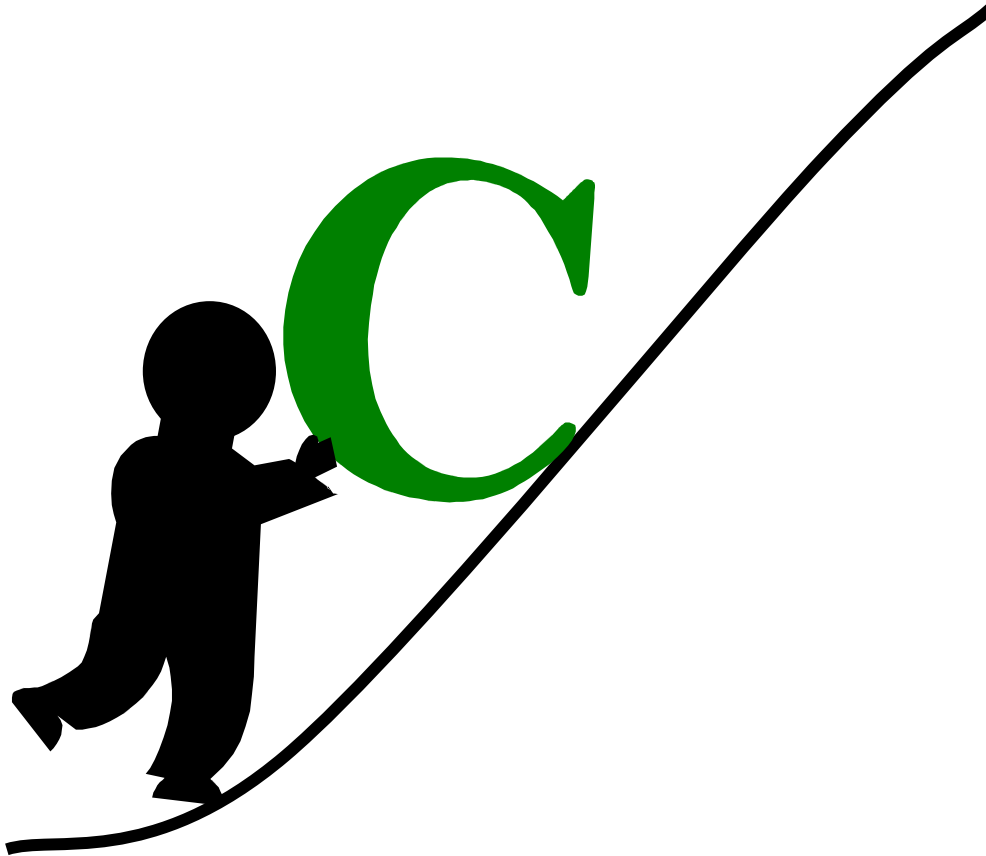
In September 2008, Ontario's Minister of Energy and Infrastructure directed the OPA to re-visit various key elements of the IPSP, including looking into whether we could accelerate achievement of the conservation target.

Then last May, the Government passed the Green Energy and Green Economy Act, which is focused on promoting conservation and renewable energy in Ontario. Under the Green Energy Act:

- Energy efficiency will become a key purpose of the Ontario Building Code.
- North American-leading energy-efficiency standards will be established for household appliances.
- Energy audits are mandatory for the sale of homes – unless waived by the purchaser.
- Industrial productivity will be increased through energy-efficiency programs and demand management plans.
- Low-income Ontarians will be protected from energy price increases.
- Local distribution companies have conservation targets to meet through programs for homes and businesses – and the OPA is the central coordinator responsible for making sure we achieve the overall provincial target.

## How we're meeting the challenge

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- Programs
- Awareness and education
- Conservation Fund
- Technology Development Fund
- Codes and Standards
- Smart meters and time-of-use rates

## Slide 5

I mentioned earlier that Ontario's conservation target is one of the most aggressive conservation initiatives in the world. And that we're looking for opportunities to accelerate that target. I want to add that, while we are making progress, the task ahead of us will not be an easy one.

In fact, success will require the collective actions of everyone – local distribution companies, businesses, institutions and individuals across the province. To that end, the Power Authority, the local distribution companies and other organizations in Ontario are promoting conservation and energy efficiency through a wide range of programs.

These programs reach every sector of the economy: residential customers in single and multi-family buildings, including low income groups, the commercial and institutional sectors, and industrial customers – both large and small.

In addition to programs, we promote conservation through education and awareness initiatives, and we manage two funds to help support conservation pilot projects and new technologies that can improve electricity conservation or supply. One of these funds, the Technology Development Fund, is supporting some interesting projects that are linked to the smart grid. I'll come back to these in a few moments.

The Power Authority also supports the efforts of the Ministry of Energy and Infrastructure for changes in energy-efficiency codes for buildings and standards for electrical appliances and various kinds of equipment. We estimate that codes and standards, together with pricing, may account for a large percentage of conservation gains in the long term.

As you know, these changes require long lead times and involve enacting regulations or legislation. Results are slow in coming, as they rely on the turnover of capital stock in housing, machinery and appliances. But the effects are sustained over time and lead to a real, measurable change.

Our research shows that the most successful conservation efforts use a combination of programs (pull) and changes to codes and standards (push) to achieve long-term results.

# Smart Meters and Time-of-Use Rates

- > 2.4 million smart meters installed
- 1 million households on time-of-use rates by summer 2010
- Entire province on time-of-use rates by mid 2011
- Smart meters and time-of-use rates will deliver about 390 MW of peak demand reduction by 2027
  - most of these savings will occur by 2014
- Success depends on consumers getting the right price signals
  - 3:1 ratio most effective



## Slide 6

Of course, smart meters and time-of-use pricing will also play a key role in conserving electricity.

Ontario is on track to meet its 2010 smart meter installation target. More than 2.4 million smart meters have been installed across the province, and by next summer, over a million Ontario households will be on time-of-use rates. The entire province should be on time-of-use rates by mid-2011.

Time-of-use pricing is indeed what makes our smart meters “smart” by telling us how much electricity we are using throughout the day. They offer customers a new level of engagement in the electricity system and a new level of control over their electricity use.

We estimate that smart meters combined with time-of-use rates will deliver about 390 megawatts of peak demand reduction by 2027 – and most of these savings will occur earlier in the planning period. They are also expected to be key supporting elements of other conservation programs and the development of the smart grid.

The main point I want to make here is that the success of time-of-use rates and smart meters will depend on consumers getting the right price signals in their rates. The change in price is what will inspire consumers to change their behaviour, so it has to be meaningful to be effective. Our research shows that a 3:1 ratio between peak prices and off-peak prices would be the minimum spread to be effective in driving consumers to shift their usage.

# Accelerating Conservation

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- Demand management programs and energy efficiency
- Benefits:
  - Generate economic activity
  - Improve industrial competitiveness
  - Cost effective
- Will reach target one year ahead of schedule



## Slide 7

So where does our long-term conservation plan go from here? As I mentioned earlier, we're working on revising our IPSP, and that includes the plan to achieve our conservation target. We've updated our demand forecasts to reflect new information and potential economic scenarios.

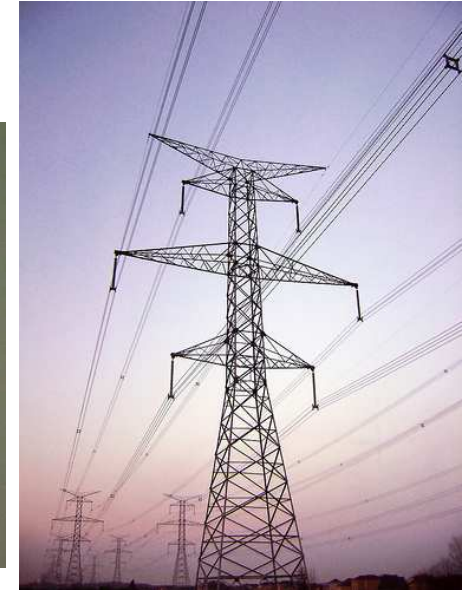
We believe that we can accelerate conservation results by 2014 through aggressive demand management programs. Energy efficiency will play a central role – more so in the mid-term, reflecting the longer ramp-up period associated with implementing codes and standards. Programs will assist us in bridging that timeline as well as help to improve the penetration rates of more efficient equipment and thereby increase customers' acceptance of changes in codes and standards to improve energy efficiency.

We plan to work more aggressively toward accelerating the adoption of elevated codes and standards. We are also working on introducing a new energy-efficiency initiative that will encourage and help large industrial companies to invest in energy management projects.

Demand response and energy efficiency bring tremendous value to Ontario's economy and to electricity ratepayers. They generate immense economic activity. They improve industrial competitiveness. And because they cost significantly less than building new supply, they result in lower costs for electricity consumers in the long run.

We believe these resources will play a major role in enabling Ontario to achieve the 6,300 MW target one year earlier – by 2024. And by 2025, we project that we will exceed the target by about 300 MW.

# Smart Grid



## Slide 8

So how does all of this relate to the smart grid? There's a strong connection. The smart grid will bring conservation to a whole new level. It will help fast-forward the establishment of a true culture of conservation in Ontario.

The smart grid is important to the Power Authority because:

- it will facilitate demand response initiatives
- it will help us to harness the benefits of distributed generation, allowing an increased role for renewable energy supplies in meeting provincial demand
- and it will enable the grid to adapt to new technologies, such as electricity storage.

It's important to transmitters, distributors and system operators because it will help optimize the efficient operation of the grid.

And most significantly, it's important to customers. The two-way flow of energy and communications will enable them to take part in the electricity system in ways we once never imagined. They'll be able to receive information and make informed decisions about their energy use. They'll also be able to connect to the grid and sell renewable energy they've generated on their properties.

# Next wave of conservation programming

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Innovation is key.

## Slide 9

And in the very near future, the smart grid will serve as a platform for building a new wave of conservation programming.

I mentioned that we expect to exceed our 2025 target by 300 MW. But there is potential to achieve much higher savings.

The key to greater success will be innovation in appliances and technologies.

Let me give you some examples. I mentioned our Technology Development Fund earlier. It helps bring to market new technologies that can improve electricity conservation or supply. At the moment, about five of the projects we're supporting are smart grid technologies. They range from:

- a web-based intelligent dimming and lighting system
- to a peak demand management and response technology demonstration
- to development and testing of a smart dryer that will give consumers real-time pricing signals.

The last one I mentioned, the smart dryer, is the first in a suite of smart appliances being developed by Whirlpool. And Ontario is the first jurisdiction in the world to test this device as a result of Whirlpool's partnership with the Power Authority.

It's all very exciting stuff! And it's just around the corner.

I won't get into the details of these projects, in the interest of time. If you want to learn more about them, I'd be happy to talk to you. You can also contact Bryan Young or Phil Bosco at our office – they're actively involved in these and many other projects.

In closing, I want to emphasize we're making great progress in our conservation efforts and we will not only meet but exceed the 2025 target. But going well beyond that target and taking conservation to a whole new level will depend on innovation. We're looking for the next generation of fridges and industrial processes.

It's all about coming up with solutions that are meaningful to customers. That means staying in touch with customers, and getting to know what tools they want and need to help them manage their electricity use more efficiently and more conveniently.

We're always looking for input in this area. And who better to provide that input than you. We're planning to hold eight LDC Forums on this subject in 2010 and I hope that those of you from the LDCs will take part.

We also need input from across the energy sector, including manufacturers and suppliers of appliances and equipment. So I invite you to give me a call. We value your knowledge and experience.

Thank you for your attention.