

Statement by
Denise Carpenter
President and CEO
Canadian Nuclear Association

To

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Panel Session: "Energy System Grids of the Future"
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Good morning.

I am very pleased to be part of this panel with the Presidents of other Canadian energy associations. I have been head of the Canadian Nuclear Association for only six months now, so I am still in learning mode. Fortunately, I came to the CNA from EPCOR in Edmonton, so I have a background in both the energy and the electricity sectors.

The Canadian Nuclear Association has some 95 members representing the entire spectrum of the nuclear industry – electricity producers, equipment manufacturers, uranium mining and fuel processing, nuclear medicine, labour unions, engineering firms, and the education sector.

At first glance, there is not an apparent “fit” between our subject today – “Energy System Grids of the Future” and the nuclear power industry. CNA members are power generators; we do not transmit or distribute electricity.

Dig a bit deeper, however, and you can see how Canada’s nuclear power sector will be an excellent support for the smart grids of the future.

My opening statement will be in two parts:

1. First I will give a very high-level and simplified overview on smart grid development for those who may not be familiar with the concept. Since we are meeting in Ontario, I will focus on this province’s smart grid initiatives; and
2. Second, I will show how nuclear will have an essential role in the development of smart grids.

What is the smart grid?

A smart electricity grid is one featuring a high degree of automation, monitoring capability, and two-way communication with customers. It is designed as a “two way street” – able to deliver electricity to customers or to accept generation from them; and to retrieve data on electricity usage from customers while also providing information on usage back to the customer.

Development of smart grids is being driven by the need to make utility operations more efficient; the need to incorporate new sources of distributed generation; and the need to help customers become more efficient in their use of electricity.

The high-voltage transmission system tends to be automated already. It is the lower-voltage distribution system, which has changed little in the last hundred years, that needs to become “smart”.

The smart grid begins with the installation of smart meters, which should be mostly complete in Ontario by the end of this year. No longer will meters need to be read. The new smart meters continuously record power usage, and they are the gateway for information on power usage back to the customer, visible on computers or in-home monitors.

Smart meters make possible time-of-use pricing, which is to be instituted across Ontario by the end of next year. All Ontario electricity customers are to be charged for their electricity usage according to three time periods – reflecting times of peak demand, mid-peak and off-peak.

In this way, customers are rewarded for shifting their demand to night-time and weekend usage, and they pay more for using electricity during high-demand periods. The power system benefits if peak demands are reduced, since fewer new power stations have to be built.

The development of a smart grid is part of Ontario’s Green Energy and Economy Act. With higher levels of automation and protection and control, the smart grid makes it easier to detect and isolate power outages, and

should result in shorter-duration outages. The smart grid will also protect customers from power disturbances on the distribution system as distributed generation sources, which generate intermittently and “at will”, enter and leave the grid.

The smart grid will also enable customers to become generators by installing wind, solar, or other renewable energy sources. In theory, a plug-in electric vehicle could become a storage device – being charged with low-cost off-peak power, which could be sold back to the system during times of much higher prices.

Customers will benefit by receiving much more information about their power usage, and they will be incented to take more control over their demand to reduce their power bills.

That is a very simplified explanation of what a smart grid is designed to do. Now let me turn to the role of nuclear power.

How is nuclear power complementary to a smart grid?

Nuclear power is a complementary technology to smart grid technology. I believe it is even a prerequisite to achieving the objectives of a smart grid.

Nuclear power is an excellent support to smart grid technologies in three ways.

First, as I mentioned earlier, smart grids are being put into place to safely and reliably incorporate all the new distributed generation sources such as wind and solar now being introduced. As I mentioned earlier, these power sources are intermittent, with capacity factors well under 50%.

To meet our continuous needs for power, and to allow more intermittent sources on the system, we need the 24/7 generating capability of sources such as nuclear, to operate as the foundation of the power systems of the future.

Second, smart grids are also being introduced to help power systems become cleaner, with renewable power replacing sources like coal.

Nuclear power is complementary again, in that it does not emit the gases that cause smog or global warming. Base load nuclear and hydro power can be the foundation of the cleaner electricity system that will also feature distributed and renewable power sources.

And **third**, smart grids are being put into place to encourage and support new technologies such as plug-in electric vehicles.

Nuclear is the perfect complement to PHEVs. In Ontario, it is primarily nuclear and hydro power, with some wind, that generates overnight when these vehicles will be charged. Each of these generating sources is emission-free. This is key to making electric vehicles a very low emitting source of transportation.

Conclusion

So to conclude, electric utilities are moving to smart grids to make utility operations more efficient, to help customers use electricity more efficiently, and to make the power system cleaner.

Nuclear power, which operates continuously and is a clean source of generation, is an excellent partner for the smart grid of the future.

Thank you.