

Notes for Remarks
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Building the Foundation for the Future

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I'd like to thank the OEA for the opportunity to discuss the future of renewable generation in Ontario.

Outlook

Our starting point is the current situation. Ontario has roughly 9,500 MW of renewable supply today. Most of this is hydro electric generation but wind makes up almost 1,200 MW. It is worth noting that during the Labour Day weekend, wind generation exceeded 1,000 MW for 7 consecutive hours.

But over the next three years, as much as 7,000 MW of variable generation could be on the system with more coming after that. This will be primarily wind but will also include a substantial amount of solar with which we have little experience.

At the same time we are increasing variable resources, we are losing significant amounts of load following supply as coal is phased out in Ontario. In terms of flexible dispatchable generation, today is as good as it gets.

The rapid deployment of this significant amount of variable generation and the changing nature of our supply mix will challenge the IESO's ability to maintain reliability of the power system and to do so as economically as possible.

We are preparing to adapt both the way we carry out our power system operations and the market we administer to accommodate the influx of renewable power.

And while there is a lot that the system operator needs to do, you will see that there are a number of challenges for renewable resources themselves if Ontario is to bring wind and solar into its mainstream of supply resources.

The move to a more renewable supply mix will also have significant impacts on our conventional supply fleet.

Today I will talk about some of the things we need to do to reliably and efficiently integrate the expected large amounts of renewable into system operations.

Short term

In the short term, there are three areas we need to focus on: Forecasting, Visibility and Dispatch.

From a forecasting perspective, our ability to predict output from variable resources is essential for maintaining reliability and market efficiency. Today, renewable operators provide us with their forecast schedules. Relatively large variations in these can be managed today but not when we have six or seven times today's amounts.

We will be addressing this need in a number of ways including improved forecasting tools and techniques.

For example, we are moving to implement, next year, a centralized forecasting approach for all wind and solar facilities directly connected to the high voltage grid and for all embedded wind and solar facilities of 5 MW or greater. This type of

forecasting is already being done by several US system operators as well as others around the world.

The limited amount of visibility and control that the IESO has over embedded generators is a concern for the IESO, one that will continue to increase as the amount of embedded generation increases.

There will be increased blurring of the line between transmission and distribution systems and we are seeing a need for telemetry and reporting from embedded resources; most likely through our distribution partners who will need this visibility for their own operations.

As the market administrator, you won't be surprised to hear me say that the increasing role of wind and solar is creating a need for greater integration of these resources into market operations.

North American jurisdictions with high wind and solar penetration like New York and Texas have moved their variable generation into the economic dispatch and Ontario will have to follow suit. The IESO will propose the active dispatch of all grid connected variable resources on a five minute, economic basis. Most of the time this will have little impact on renewable generators but at times of surplus, during transmission constraints, or when there is excessive variability this flexibility will be very crucial.

Other Jurisdictions

We need to recognize that Ontario is not alone in its quest to increase its reliance on renewable resources. For example our neighbours in New York and the Midwest are

expecting large increases. As such, broader regional coordination between markets will be essential if we are to maximize the integration of renewables into our system. A good example of this occurred recently during the Labour Day long weekend when demands were very light overnight. We had surplus supply and both MISO and PJM were in minimum generation conditions. We had to curtail imports. So did PJM. But PJM's curtailment meant we, in turn, had to reduce some of our exports which increased our surplus. We can't just look inward; we will have to coordinate our actions in new ways across the region.

We can also learn from the experience and plans in other jurisdictions.

California, for example, has a requirement under its Renewable Portfolio Standard for a 20 per cent contribution from renewable resources and compliance to that requirement is expected within the next two years.

Our counterpart, the California ISO, recently published a very good report describing the expected impacts of meeting that 20 per cent target.

The report suggests that California's existing and planned generation fleet will likely need to operate at lower minimum levels and provide more frequent starts, stops and cycling over the operating day. Not surprisingly, certain conventional generators can also be expected to operate at lower capacity factors because of the increased output from renewables.

Interestingly, the ISO report also highlighted that in California's case, wind and solar combined can lessen operational requirements in some hours because solar resources are ramping up when wind resources are ramping down, and vice versa. I don't expect

that to be the predominant pattern for Ontario based on our experience to date. This, and our large supply of inflexible nuclear generation, demonstrate why operating with renewables has to be studied with the unique characteristics of our own system. We can learn from others but we also need to recognize the differences. We currently have a study underway with the OPA to specifically look at solar impacts for Ontario.

Other jurisdictions are also actively exploring the role of storage in meeting future needs and here at home we need to determine whether the use of storage in Ontario can help us maximize the contribution of renewables.

IESO Approach

Let me conclude by talking about how the IESO is dealing with some of this.

The business plan that we expect to file with the OEB next month recognizes the extra effort we will need to provide in order to reliably and effectively implement the government's green energy policy.

With all the new generators coming on line, our connection assessments have increased and are expected to double over what they are now ... and these assessments are now required to be done faster than before.

We've put in place simplified connection rules and will soon publish "performance validation requirements" so participants will have a better understanding of what they'll be held to when commissioning.

We intend to include ramping and regulation requirements in our future 18 month forecasts.

We continue to engage with NERC to look at reliability impacts of variable generation. We expect standards to emerge in the areas of modelling, frequency response, and inertia requirements.

In a nutshell, the way that we will carry out our system operations and market responsibilities will have to change.

Over the next decade the power system will be continually reconfigured as coal plants are shut down, new gas plants are commissioned, nuclear units are refurbished, unprecedented amounts of renewable generation are integrated into the system, the transmission system is renewed, improved and expanded and the distribution system is retooled for two way flow.

The IESO has a key role in actively supporting this transformation, as do many others within the industry. Our role will continue to focus on reliability and efficiency and it's a role we are proud to fulfill, as we move forward.