

# Update

Embedded and Renewable Generation  
February 10, 2009



- Visibility and Telemetry
- Proposed Expanded Scope
  - Centralized Renewable Forecasting
  - Dispatch Priority
- Next Steps

- Participant comments on original IESO paper:
  - Existing means for providing real-time visibility
  - Required understanding of curtailment criteria for embedded generation
  - Stakeholdering is required for decision criteria

- Visibility for critical masses (MPs, non-MPs, renewables)
- Telemetry on a broad level to allow for dispatching priority discussions
- Dispatch control and visibility needs to move to the Electrical Distribution Association (EDA) where the LDC's can assist with this issue

- Draft of revised SE plan
  - Renewable forecasting
  - Dispatch priority
    - New supply mix
    - Embedded generation
    - Issue during times of low demand and transmission constraints
  - Development of standards that enable renewable resources to supply to the maximum benefit to Ontario

- Increasing amounts of renewable resources make accurate forecasting essential for efficient and reliable market function
- Use wind as an example
  - Wind Power Standing Committee:
    - Growing MW of wind coming online
    - Accurate accounts of wind quantities for effective and efficient management of IESO controlled grid
    - Accurate wind forecasting results in efficient market response
    - Accurate wind forecasting will better prepare the IESO to make resource decisions based on adequacy
    - Inefficiencies due to forecast error is trivial and the cost of centralized is too high at this time

- Pros of Centralized Forecasting
  - Consistent and accurate forecasts between generators
  - Ability to assimilate the forecasts from each generator into one usable form (if there is no standard for decentralized forecasting, all forecasts received can differ vastly)
  - Balancing out of errors (overall smaller forecasting error)
  - Forecast of one area can be determinant for another
  - Capability of area forecasts rather than individual generator forecasts (regional forecasts can be more accurate than individual forecasts)
  - Cost effective and consistent improvements, when required
    - Common methodology allows for targeted evolution of forecast modelling

- Other ISOs
  - Many other ISOs have or are looking at using centralized forecasting as a way to effectively and efficiently integrate the expected increase in renewable generation
- Forecast Providers
  - There are many forecast providers that can customize programs to best suit the unique characteristics of Ontario

- Is paying for centralized forecasting more cost effective than improving the accuracy of each individual generator's forecasting?
- Does the market efficiency gain and the resulting cost savings offset the cost?
- Who pays for it?
- What level of detail is required for reliable operation of IESO controlled grid?
- Can we use an existing forecasting methodology as a guide?
- Should the IESO pursue test projects and estimates for centralized forecasting?

- Ontario's Future Baseload Generation Mix:
  - Phase out of coal by 2014
  - Growth of wind
  - Increase in biomass and gas-fuelled generation
  - Refurbishment or retirement of nuclear
  - General reduction in the proportion of manoeuvrable generation
- Growing number of SBG situations or periods of low demand and transmission constraints
  - May be exacerbated by the increase in renewable generation

- Nuclear generation is already experiencing dispatch issues due to SBG and, as such, the IESO has had to put procedures in place to help address these issues
- The paper and this presentation will be in two parts in terms of dispatch priority:
  - Nuclear Policy
  - Renewable Policy

- Nuclear Policy

- Background:

- A change in nuclear output causes potential reactor safety implications
      - Reactor imbalance can lead to serious equipment damage and adverse environmental impacts
    - Nuclear units are preferred to be running at a constant energy output versus manoeuvring up and down
    - Nuclear units are expected to offer at a price where they will be economic to remain at a constant output
    - Once a nuclear unit is dispatched off, and there is no equipment damage as a result of ramping down, the unit cannot come back online for 48 – 72 hours

- Nuclear Policy

- Procedure Update on December 23, 2008:

- Two-hours prior to the dispatch hour, expand the Net Interchange Scheduling Limit (NISL) to 1000MW (from 700MW);
    - One-hour prior to the dispatch hour, cut import transactions if nuclear are being dispatched down;
    - During check-out, if export transactions are curtailed causing nuclear to be dispatched down, cut import transactions of equal MW value to the exports that are curtailed; and
    - If a nuclear unit receives a dispatch down instruction midway through an hour and no other internal resources can be reliably reduced, imports will be cut mid-hour for a value equal to the nuclear dispatch down amount;
    - If there are still reliability concerns, the IESO will dispatch off self-scheduling generators and/or intermittent embedded and non-embedded generators.

- Nuclear Policy
  - Recommendations and Moving Forward
    - More specific guidelines on when nuclear units should be dispatched down to be stakeholdered here (under the assumption that these units offer accordingly – offer to not manoeuvre)

- Renewable Policy

- Background:

- New renewable, embedded and non-embedded, requires new procedures for efficient and reliable integration
    - Considered baseload, so need to be options for reductions during times of low consumption
    - Not dispatchable – run when they can – unless to dispatch off
    - Factoring in intermittent, vulnerable generation is challenging but is a must
      - As long as there is wind, wind generators can come on and go offline quickly to meet reliability needs
      - No known equipment limitations as with nuclear units

- Renewable Policy

- Prioritizing:

- Should self schedulers be asked to reduce output before a renewable generator MP is asked to go offline? Should self-scheduling commissioning units be asked to shut down before a renewable generator MP is called off?
    - Should renewable generator MPs be taken off before a nuclear generator?
    - Should an embedded renewable generator (non-MP) be asked to go offline to avoid manoeuvring a nuclear?
    - Should an embedded renewable generator (non-MP) be asked to go offline while imports or self-schedulers are online?
    - Should wind 'spill' before water spills?