

# Development of Standards

Embedded and Renewable Generation (SE-57 )

June 16, 2009



- To create reliability standards if needed to accommodate maximum penetration of embedded/renewable generation.
- To validate operability of Ontario's forecasted resource mix.
- To leverage proposed standards in the industry (NERC, NPCC standards).

- Background
- Current Supply Mix (Renewable Resources)
- Existing Operating Standards
- Prospective Development of Standards
- Feedback

- High level of renewable/embedded generation is projected in future supply mix. (Government policies and environmental priorities)
- Reliable integration requires significant change to traditional operating methods.
- Fundamental difference between proposed (except Biomass) and conventional generation resources:
  - *Fuel source cannot be controlled or stored;*
  - *Fuel availability does not positively co-relate with demand; and*
  - *Steep ramp rates as opposed to gradual/controlled ramp experienced with demand*
- Potential Impact : Increase in supply variability and uncertainty
- Possible Action: It may require revisiting existing standards, and/or develop new standards.

- About 3800 MW of new and refurbished supply (nuclear, thermal and renewable) is scheduled over next 18 months.
- Phase out of existing coal generation by 2014.
- OPA's Large-Scale and RESOP contracts - 3,317 MW (Renewable Generation).
  - Expected to be in service by 2012, with 881 MW already in commercial operation\*.
- Under Green Energy Act, FIT (Feed-in Tariff) will be used to procure renewable supply.
- FIT impact : Probable increase in renewable energy contracts.

- Standards are established by standards authorities (NERC, NPCC) and the IESO itself.
- IESO manages reliability of the system by enforcement of standards (through market rules).
- IESO's assessment of resource operability – Verify IESO's compliance with standards in operating resource mix

## Standards:

### **Real Power Balancing Control Performance (BAL -001)**

To maintain system steady state frequency within defined limits by balancing real power demand and supply in real-time (Demand = Supply).

*CPS1 - It is statistical measure of ACE (Area Control Error) variability and its relationship to frequency error over a 12 month period.*

*CPS2 - It is a statistical measure designed to limit unacceptably large net unscheduled power flows by measuring a 10-minute period average of ACE. 6*

## **Disturbance Control Performance (BAL-002)**

To ensure the system operator is able to utilize its Contingency Reserve to balance resources and demand and return system frequency within defined limits following a Reportable Disturbance.

## **Automatic Generation Control (BAL-005)**

Establishes requirements for system's Automatic Generation Control (AGC) necessary to calculate Area Control Error (ACE) and to routinely deploy the Regulating Reserve.

**Potential standards development could be primarily based on the following:**

- Recommendations from IVGTF (Integration of Variable Generation Task Force )
- Resource Operability Assessment

## **IVGTF Recommendations**

**Objective:** To consider and apply industry recommended enhanced practices, study and coordination efforts for reliable integration of new supply mix.

### **Some Recommendations:**

1) In light of projected changes in supply mix, it may be necessary to review and potentially modify the AGC performance criteria, capabilities and technologies to ensure the system performs properly.

- 2) Interconnection procedures and standards should be enhanced to address voltage and frequency ride through, reactive and real power control, frequency and inertial response and must be applied in a consistent manner to all generation technologies.
- 3) Resource adequacy and transmission planning approaches must consider needed system flexibility to accommodate the characteristic (ramping, fuel mix, minimum loading point) of proposed supply mix.
- 4) Forecasting techniques must be incorporated into day-to-day operational planning and real-time operation routines/practices including unit commitment and dispatch.

## Resource Operability Assessment

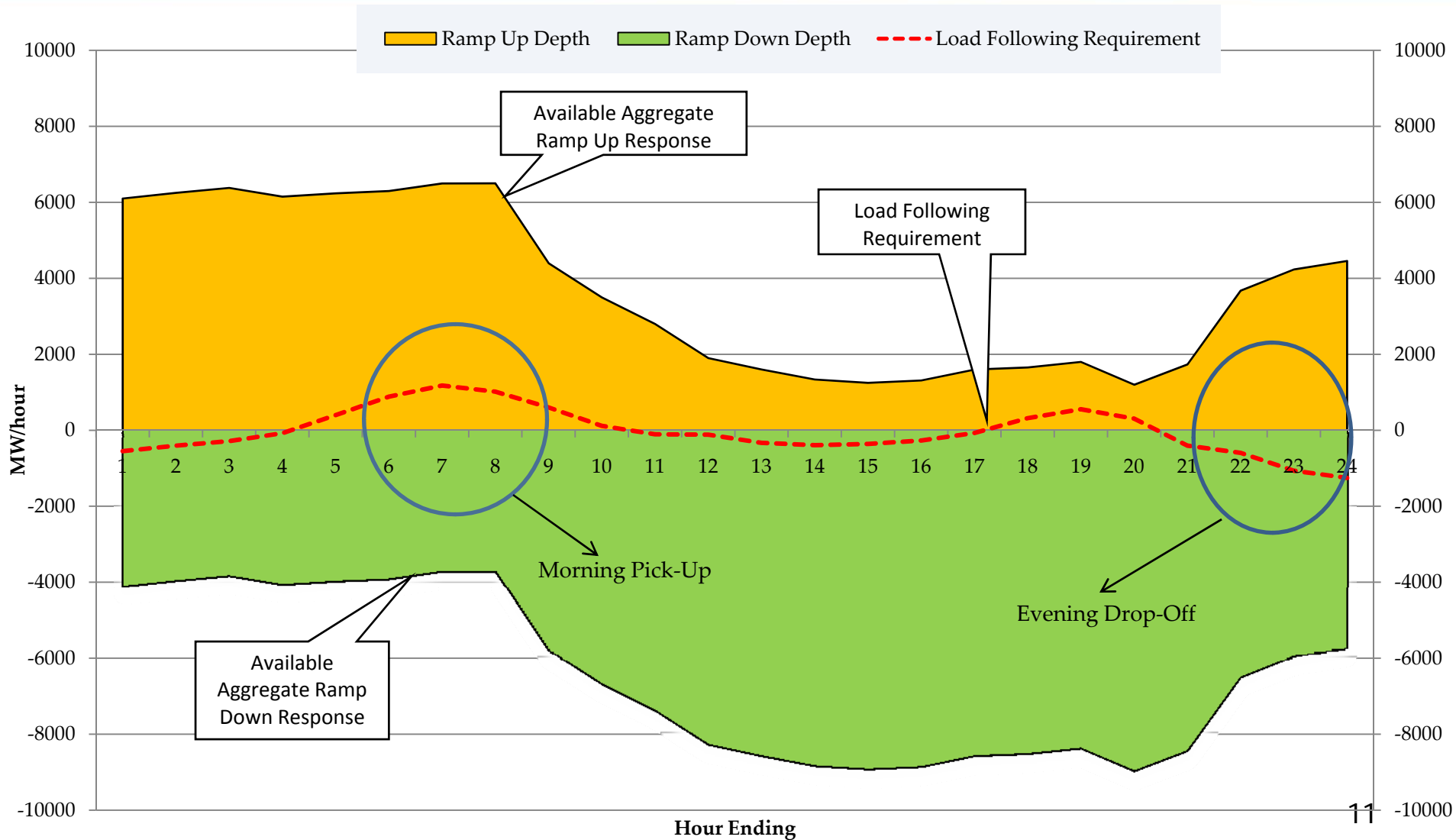
### **Objective:**

- To evaluate whether the forecasted resource mix can be reasonably coordinated to closely follow varying load profile, while maintaining all operating standards.
- To gauge the effectiveness of existing operating procedures and standards.

### **Criteria:**

#### **1) Load Following Capability**

Measure of aggregate ramp depth available from dispatchable resources to shadow demand variations



## **Remedy to satisfy load following requirement:**

Implementation of operational procedures, control actions and other market mechanism which includes:

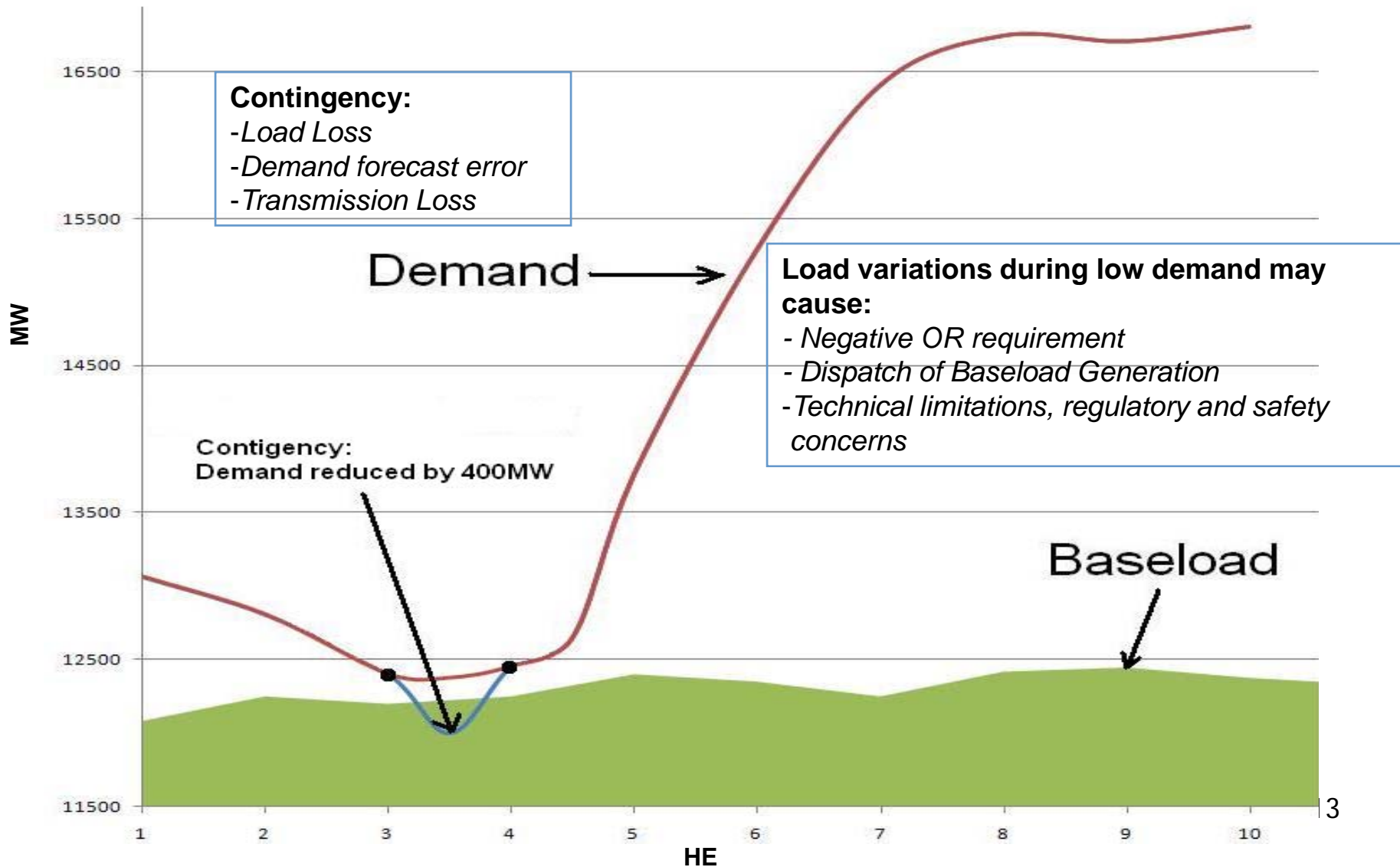
- Reliability starts and unit commitment
- Dispatch of Dispatchable loads
- Regional reserve sharing
- Export dispatch
- Additional imports

## **2 ) Management of Minimum Load Periods**

Evaluate available options to effectively manage surplus supply conditions

## **3) Verification of sufficient generation capacity**

Examine generation ability to satisfy reliability requirements  
(Demand and Operating Reserve)



- Solicit SE-57 feedback
- Questions?
- Next Steps:
  - IESO to continue its involvement with IVGTF
  - Engage stakeholders for further development