

# Wind Sensitivity in NPCC 2009 Overall Transmission Assessment



# Presentation Outline

---

- ✓ Objective
- ✓ Scope and Methodology
- ✓ Summary of Results
- ✓ Conclusions



# Objective

---

- ✓ Assess the dynamic performance of the NPCC system with high penetration of wind generation



# Scope and Methodology

---

- ✓ Study year – 2013
- ✓ 2013 Light Load Case
- ✓ High levels of wind generation
- ✓ High transfer levels
- ✓ Major RFC proposed projects included



# Scope and Methodology

---

## Contingencies Modeled:

- ✓ Design, extreme and beyond criteria
- ✓ High wind scenario specific contingency also studied



# New York Results

---

- ✓ No instability observed for the design and beyond criteria contingencies tested
- ✓ Some extreme contingencies resulted in lightly, but positively damped oscillations or post-contingency overloads – consistent with 2009 OTA and past studies
- ✓ Some contingencies resulted in localized tripping of WTGs due to undervoltage protection



# New England Results

---

- ✓ System stable for all but one beyond criteria contingency and one extreme contingency tested - Undamped responses due to high pre-contingency interface flows set above historical values



# Ontario and Quebec Results

---

- ✓ System stable for all contingencies tested



# Maritime Results

---

- ✓ Systems stable for all contingencies tested
- ✓ One islanding scenario design contingency showed potential for adverse impact on reliability due to high wind dispatch



# Conclusions

---

- ✓ The system remained stable for all design contingencies tested
- ✓ The NPCC system remained stable for all but one of the tested extreme contingencies and one beyond criteria contingencies - result of higher than normal pre-contingency flows across an interface within New England
- ✓ One added scenario specific design contingency exhibits trends that could adversely impact reliability due to high penetration of wind generation dispatch
- ✓ Some contingencies resulted in localized tripping of WTGs



# Conclusions

---

Issues with the suitability of available WTG models for large scale power system studies include

- ✓ **Ability of the WTG models to interface with large scale dynamics cases**
- ✓ **Restricted access to WTG models due to proprietary concerns**
- ✓ **Lack of WTG model documentation**
- ✓ **Lack of standardization for model development and validation**
- ✓ **Proper modeling of the WTG protection settings**