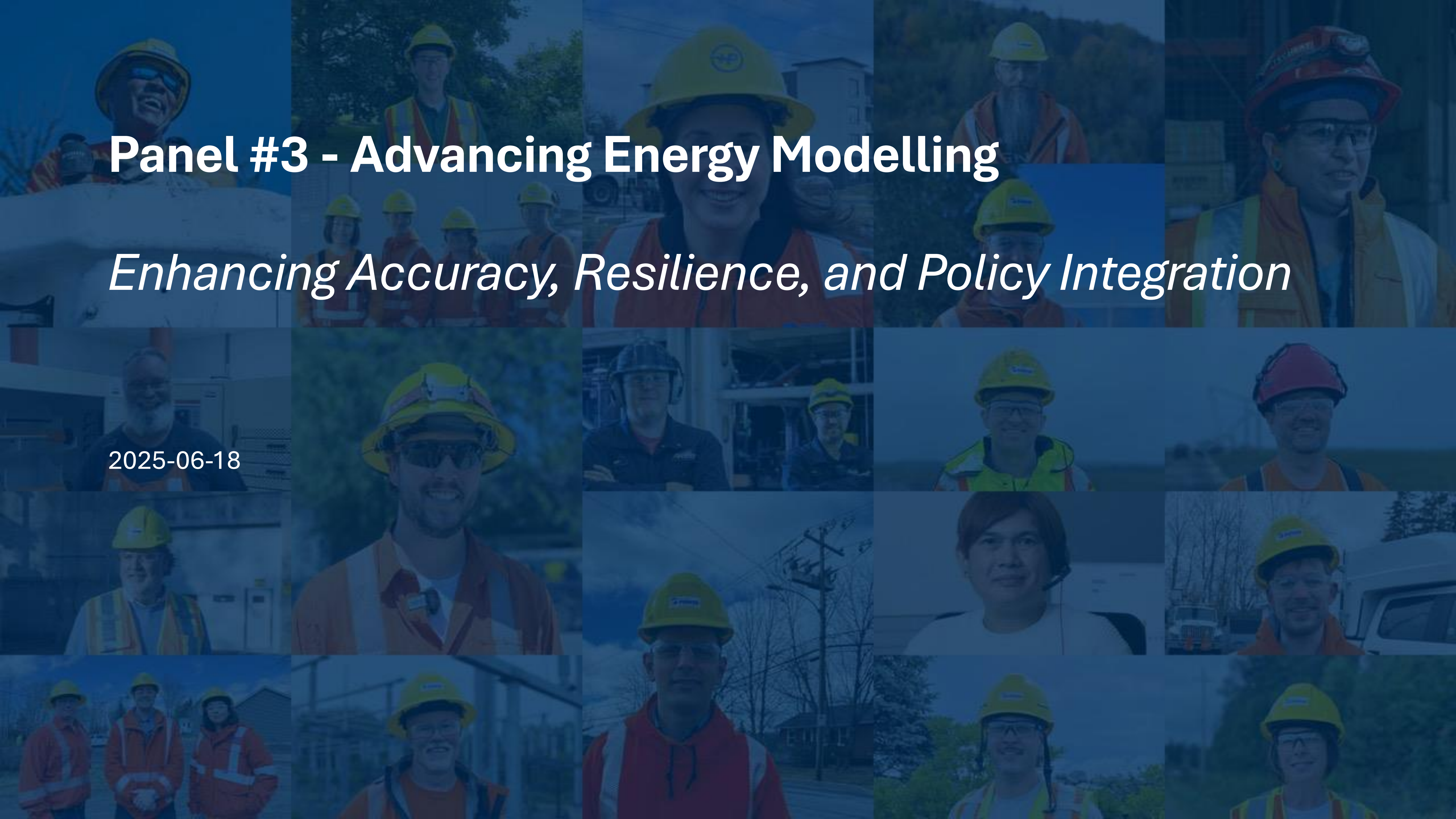
# Panel #3 - Advancing Energy Modelling

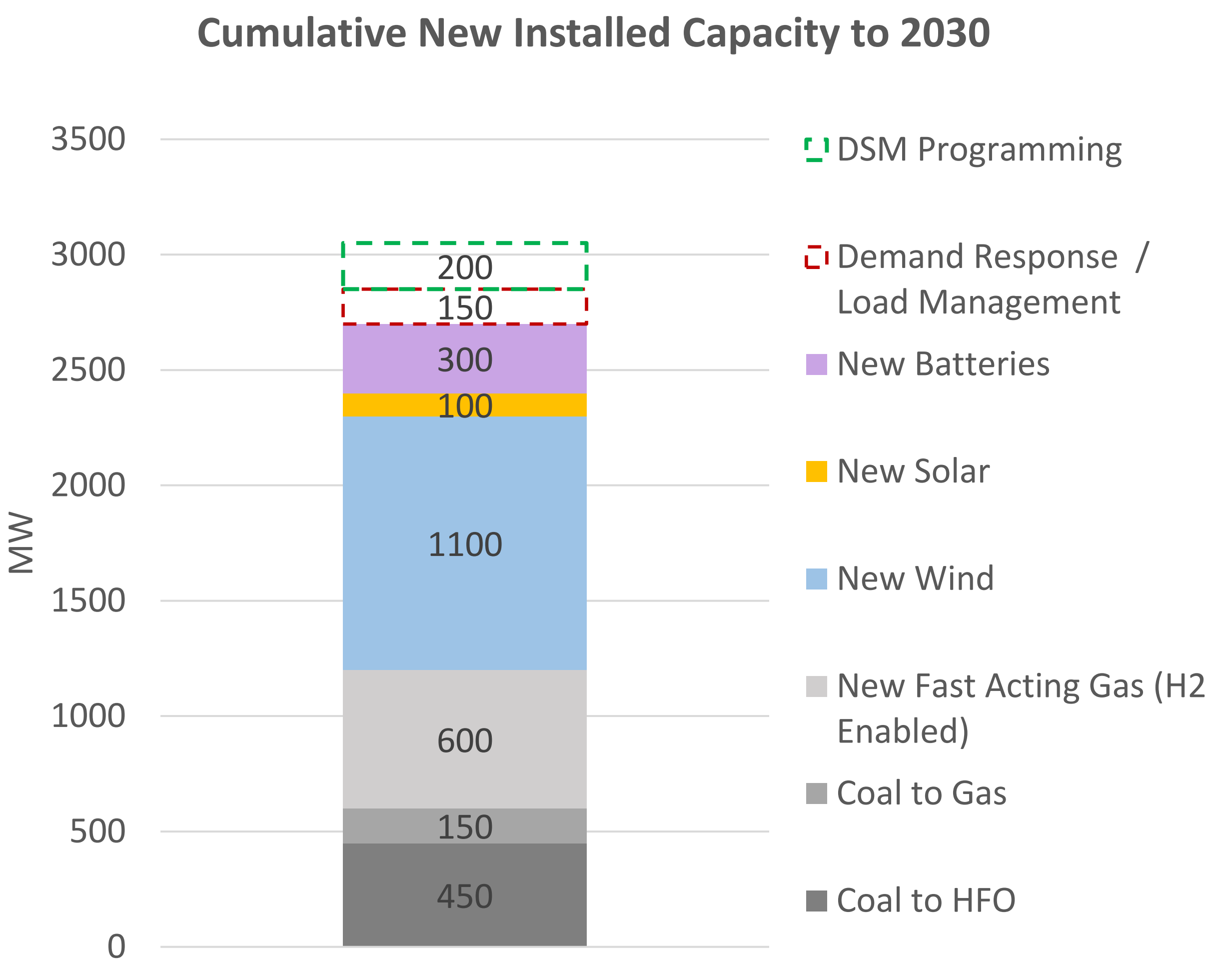
## *Enhancing Accuracy, Resilience, and Policy Integration*

2025-06-18

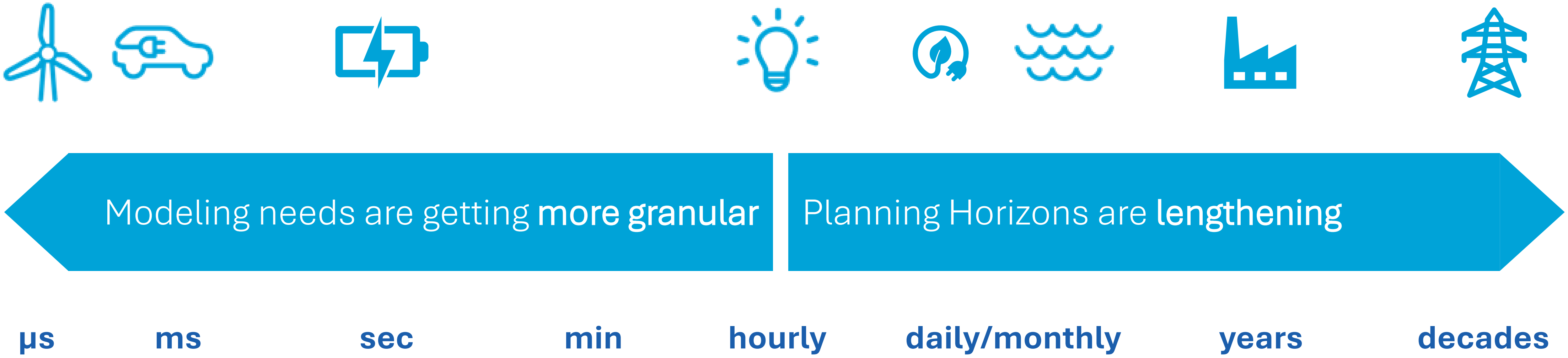


# Nova Scotia's Path to 2030 and Beyond

- NS Power's planning is centered around achieving a major system transformation
- Key Path to 2030 drivers:
  - 2030 coal phase-out
  - 2030 80% Renewable Electricity Sales
- Need to study potential strategic initiatives e.g. offshore wind, large loads, interprovincial transmission expansion (post-2030)
- These require **accurate, adaptable models** to meet decarbonization targets, optimize for long-term affordability, and maintain reliability

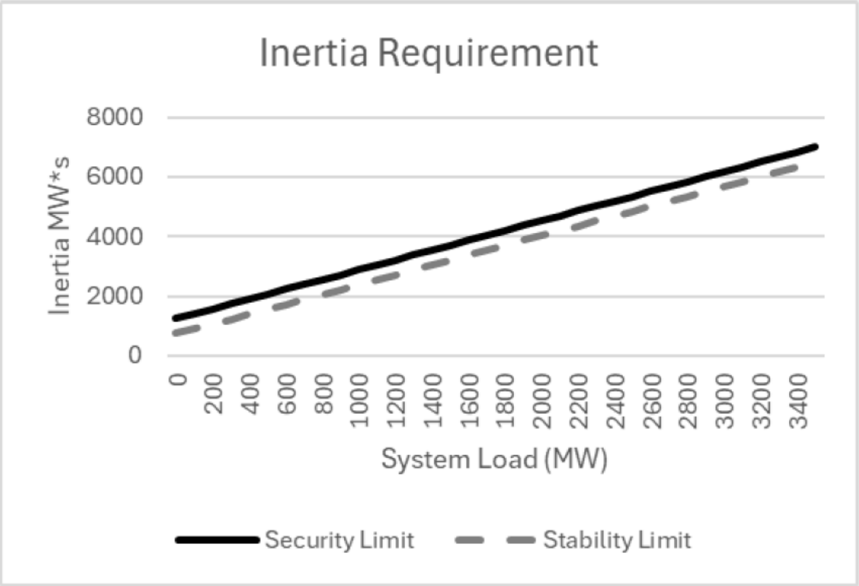


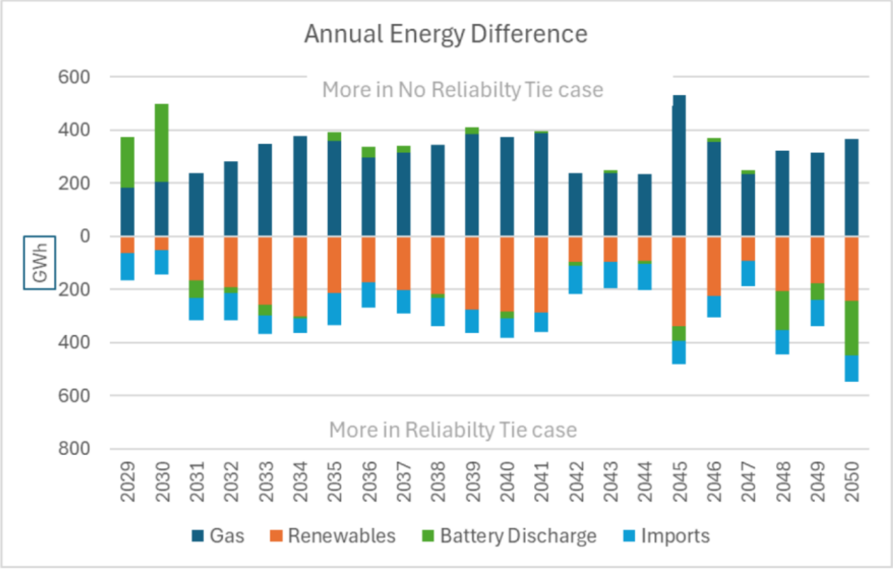
# Modeling Time Horizons are “Stretching”



# Resource Planning Models Enable Grid Investment

- NS Power's resource modeling framework is evolving to better support renewable integration and long-term scenario planning
- Over 2024-25 we have **updated wind integration constraints** that reflect our latest stability analyses
- NS Power is getting ready to use the offshore wind data from **Phase 2 of the Atlantic Canada Offshore Wind Grid Integration and Transmission Study** as it becomes available



# Transmission Planning – Model Quality & Accuracy

- Model Quality continues to increase in focus across the industry due to ongoing reliability events
- In 2024 **NS Power implemented comprehensive Model Requirements and Model Quality Testing processes**
- NS Power's TSIR also address performance issues identified in the NERC alert (e.g. grid forming, fault ride thru, etc.)to the activities required
- The **accuracy of facility models is critical** to planning a reliable high-IBR power system

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## Essential Actions to Industry

Inverter-Based Resource Performance and Modeling

Initial Distribution: May 20, 2025

**NERC is issuing this *Level 3 Alert: Essential Actions for Inverter-Based Resource (IBR)*[1] *Performance and Modeling* to Transmission Owners (TO), Transmission Planners (TP), Planning Coordinators (PC), and currently registered Generator Owners (GO) to enhance technical minimum requirements and study processes to mitigate risks posed by IBR performance during system disturbances.**

**Since 2016, NERC has analyzed numerous major events totaling more than 15,000 MW of unexpected generation reduction. These major events were not predicted through current planning processes. Furthermore, NERC studies were not able to replicate the system and resource behavior that occurred during the events, indicating systemic deficiencies in industry's ability to accurately represent the performance of IBRs and study the effects of IBR on the bulk power system (BPS).**

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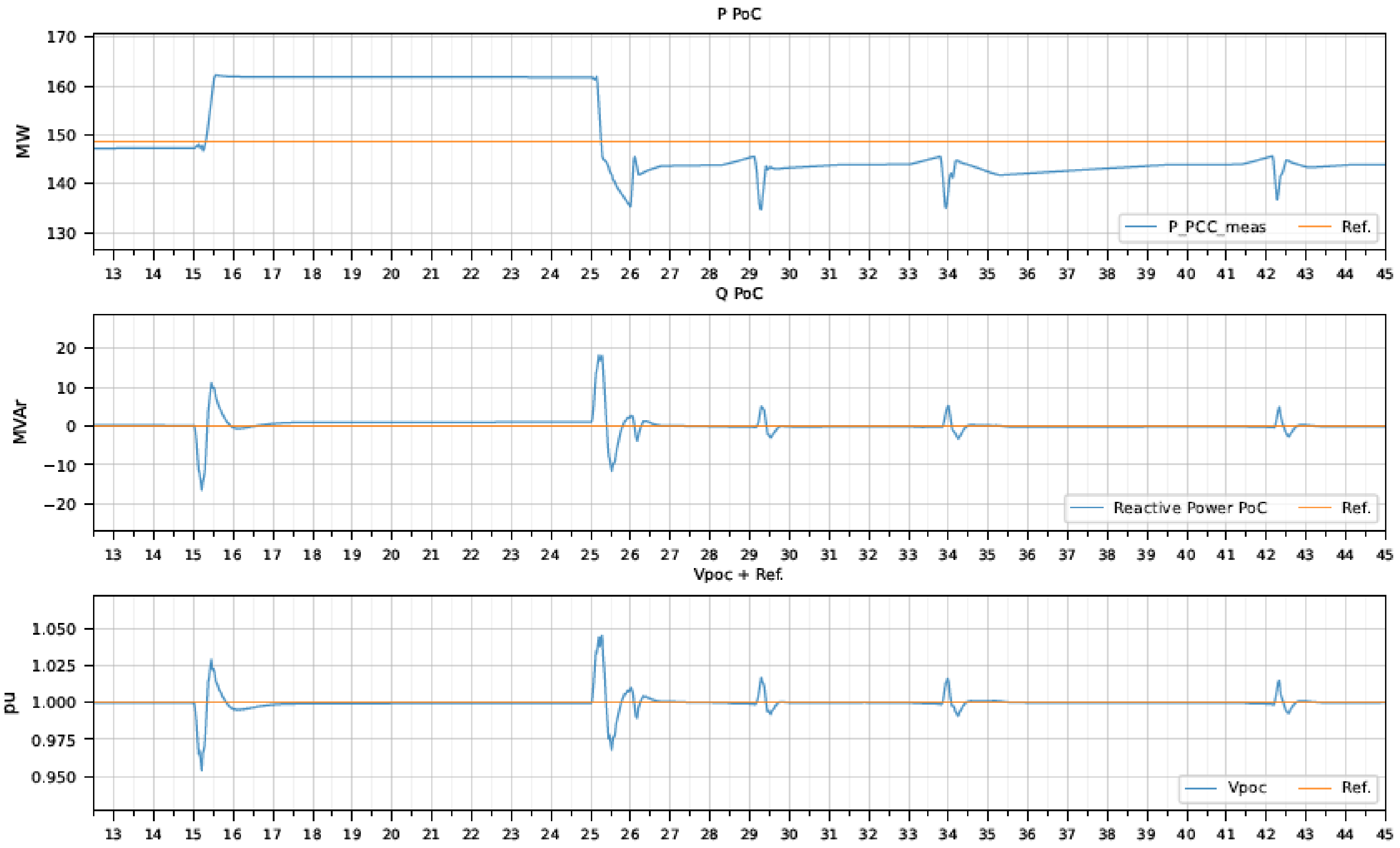
**PSS®E and PSCAD™ Model Requirements**
**NSPI-TPR-015-3**

PSS®E and PSCAD™ Model Requirements

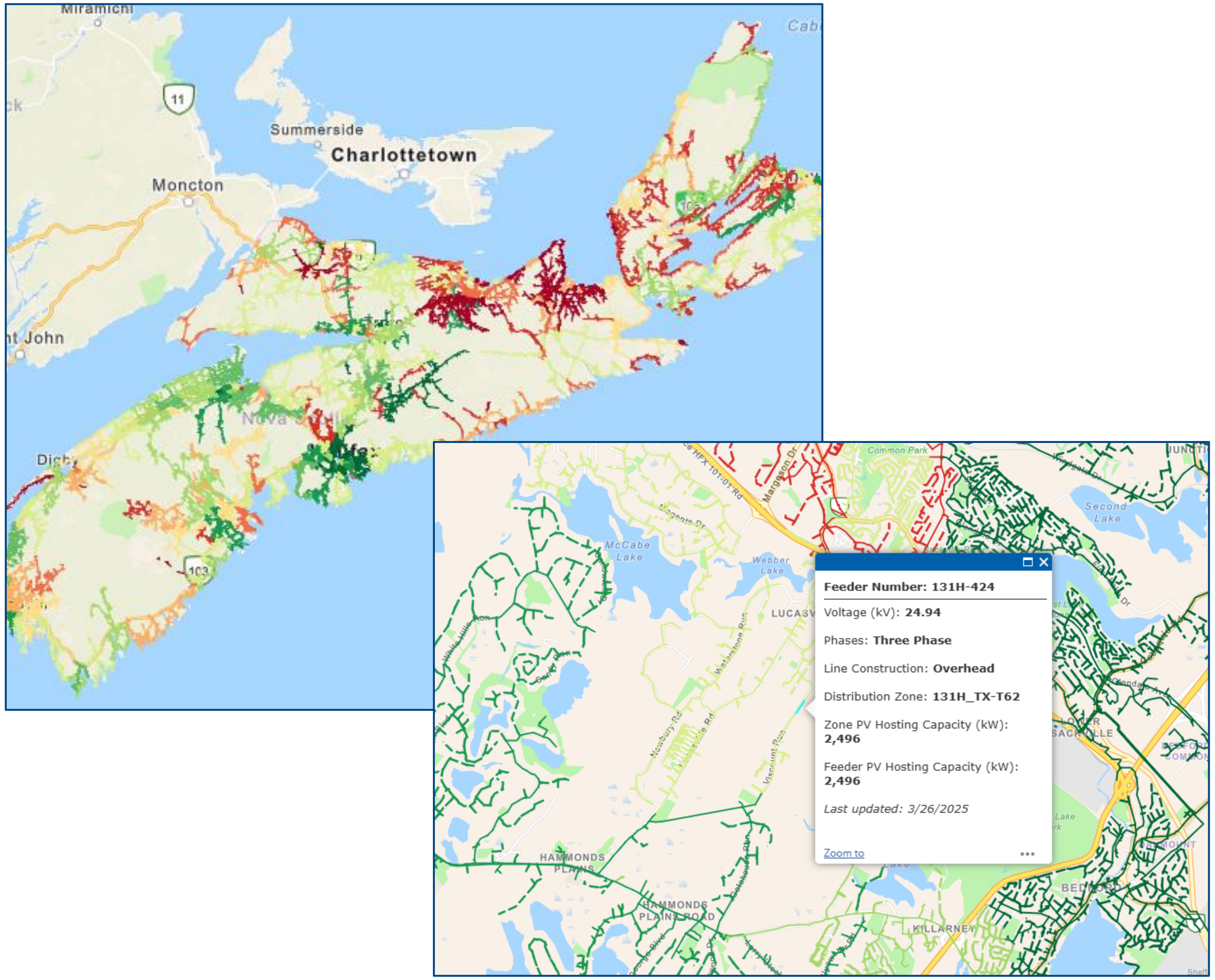
- NSPI-TPR-015-3 PSSE and PSCAD Model Requirements (PDF)
- NSPI-TPR-014-2 Model Quality Testing (PDF)

# Example Model Quality Testing Results



# Distribution Planning – Enhancements and Data

- NS Power is improving the accuracy of Distribution Planning models by **integrating AMI meter data** into CYME models
  - Previous Method: Connected kVA
  - New Method: Individual Load Points
- Improves the accuracy of distribution feeder models and allows for modeling of multiple scenarios more easily (e.g. summer vs. winter peak, low load/high DER generation, etc.)
- Data feeds into NS Power's distribution heat map, an online tool which identifies areas that can accommodate higher penetrations of distribution-connected generation

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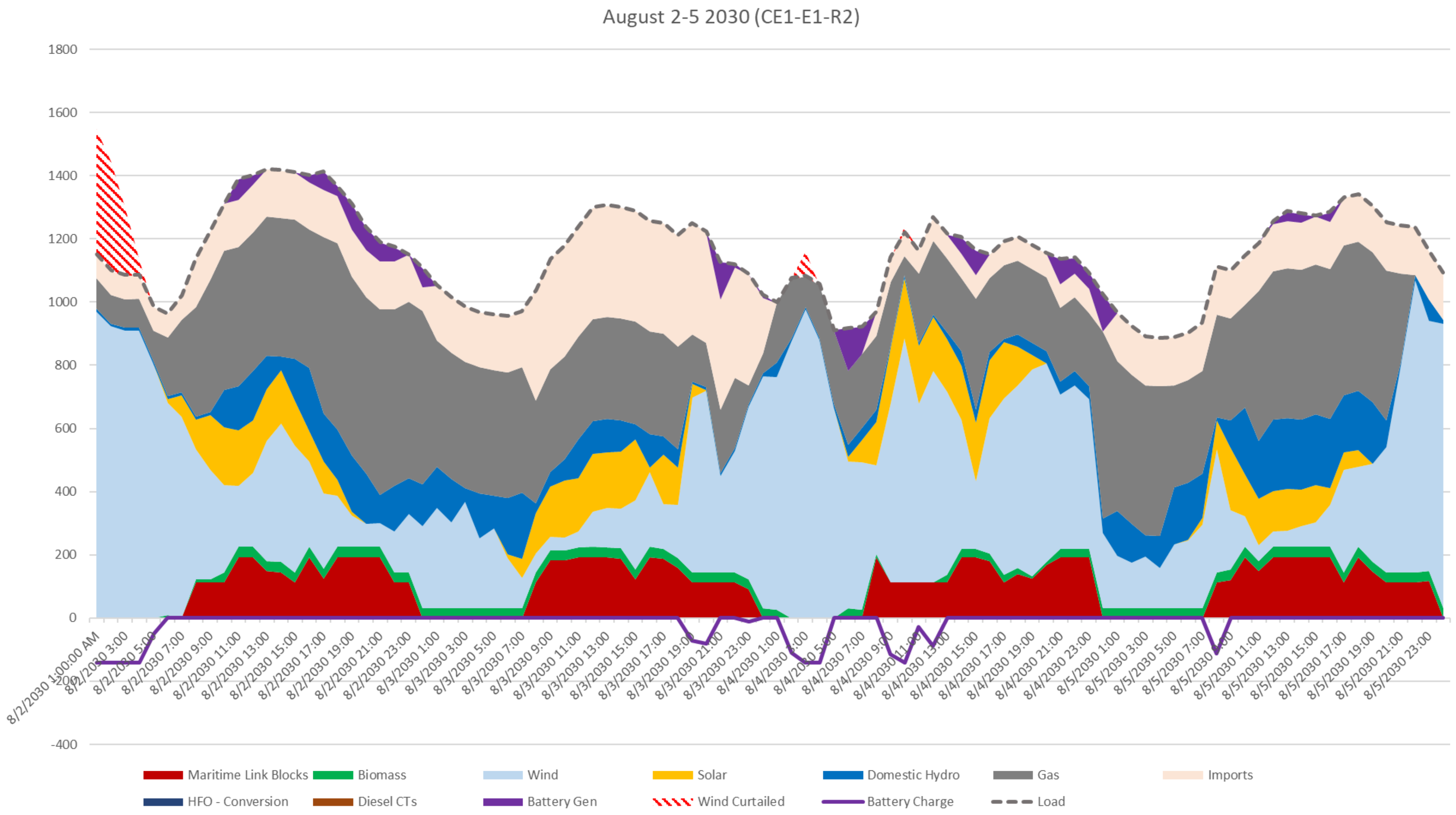
# Integrated Planning Approaches

- As models become more complex, modeling becomes more integrated across domains
- NS Power participates in industry organizations like ESIG which recently released its **Integrated Planning Guidebook** and two related reports

# Putting it all Together – Our Future Power System



# Strategic Takeaways

- Accurate modeling is foundational to enabling **real-world investments**
- System Planning teams are modeling from microseconds to decades and **integrating dynamic, operational, and long-term perspectives**
- Modeling domains are increasingly interdependent: resource, transmission, and distribution planning **will increasingly align** on key inputs and assumptions
- Ongoing **focus on model quality is needed to ensure system reliability**