

SusTech 2014

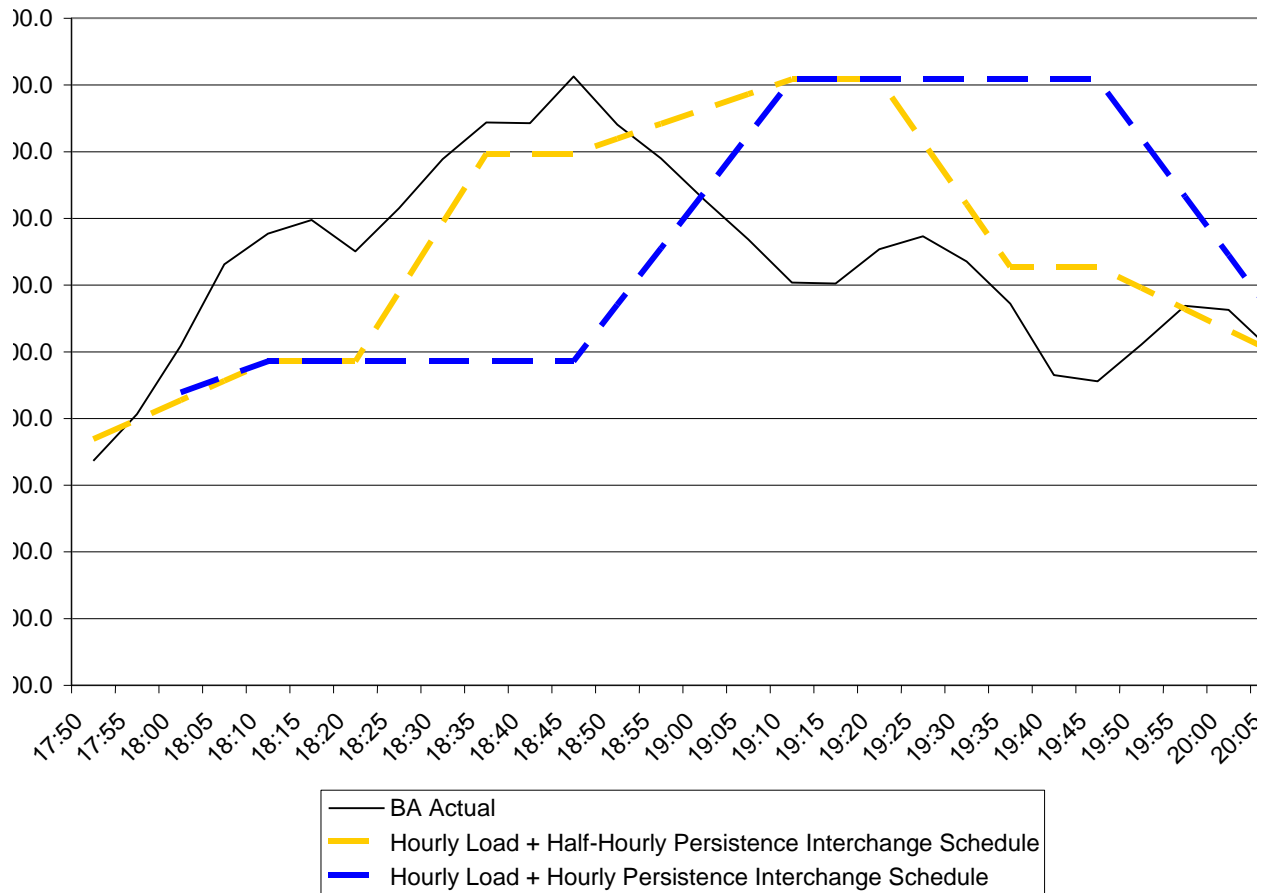
A Methodology to Analyze the
Impact of 30-Minute Wind
Scheduling on Load-Following
Requirements

Why Is This Needed?

- Northwest Power Pool EIM Studies
 - Alternatives to an EIM include scheduling wind generation separately
- PacifiCorp/CalISO EIM
- FERC 764

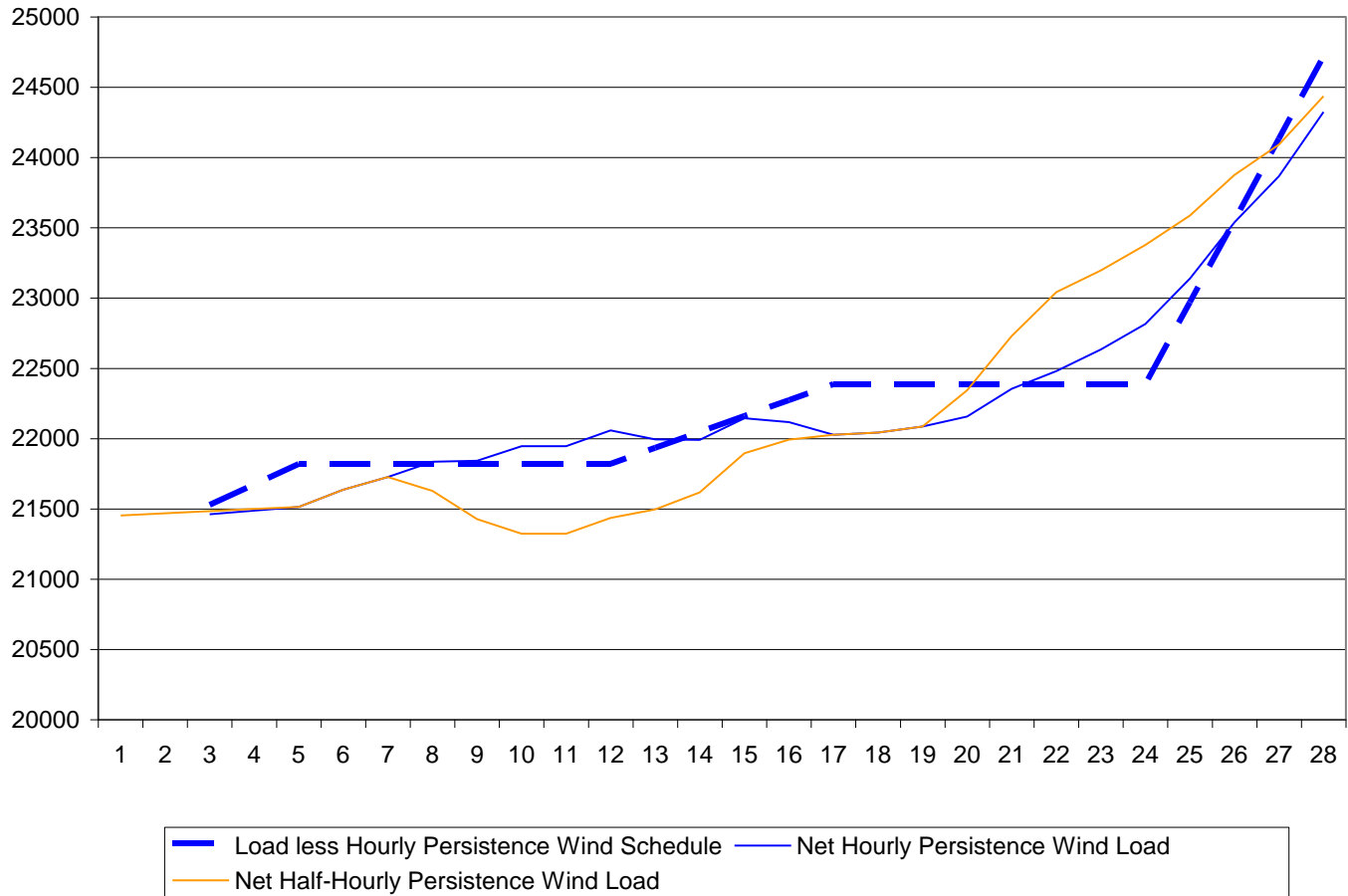
What is the Problem?

- Integrating wind generation into existing scheduling practices poses a challenge
 - Schedules are generally flat hourly blocks
 - Schedules are submitted before the hour
 - Wind has both forecast error and natural deviation from schedule
- Scheduling more frequently reduces the support needed by generators to match the schedule



Generation = Load

- Balancing Authorities (BA) ensures generation equals load for a region
- Reliability Coordinator ensures generation equals to load for an interconnection
- Shorter schedules remove balancing requirements from a BA scheduling wind generation to meet load outside it's borders (source BA)
- Shorter schedules add balancing requirements to the BA where the load is located (sink BA)

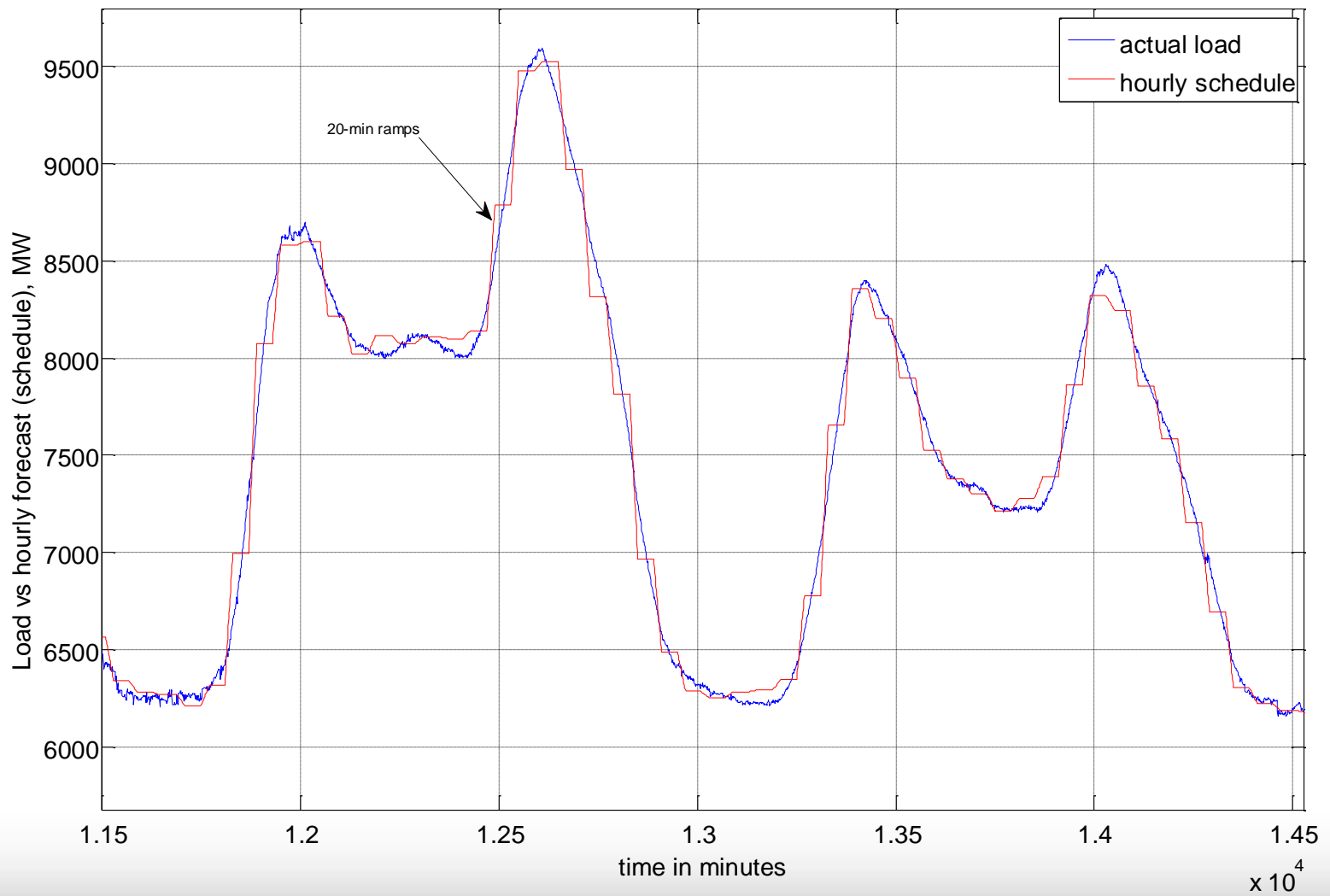


Shifting Intermittency

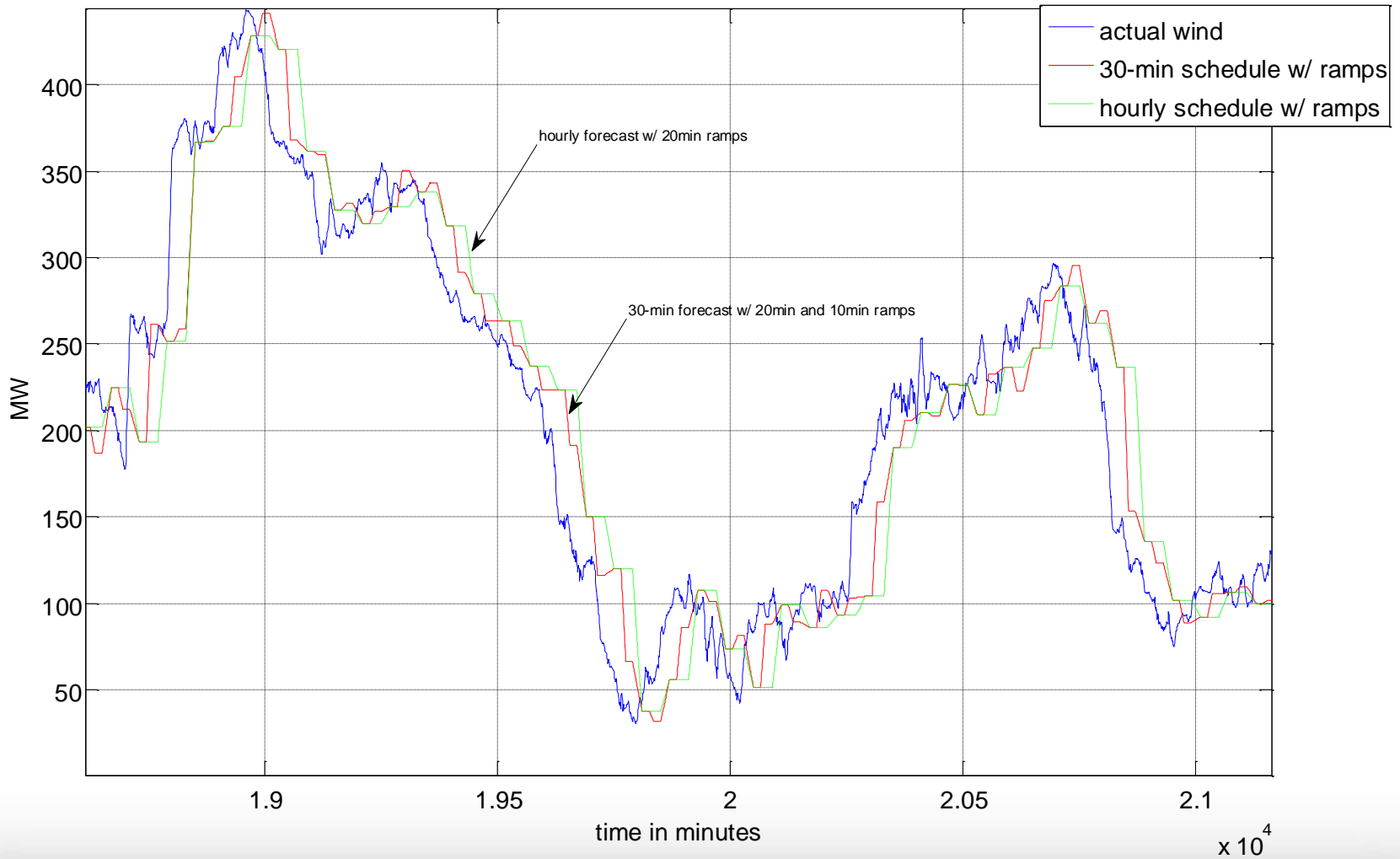
- Changing the scheduling practice will shift some balancing requirement from the source BA to the sink BA
 - Diversity may increase or decrease the overall requirement
 - Internal BA practices in both the source and sink BAs may increase or decrease the cost of balancing the system
- Our method estimates the impacts of shifting intermittency from a source BA containing wind generation to a sink BA containing load

Load Net Wind

- Balancing requirements were estimated using deviations from schedules for load and wind generation
- Net deviations, i.e. the load deviation from schedule plus the wind deviation from schedule must be met by other resources in the BA



Actual wind, 30-min wind schedule and hourly wind schedule

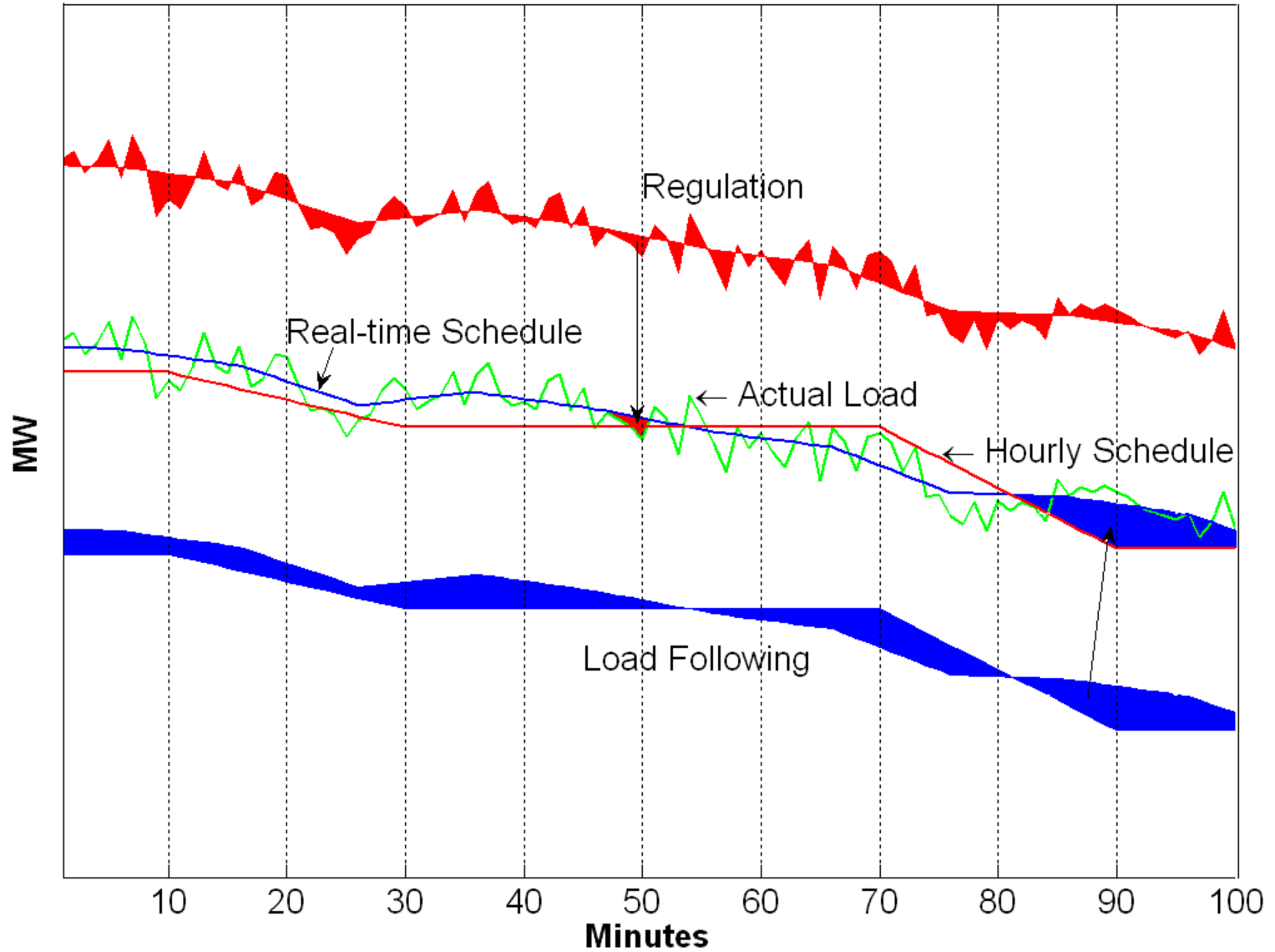


Case Study

- Two BAs in the Western Interconnection who are NWPP Members
- Data are based on historic wind generation and load
- Balancing requirements are calculated based on meeting 95% of deviations in BA
 - Should be more than sufficient to meet NERC standards

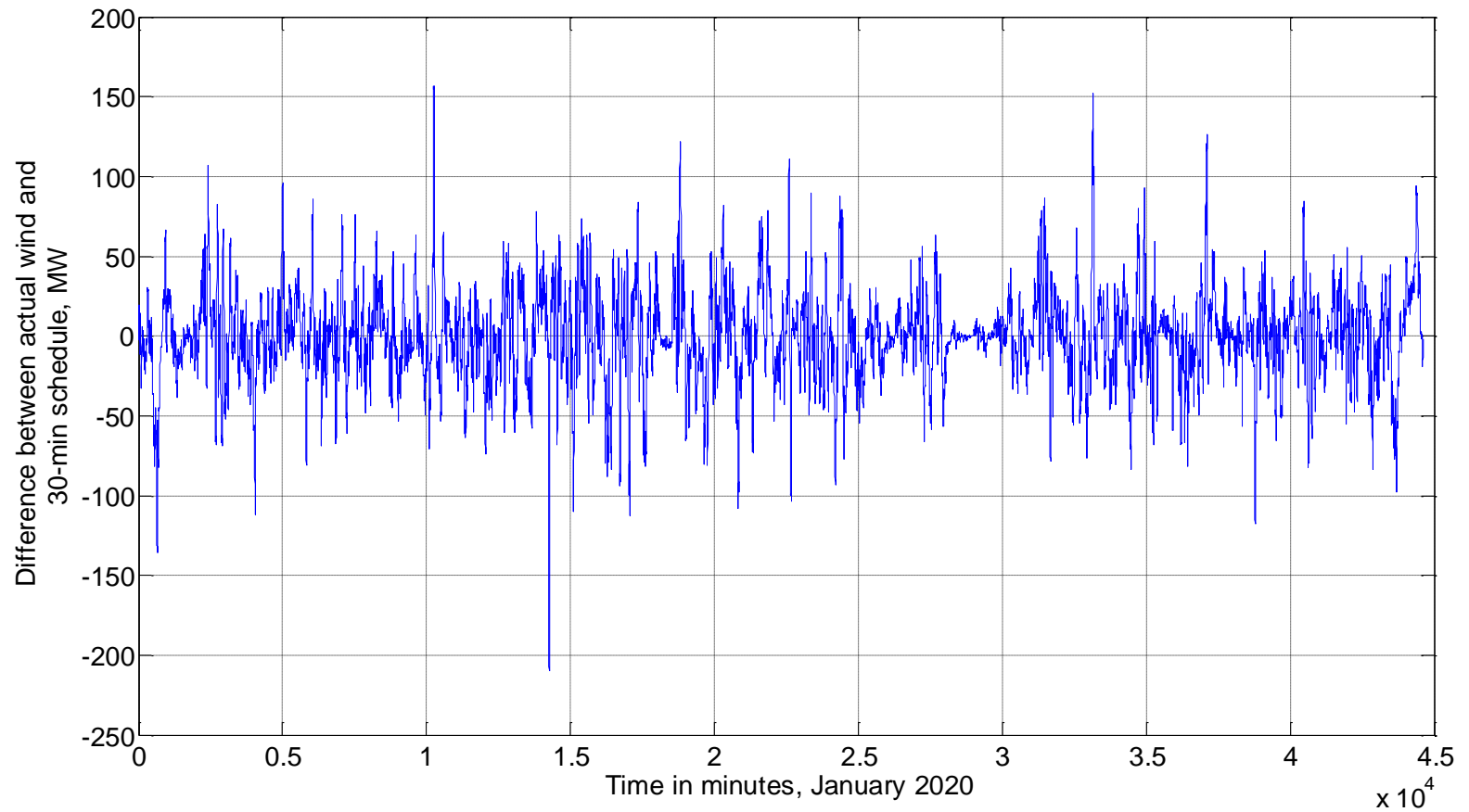
Case Study (cont.)

- Forecasted schedules for wind generation based on persistence 31 minutes before schedule
- Impact estimated on Load Following reserves



Incs and Decs

- Resources used for balancing must be able to increase generation (incs) or decrease generation (decs) based on the BAs current deviation from schedule



Case Study Results

- Slight decrease in both Inc and Decs reserves for source BA (12.39 MW and 10.77 MW respectively)
- Offset by a slight increase in both Incs and Decs in the sink BA (4.08 MW and 6.34 MW)

Potential Implications

- Balancing requirements may be shifted from generators to load with shorter schedules
- Diversity may reduce the overall requirement (as in the case study)
- Existing contracts may assume hourly scheduling

Thank You for your Attention and Interest

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Conservation Council

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