

Wind Integration and Forecasting



Presented to the
Task Force on Wind Energy

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October 4, 2012

History

- First wind integration study - 2007
- Results: \$7.92/MWh for ~500 MW of wind
- Settlement stipulation – Three tiers with integration charges capped at \$6.50/MWh

Current Wind Situation

Wind currently on-line 638 MW

Wind under contract,
but not yet on-line 40 MW

Total 678 MW

Projects under dispute 142 MW

Proposed projects 144 MW

Goals of Current Wind Study

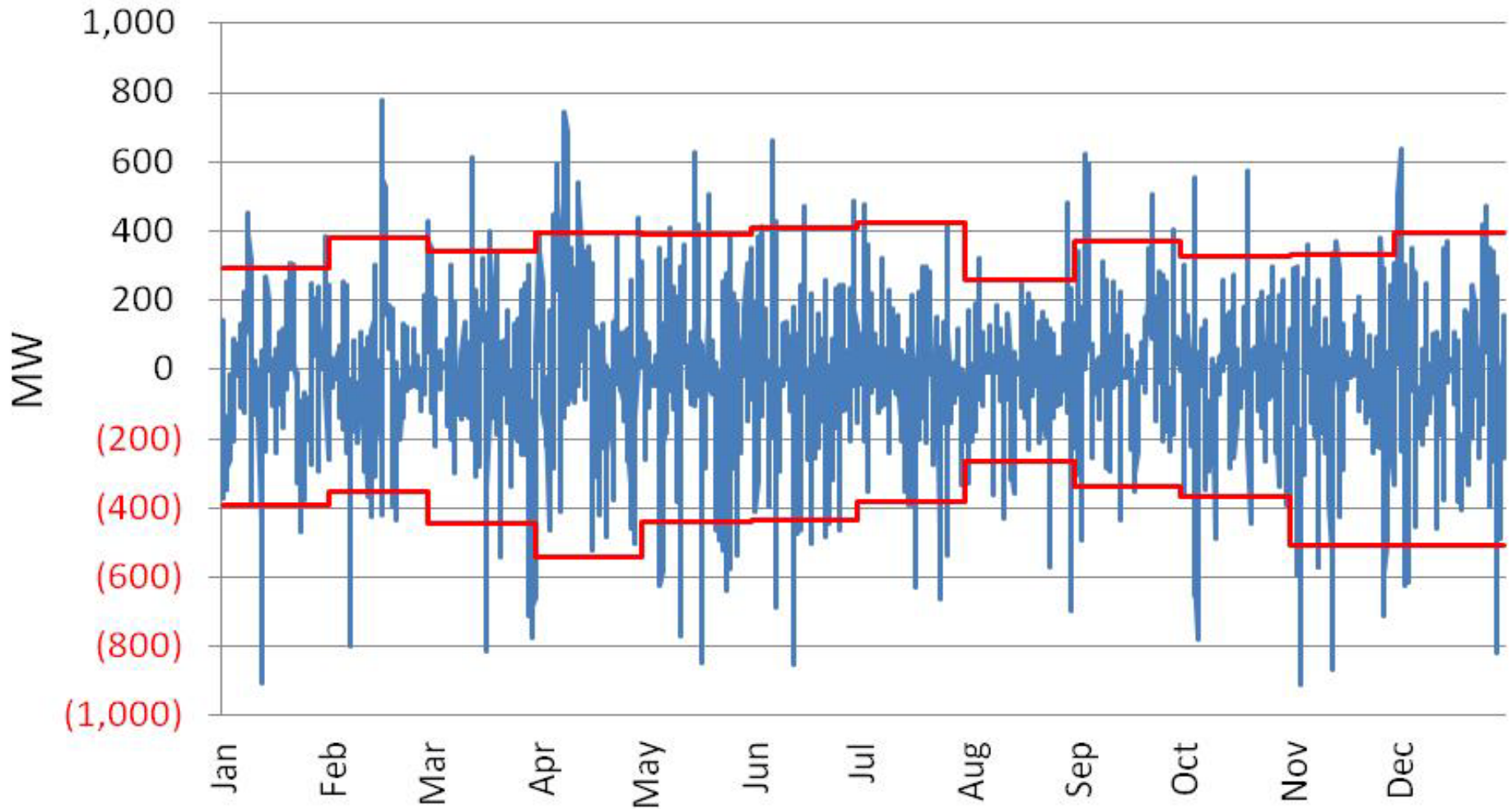
- What is the cost of integrating wind generation on Idaho Power's system?
- Is there a limit to the amount of wind generation Idaho Power's system can accommodate?

Study Parameters

- 2017 study year
- Wind penetration levels of 800, 1,000, and 1,200 MW
- Model dispatched Hells Canyon hydro, coal and gas plants & determined purchases/sales within constraints

Wind Variability

Reserves Necessary with 1,200 MW of Wind (90th Percentile)



General Findings

- As wind penetration increases:
 - Hydro generation decreases (additional spill)
 - Coal generation decreases
 - Net sales increase (due to surplus energy)
 - Gas generation increases (to provide reserves)
 - Frequency and duration of curtailment increases

General Findings

- Problems during low load periods (1,000 to 1,100 MW) because all IPC resources are backed down to minimums
- More wind can be integrated when load is higher
- Integration cost and curtailment begin to increase rapidly at a penetration level of around 800 MW



Wind Integration Cost

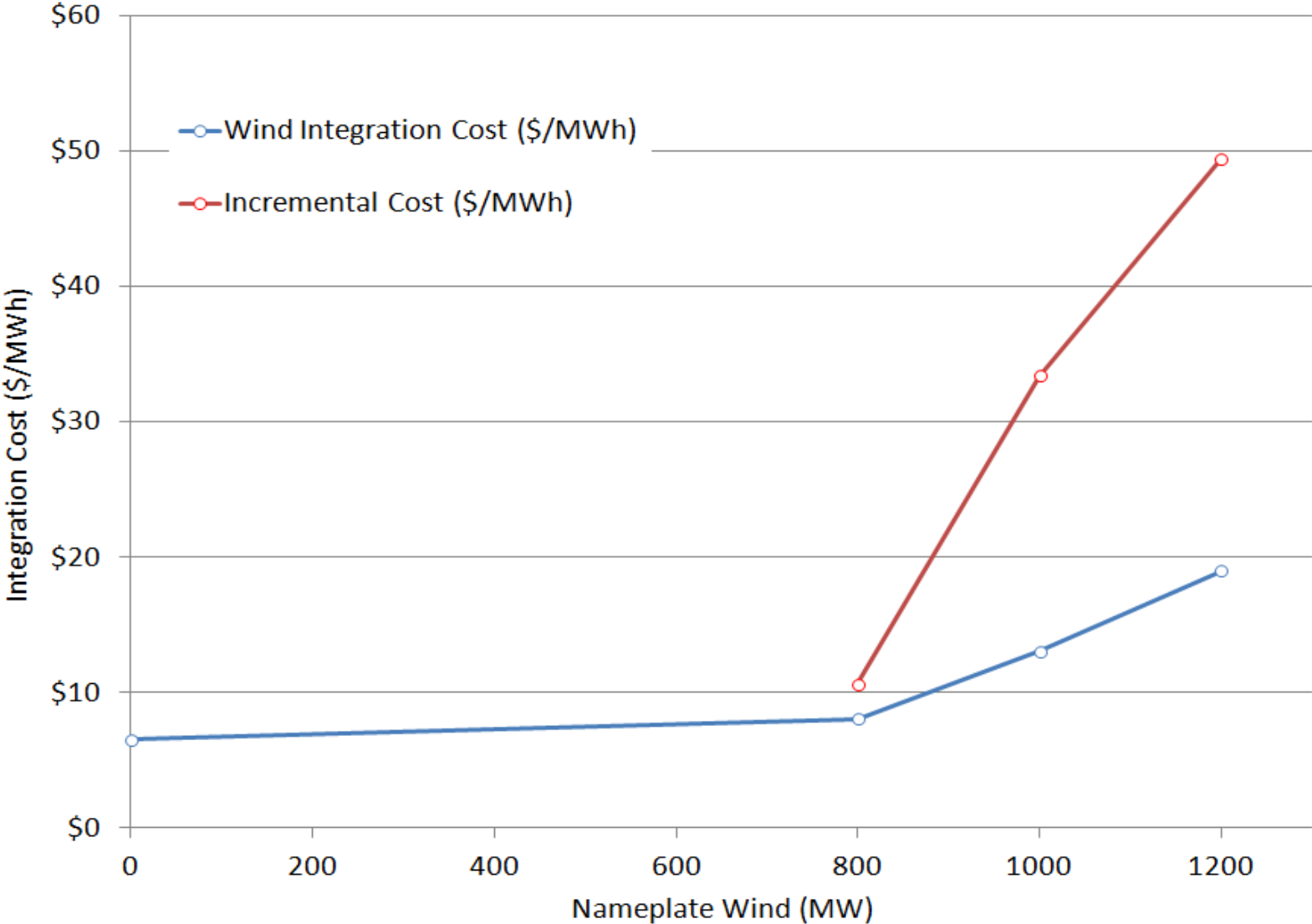
(Dollars per MWh)

Existing Charge \$ 6.50
Settlement stipulation following initial integration study

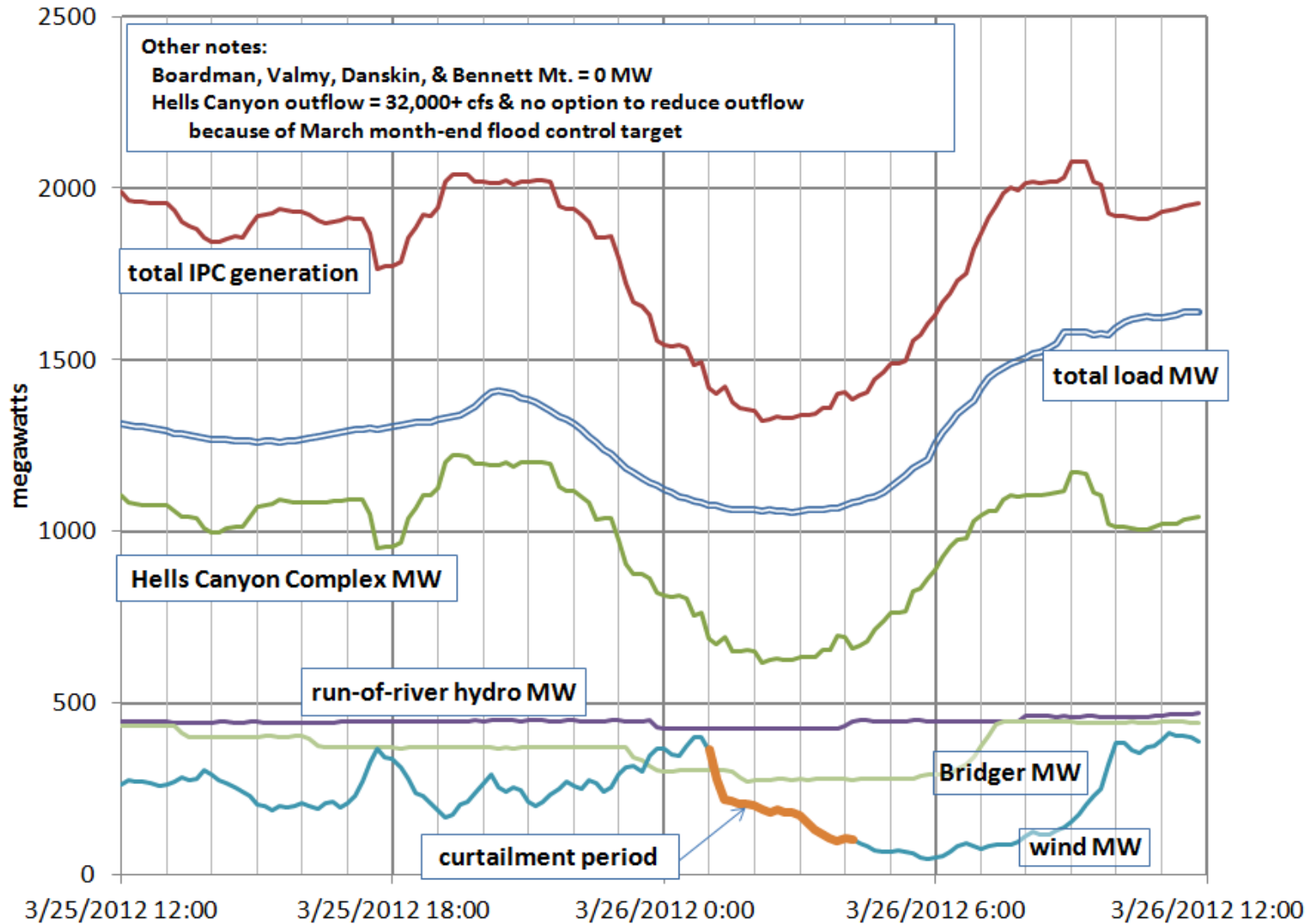
	Average	Incremental ¹
Cost at 800 MW	\$ 8.06	\$10.65
Cost at 1,000 MW	\$13.06	\$33.42
Cost at 1,200 MW	\$19.01	\$49.46

¹ Incremental cost is the estimated charge to account for existing contracts that are only paying \$6.50/MWh. These amounts would be necessary to keep customers whole if existing contracts are not amended.

Wind Integration Cost



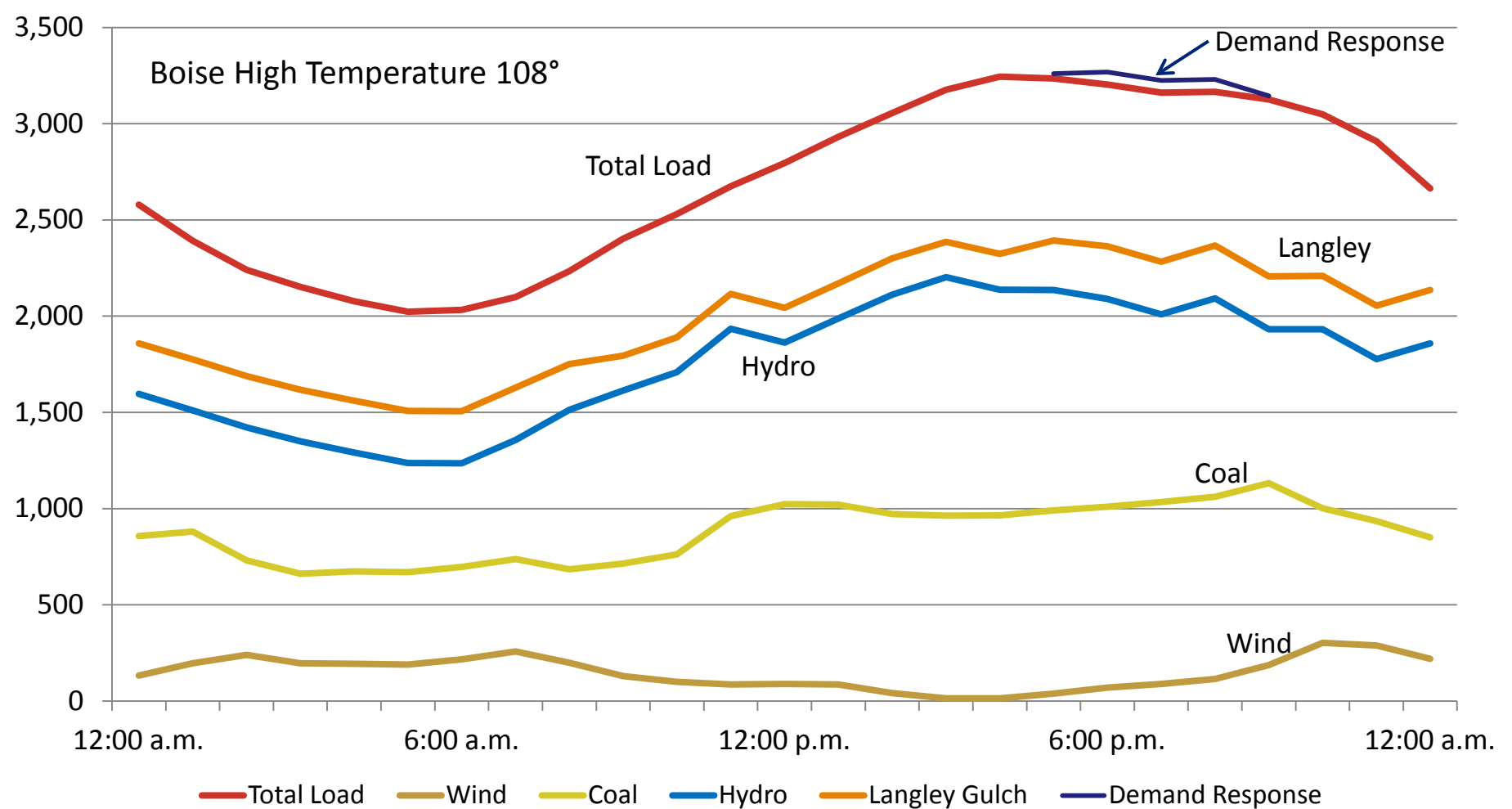
March 25-26, 2012



Summer Peak

Load and Resources

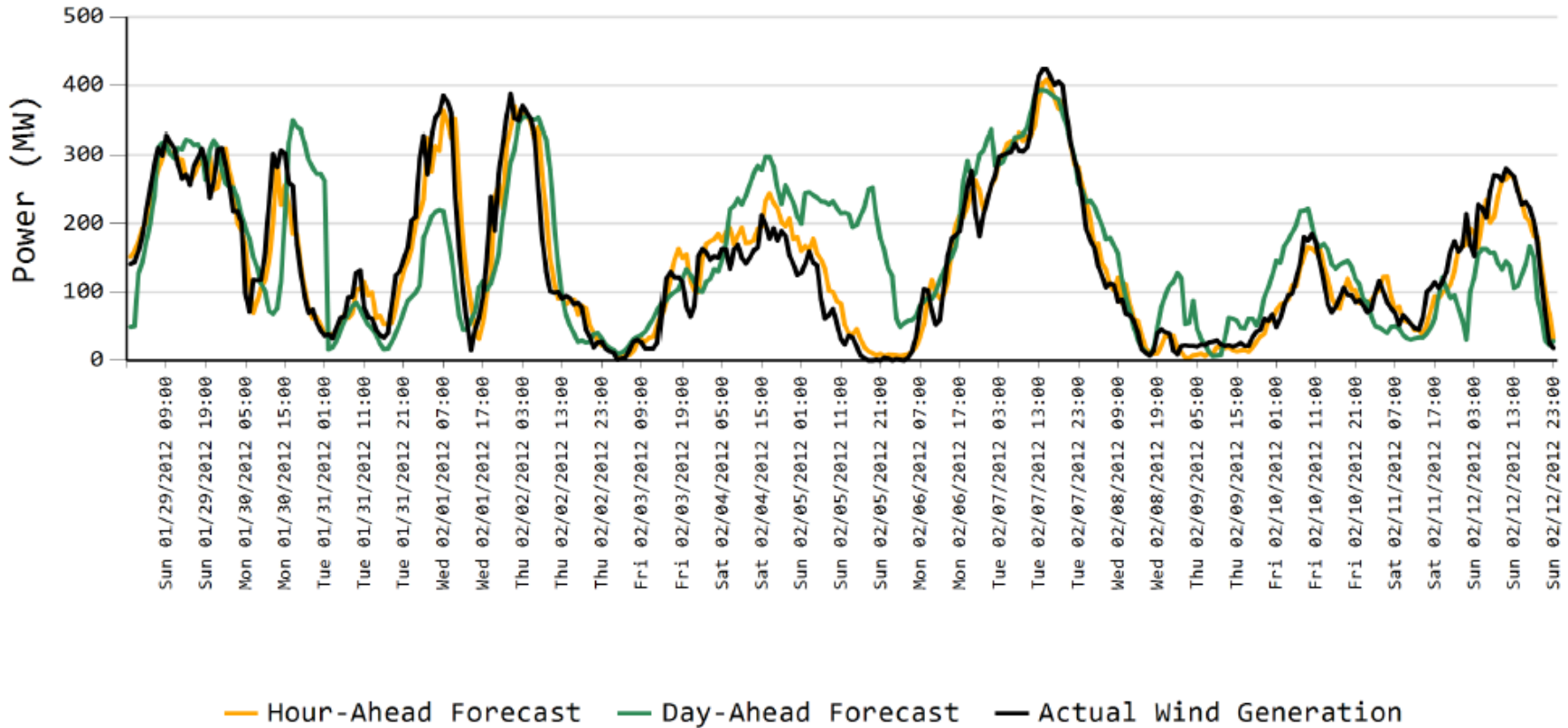
3,245 MW - July 12, 2012



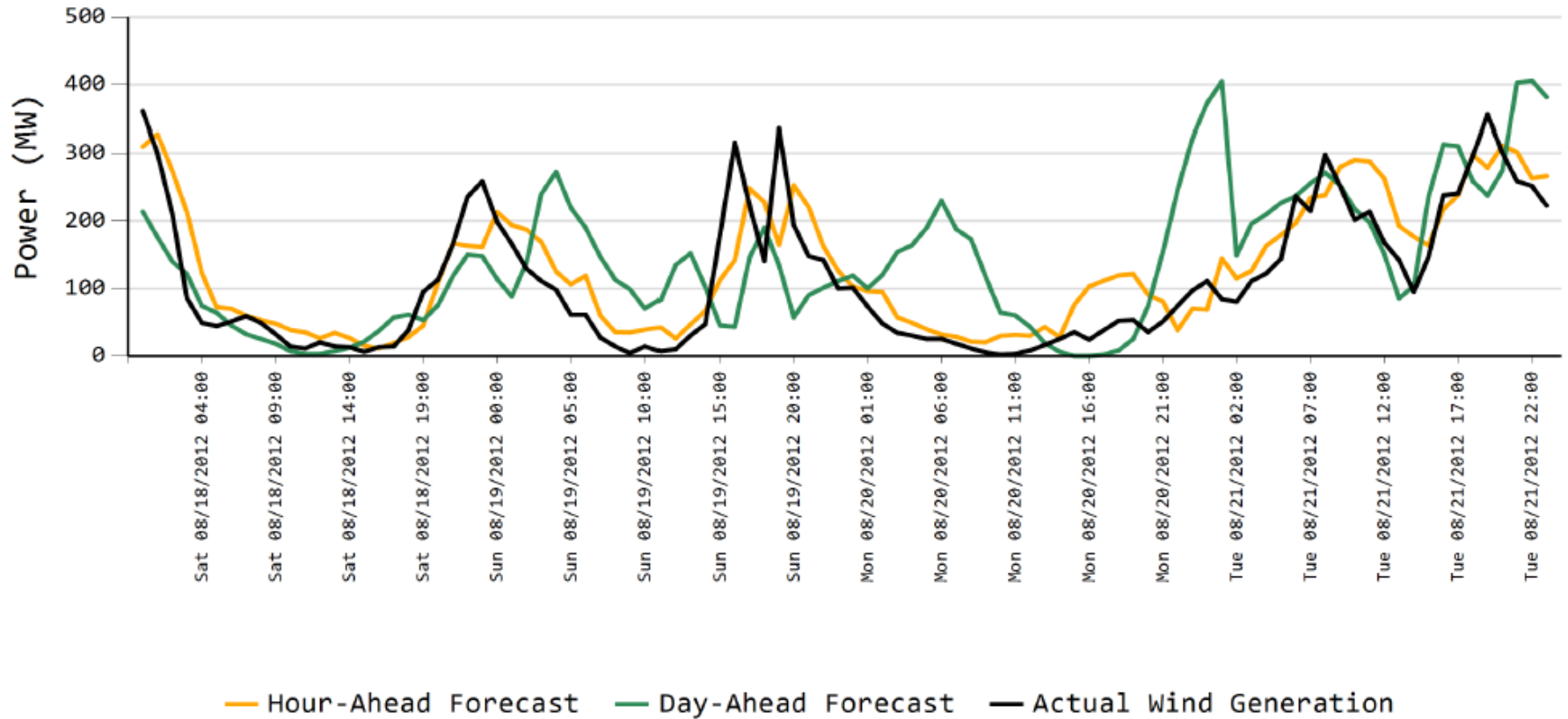
Wind Forecasting



Some Days Are Good...

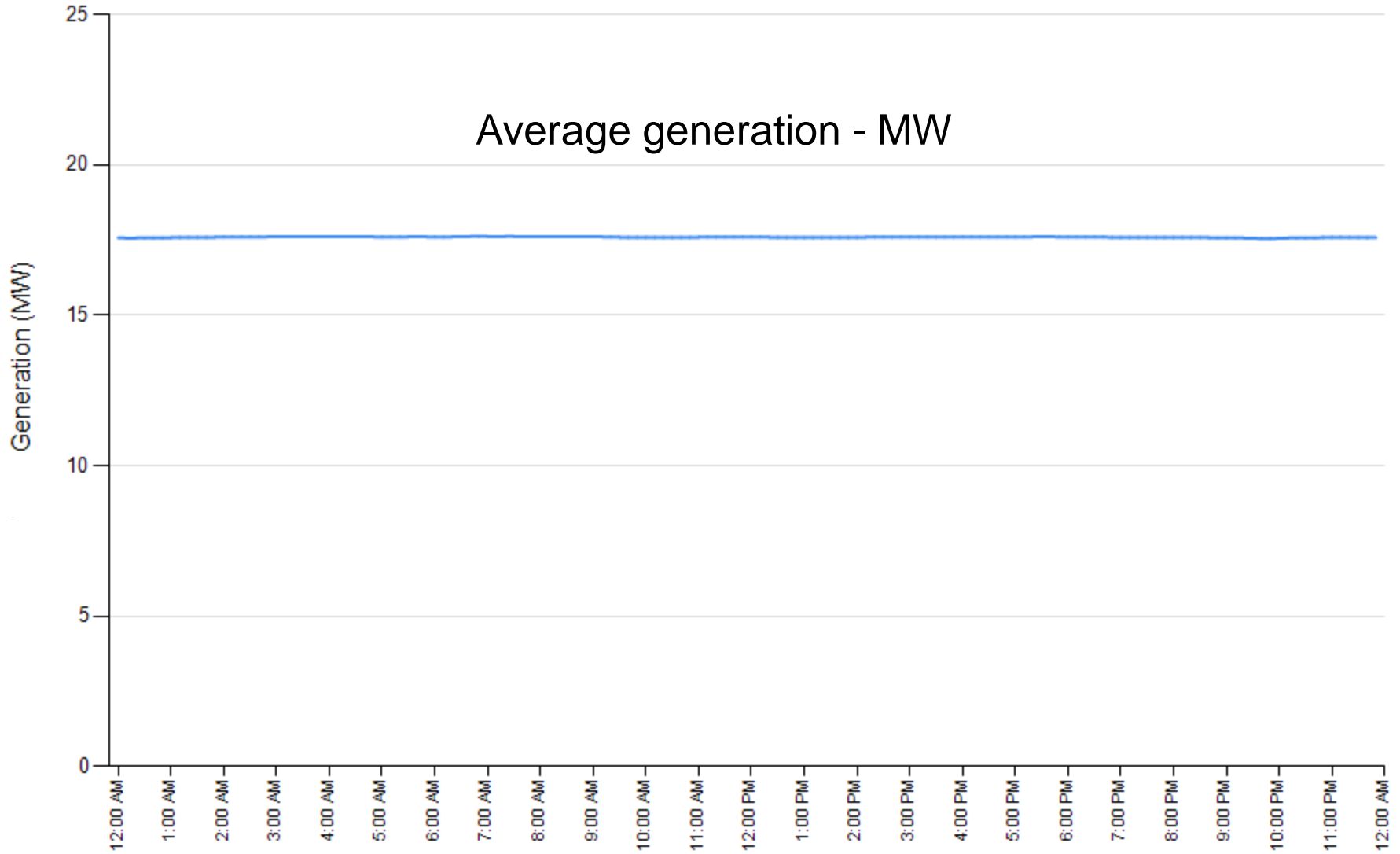


And Some Aren't So Good



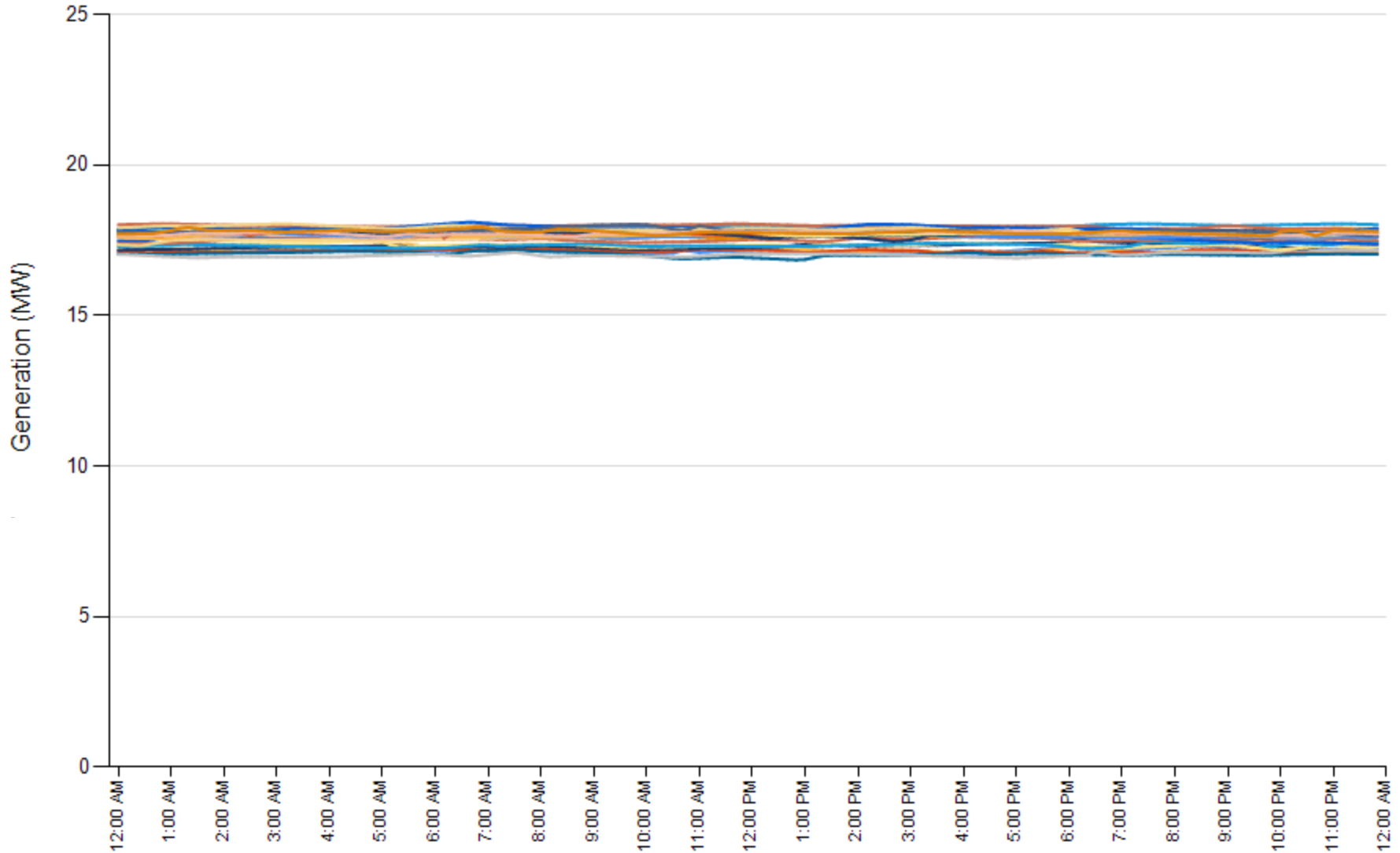
February 2012

Upper Salmon B



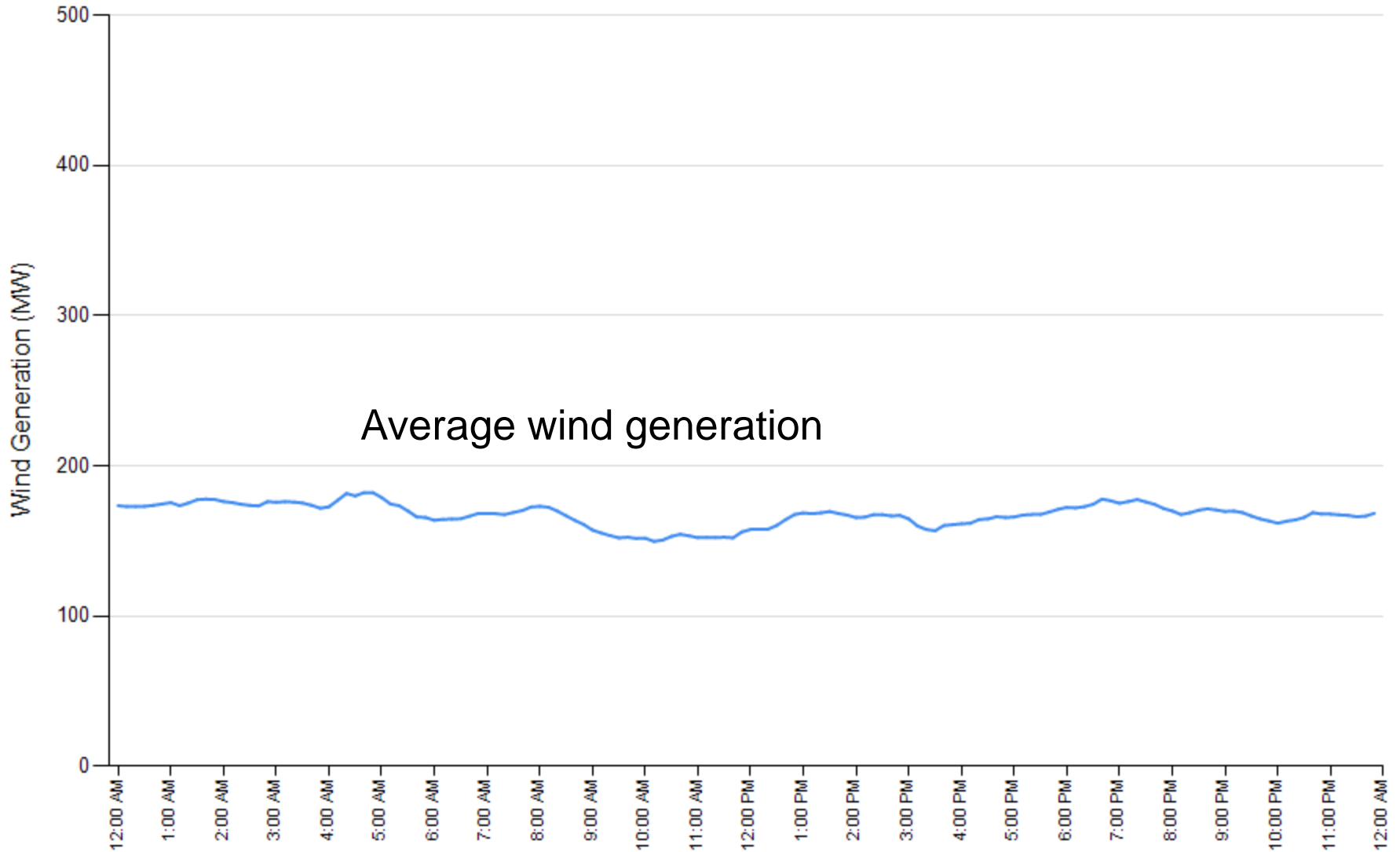
February 2012 – 29 days

Upper Salmon B



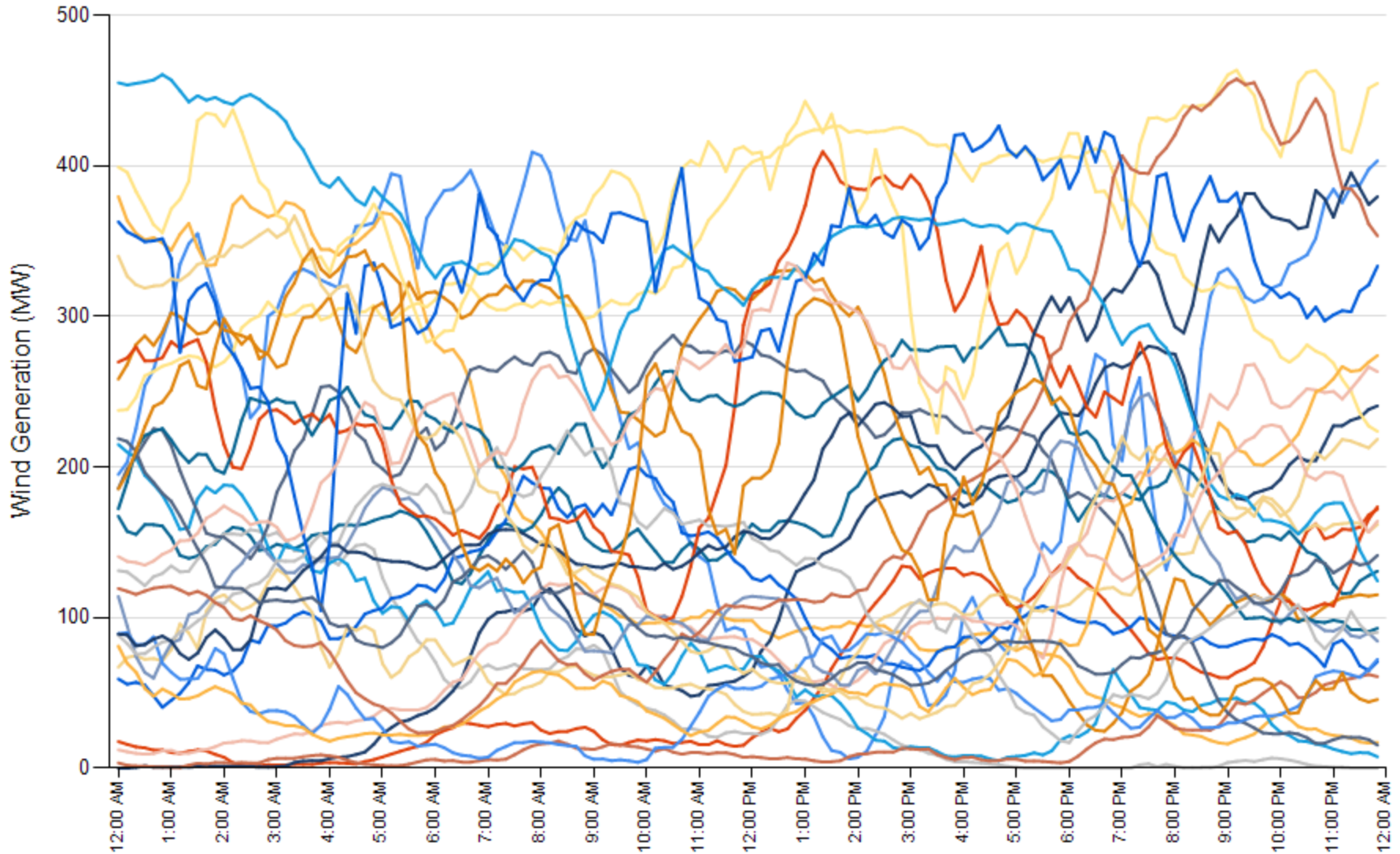
February 2012

Wind Generation



February 2012 – 29 days

Wind Generation



Questions?

