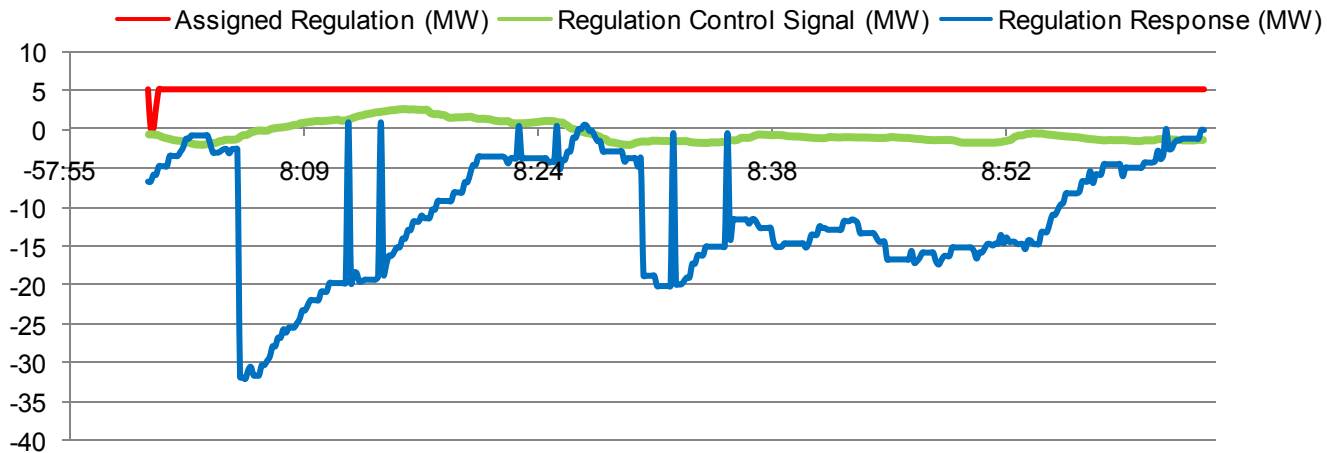


RPSTF Update to the OC

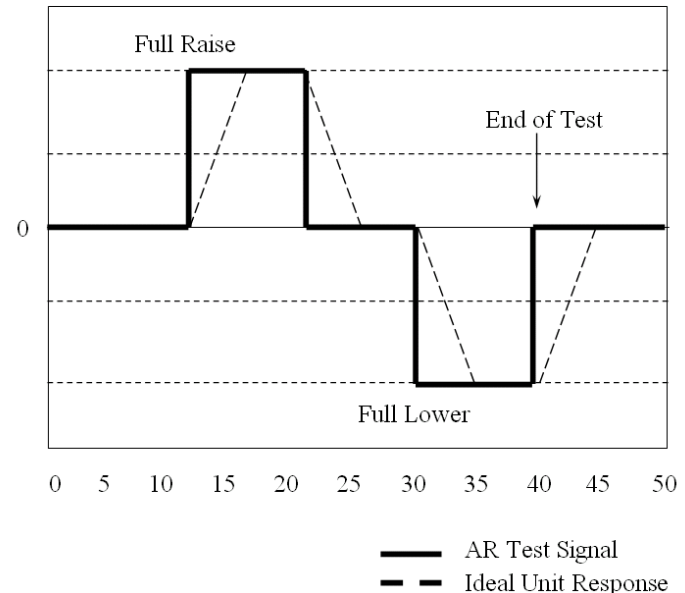
Rus Ogburn
PJM Interconnection
August 2011

- We currently do not distinguish between various levels of regulation performance
- We currently meet all of our reliability requirements (CPS1 and BAAL) but more accurate control will allow us to do so more economically.
- More accurate regulation response relative to our control signals will allow us to procure less regulation capacity.
- We may be able to better align our regulation requirements with our control needs.

- Our current verification process requires significant manual interpretation of the regulation data to determine performance.
 - No bright line criteria for on-going performance.
- Performance is not as good as it should be.



- Testing regulation resources while they are providing regulation disrupts operations and can conflict with system control.
- Automated performance metrics will provide the foundation for on-going resource qualification, performance-based incentives, and feedback to regulation resources.

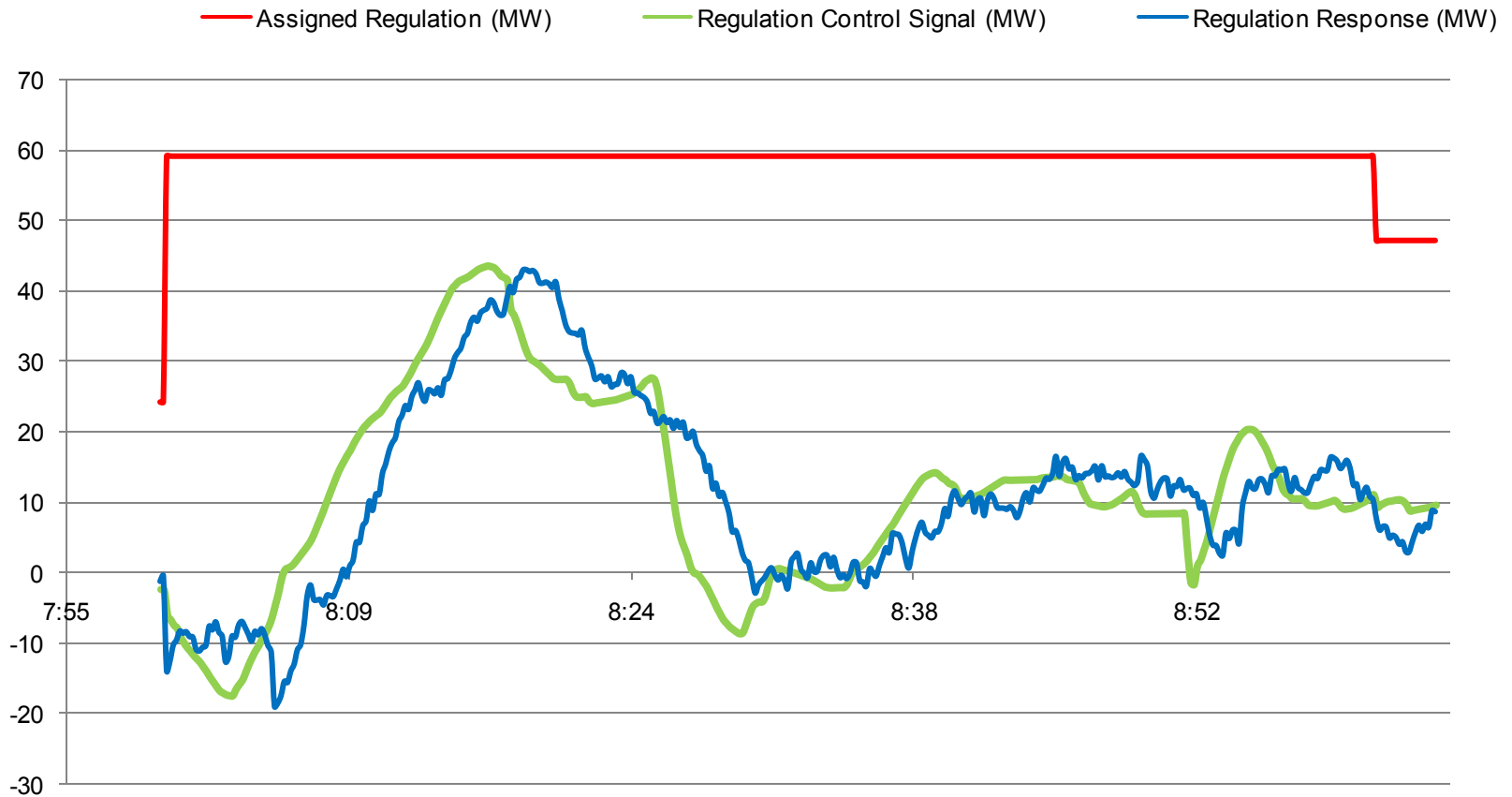


- 1) Correlation between control signal and response
 - 5 minute rolling correlation with 10 second granularity
 - Re-calculated with a 10 second time shift up to 5 minutes
- 2) Time delay between control signal and point of highest correlation from Step 1.
 - Up to 5 minutes
- 3) Difference between the area under the curve for the regulation signal and the response.

NOTE: A different weighting for each factor may be used.

Performance Factor Examples

Using Equal Weighing

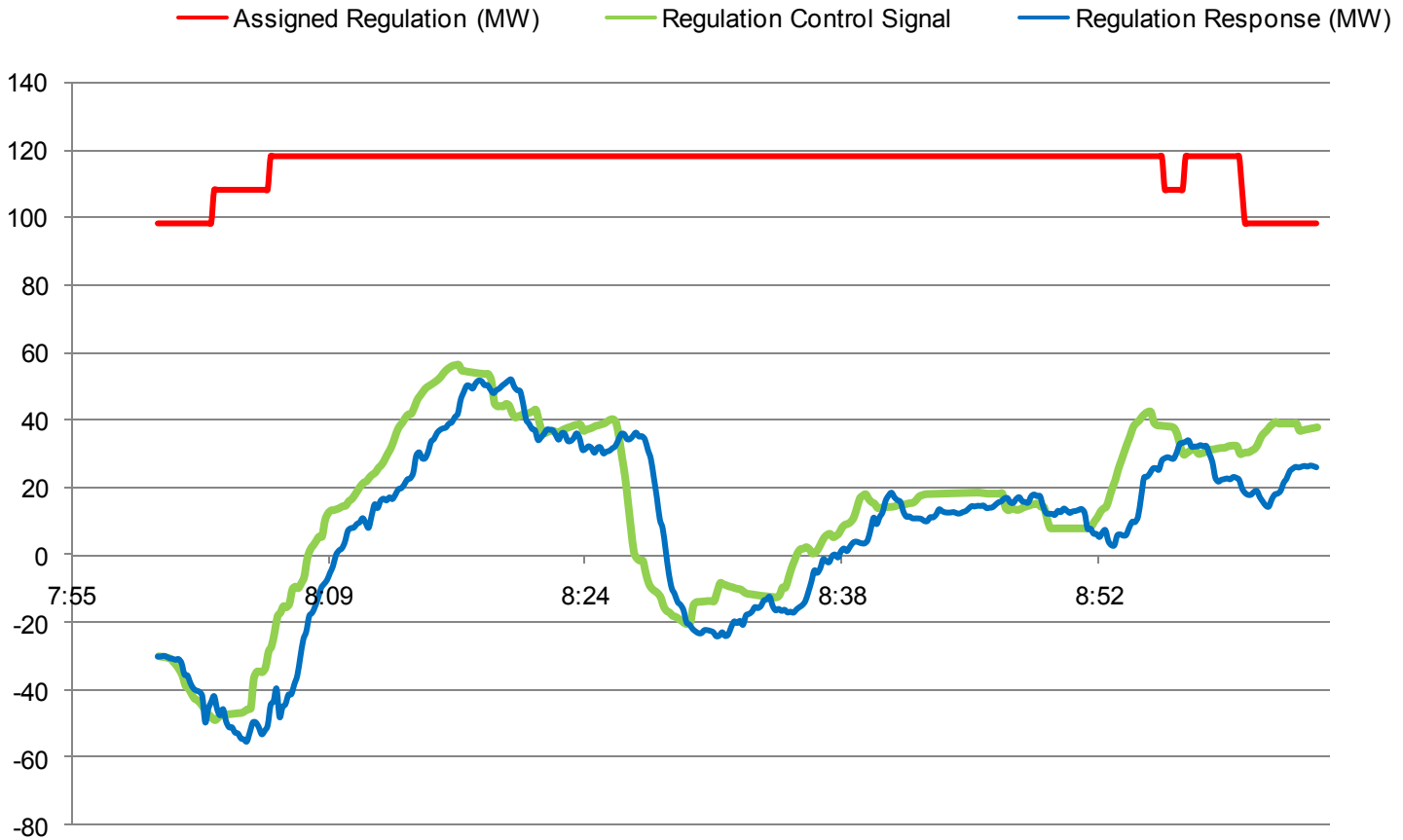


Correlation: 0.82

Delay: 0.54

Precision: 0.69

Total: 0.68

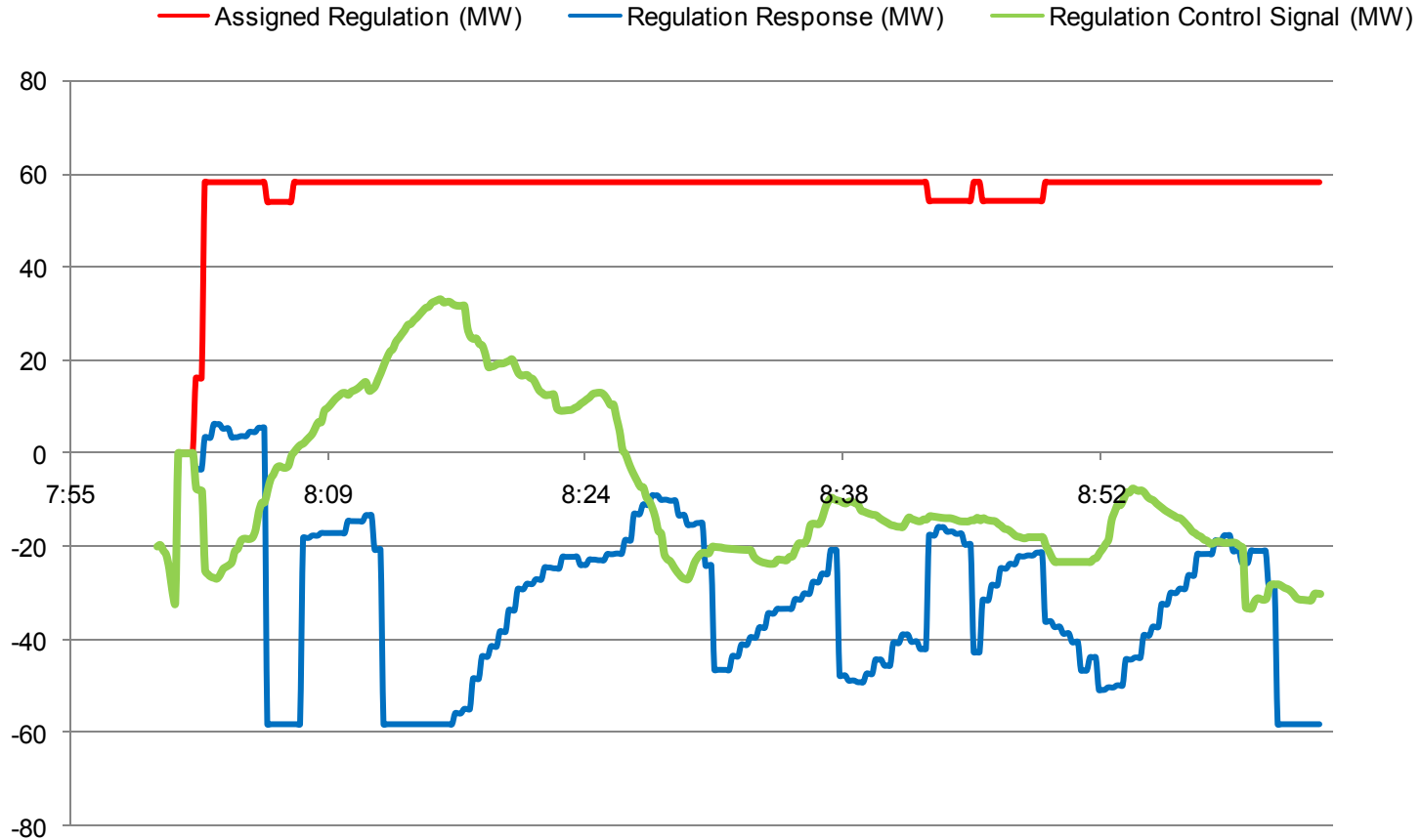


Correlation: 0.92

Delay: 0.63

Precision: 0.68

Total: 0.74

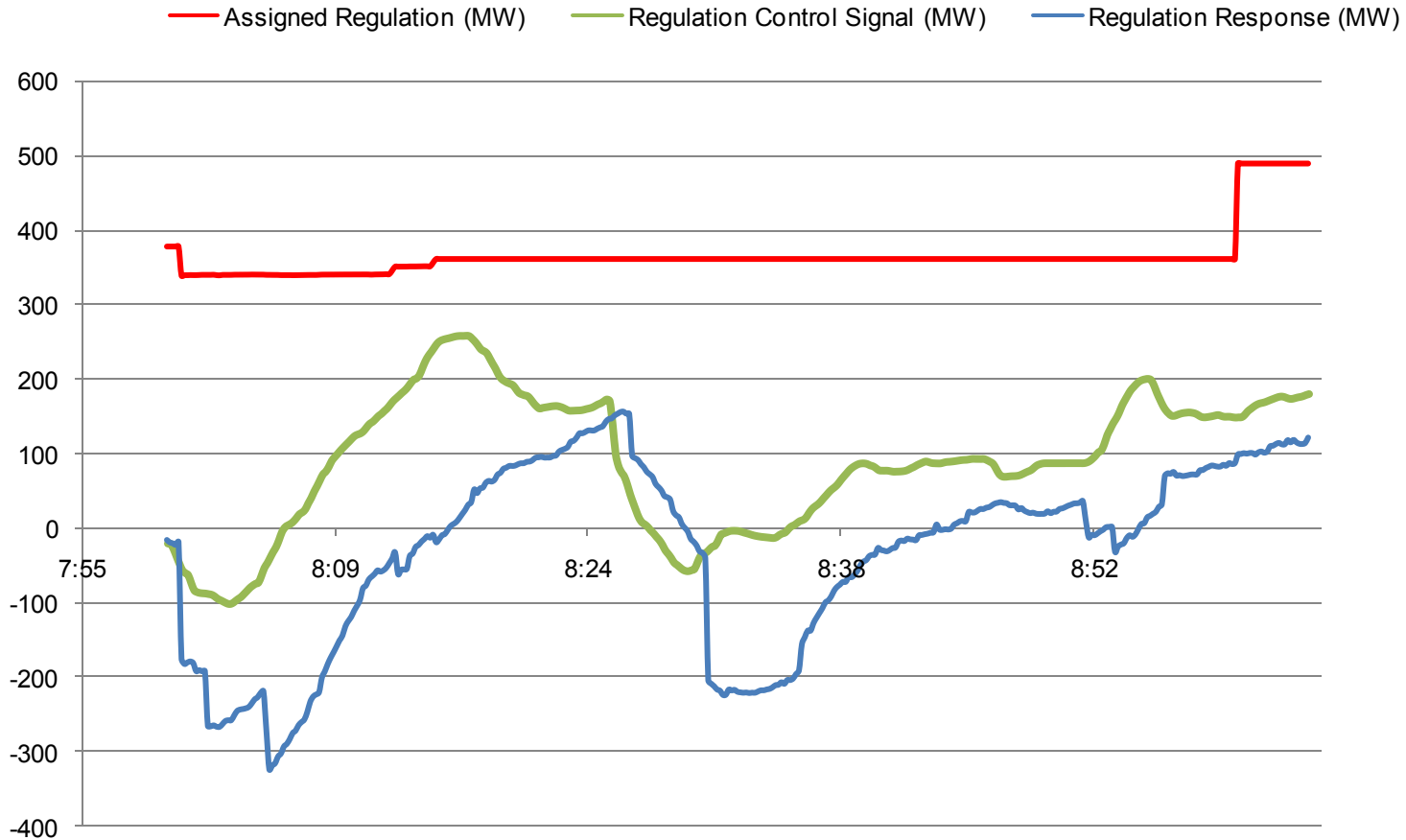


Correlation: 0.61

Delay: 0.29

Precision: 0.21

Total: 0.37

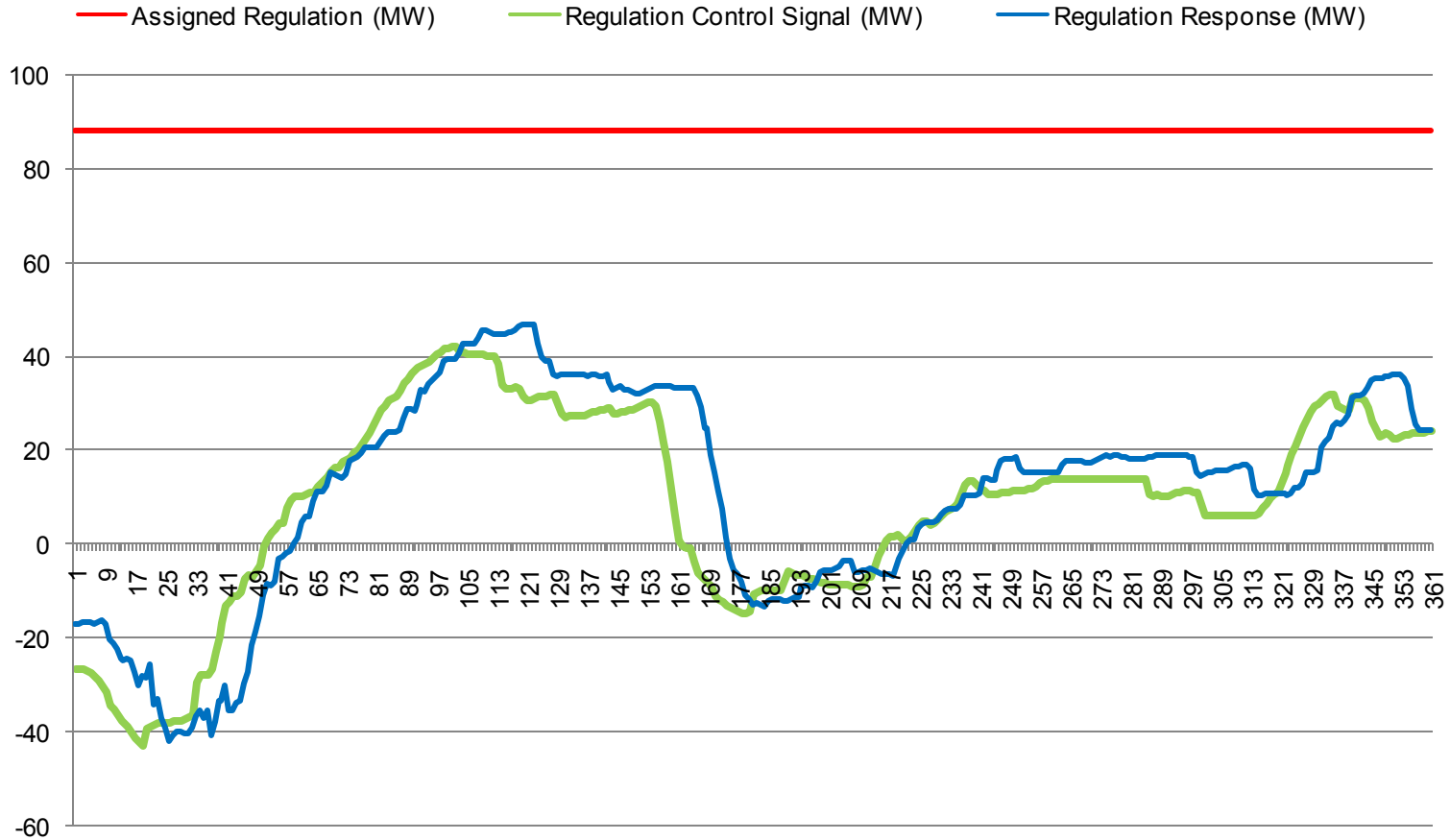


Correlation: 0.72

Delay: 0.48

Precision: 0.21

Total: 0.47

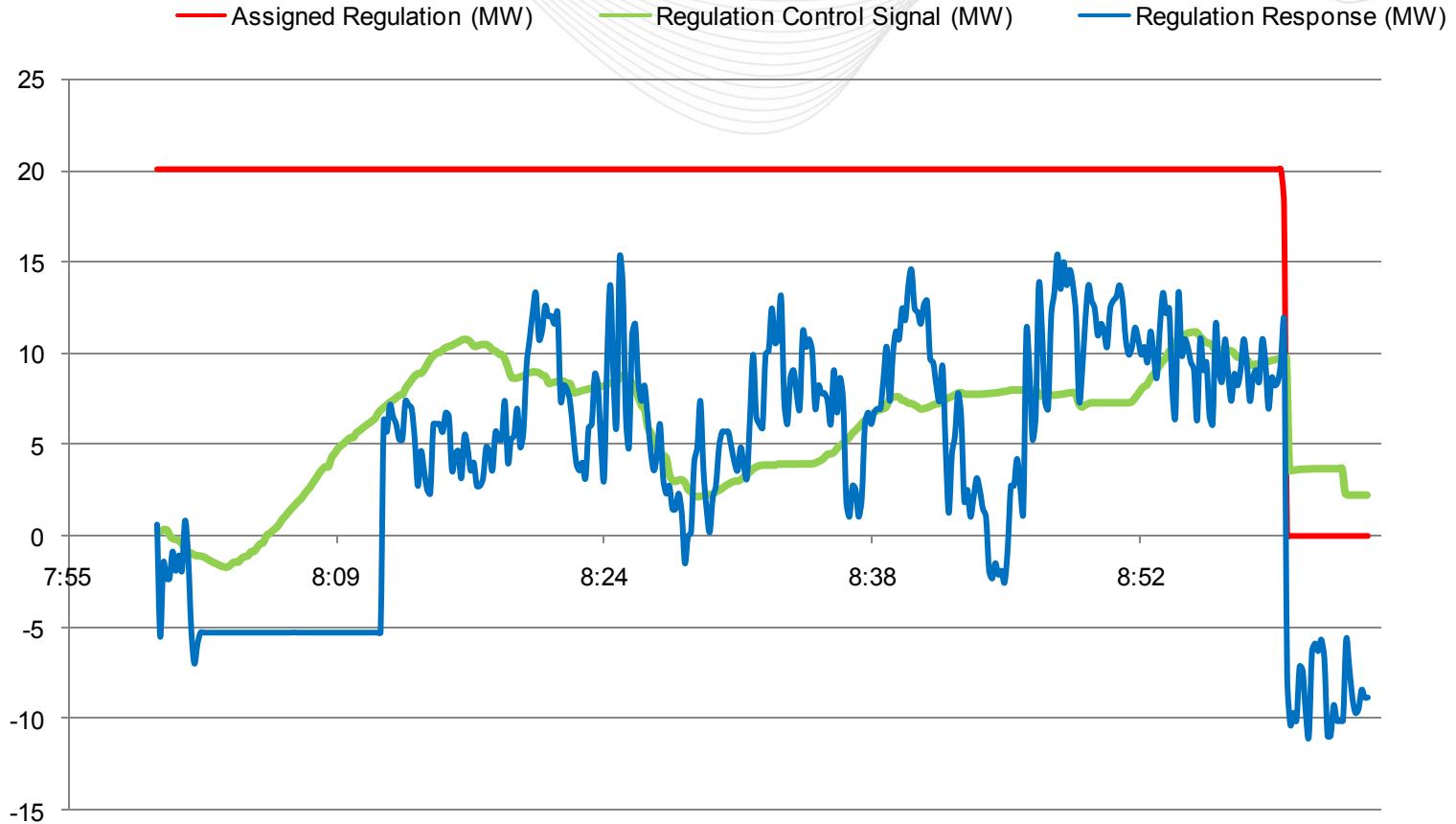


Correlation: 0.95

Delay: 0.66

Precision: 0.74

Total: 0.78

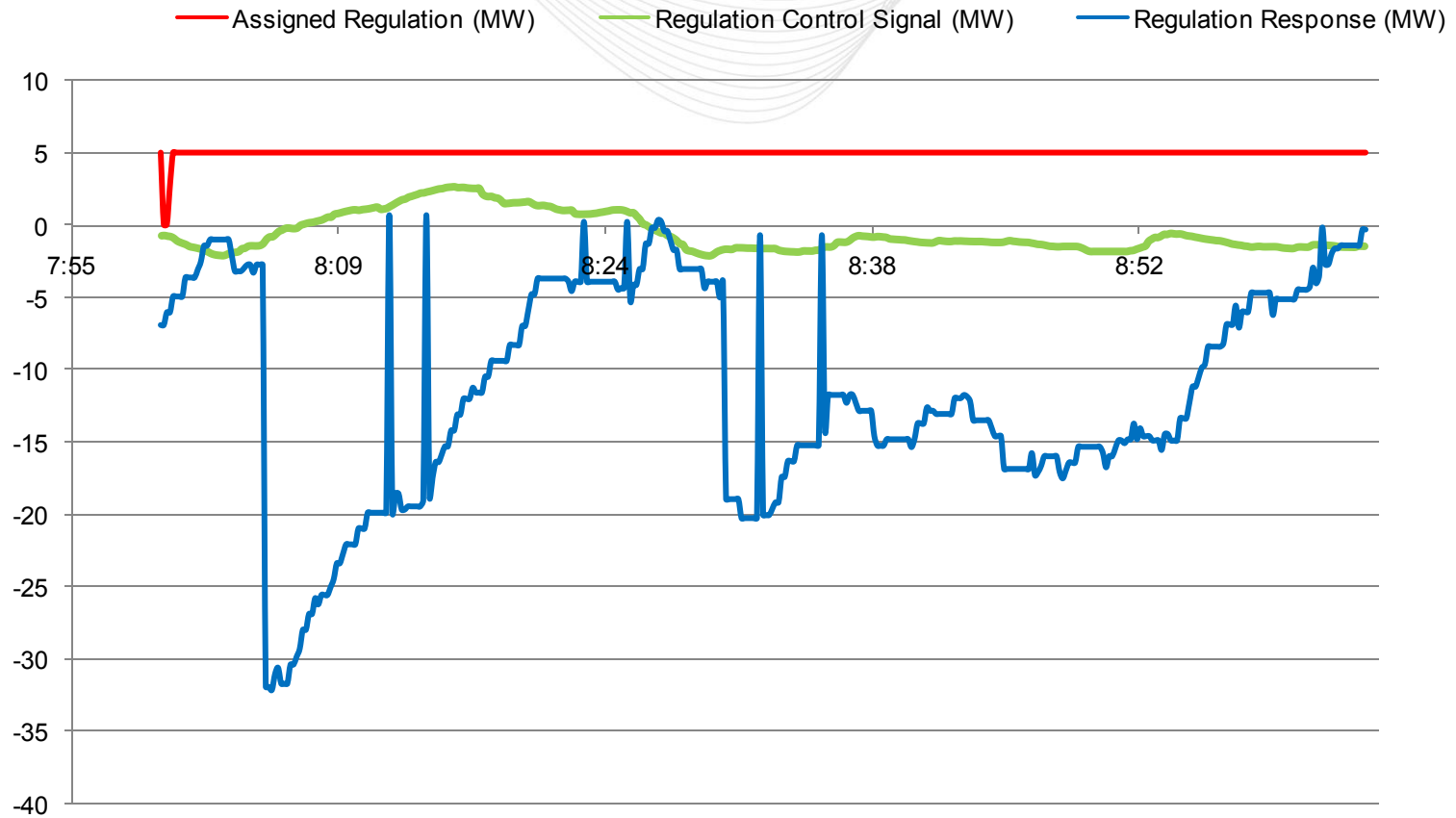


Correlation: 0.63

Delay: 0.48

Precision: 0.65

Total: 0.59



Correlation: 0.56

Delay: 0.36

Precision: 0.004

Total: 0.31

- Initial Use
 - Calculate automated score for each regulation resource for each regulating hour
 - Calculate hourly mileage for each control signal
 - Only resources with very high scores are eligible for performance incentive payments
 - Resources with very low scores will not receive regulation credit for that operating hour
 - Resources with rolling average of last ~100 regulating hours below threshold (to be set later) will be disqualified from the regulation market.
 - Chance to re-qualify

- Future Use
 - Calculate automated score for each regulation resource for each regulating hour
 - Calculate hourly mileage for each control signal
 - Only resources with very high scores are eligible for performance incentive payments
 - The regulation clearing mechanisms will be adjusted based on historical performance
 - Settlements for all resources will be adjusted based on the performance within the hour.
 - Resources with very low scores will not receive regulation credit for that operating hour
 - Resources with rolling average of last ~10 regulating hours below threshold (to be set later) will be disqualified from the regulation market.
 - Chance to re-qualify

- Resources will be able to enter Segment-Specific Energy Ramp Rates While Regulating to be used by SCED when the unit is cleared for regulation.
- Resource owners will need to add regulation points specific to the regulation control signal(s) they wish to follow.
- No additional data exchange needed at this time.