

WESTERN ENERGY IMBALANCE MARKET

EIM Participant Discussion: Variable Energy Resource (VER) Forecast Options

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EIM RIF Meeting

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ISO Public



Overview

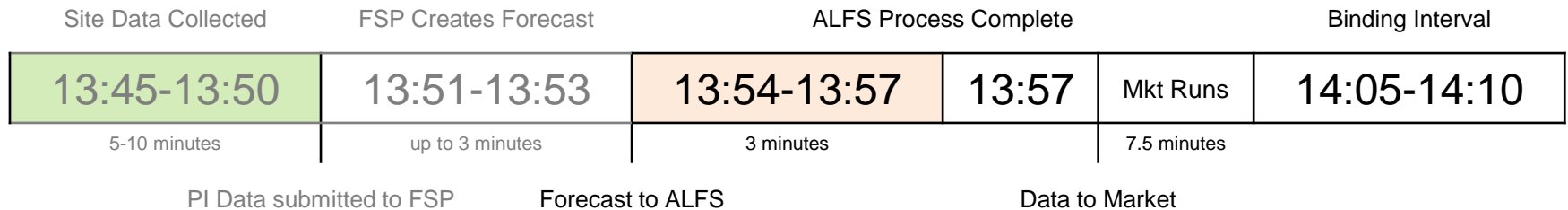
- EIM VER Forecasting Options
- Questions

EIM VER FORECASTING

Current Data Transfer Time Needed for External Forecast Service Provider

Forecasts received 11-16 minutes before binding interval are used.
 **This does not count additional time outside CAISO needed to create forecast.

Expected Lag:



Possible extra 5 minutes:

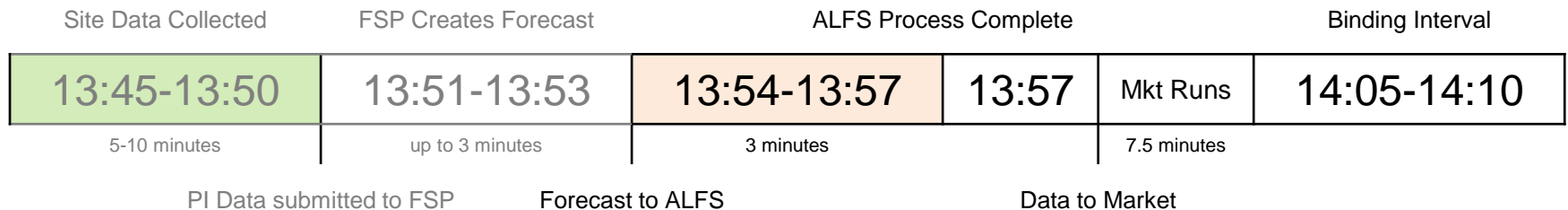
- ALFS takes longer than 3 minutes to process
- Forecast is submitted with next market run



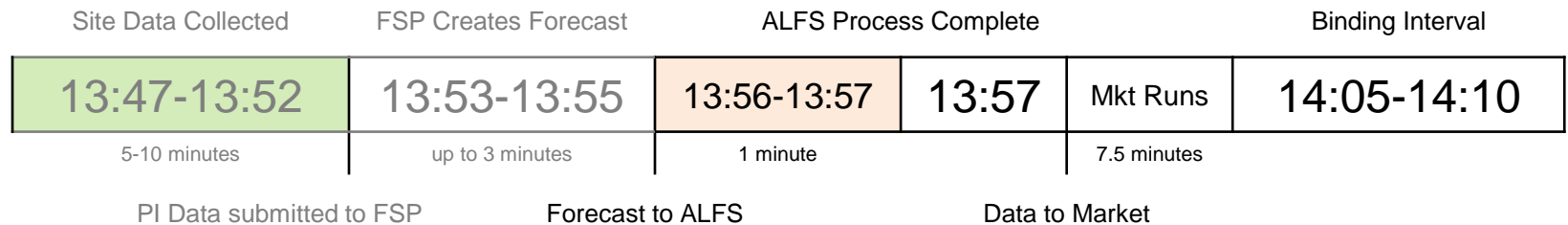
Processing Enhancement

Forecasts received 9 minutes before binding interval are used.

Current:



Enhancement: Shorten ALFS processing to 1 minute

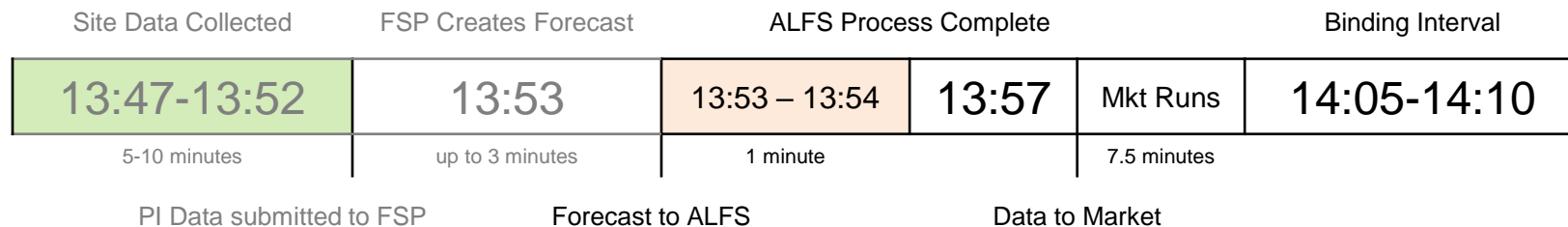


Idaho Example

Forecasts received up to 9 minutes before binding interval are used.

Verified:

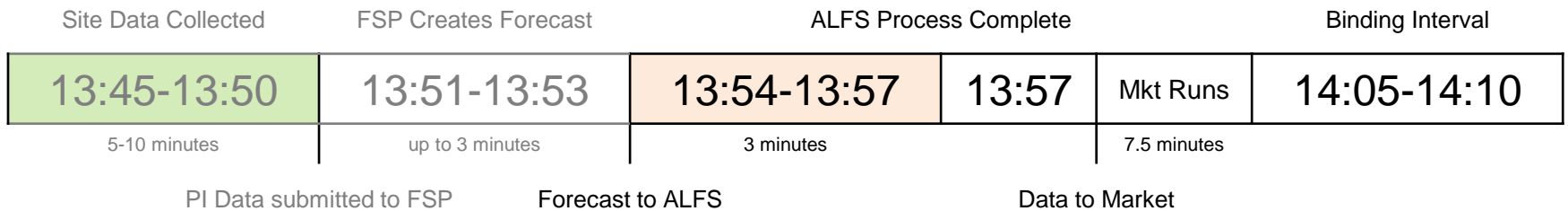
The forecast received from IPCO at 13:53 was used in the 14:05-14:10 Binding Interval.



Persistence Enhancement

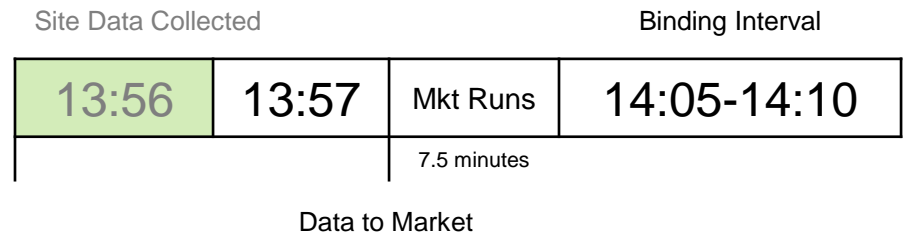
Forecast calculated in market, eliminating ALFS & processing time needed outside of CAISO

Current:



Persistence Method:

- More recent telemetry is used in forecast
- 6+ minutes are eliminated from lag



How the VER Persistence Market Method Works

- Simple Persistence:

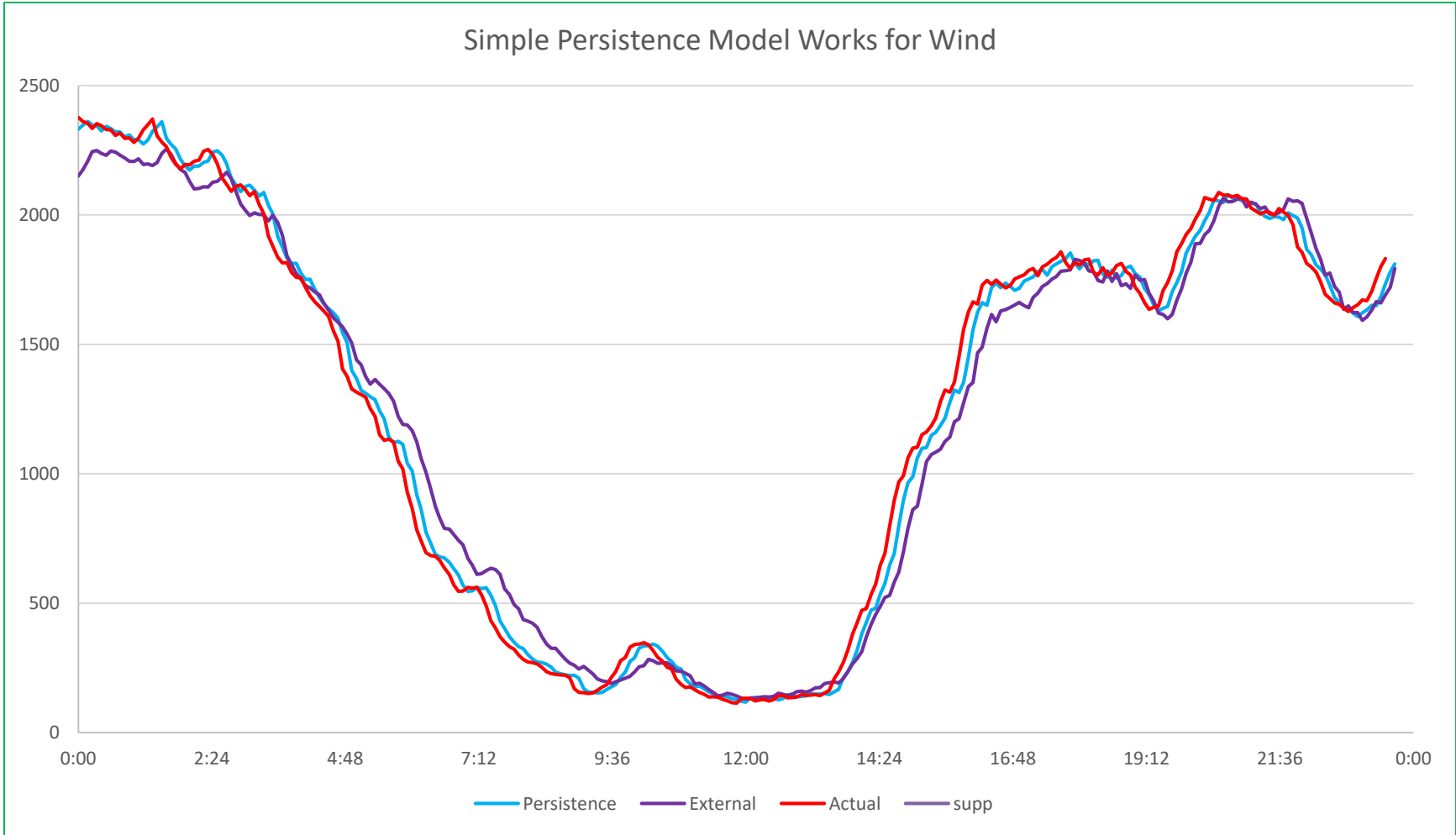
$$F(t) = A(t-lag)$$

- Contour Persistence Model:

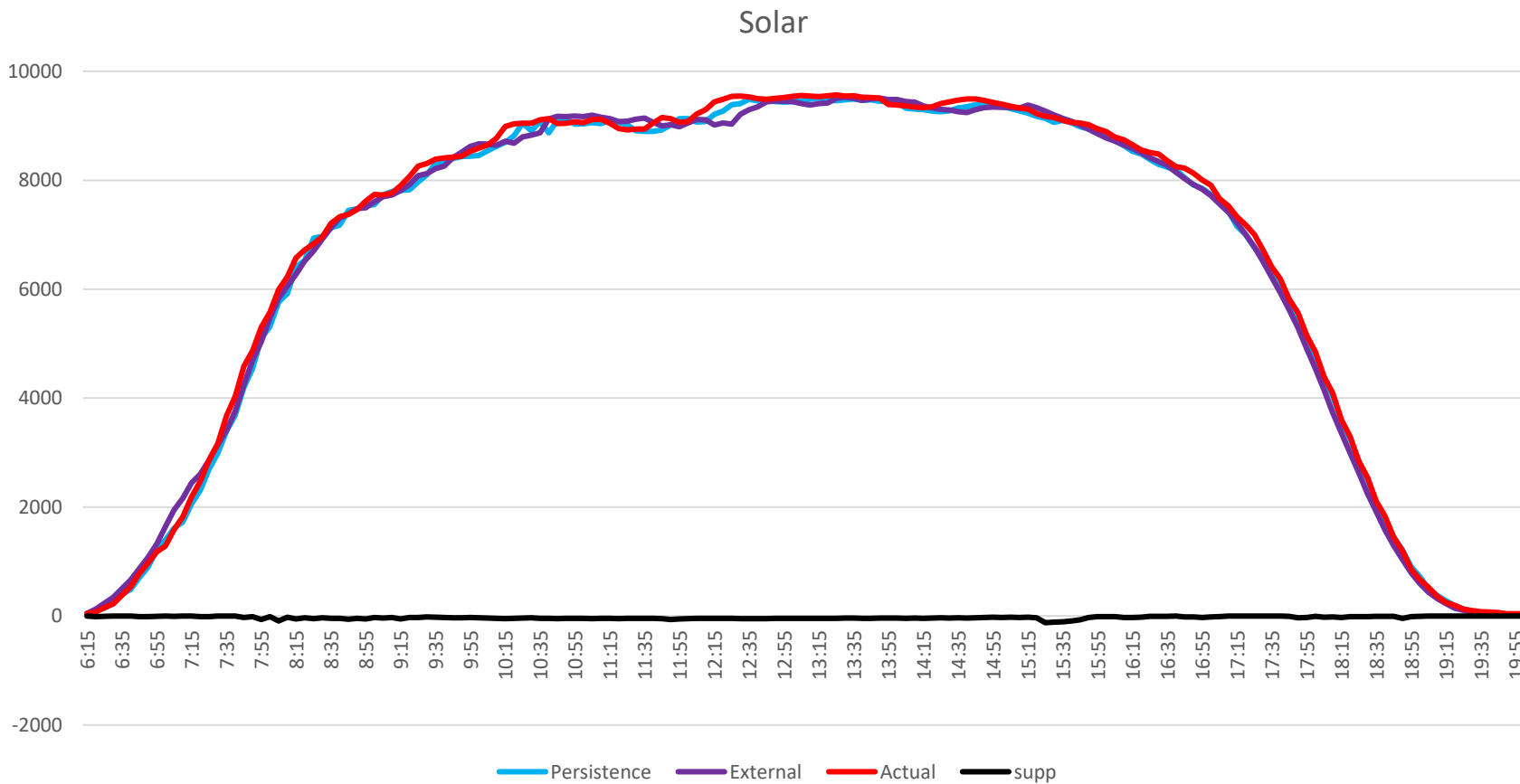
$$F(t) = A(t-lag) * R(t) / R(t-lag)$$

R(t) is expected full fuel (full sun) reference curve

Impact of Shortened Processing Time for Wind

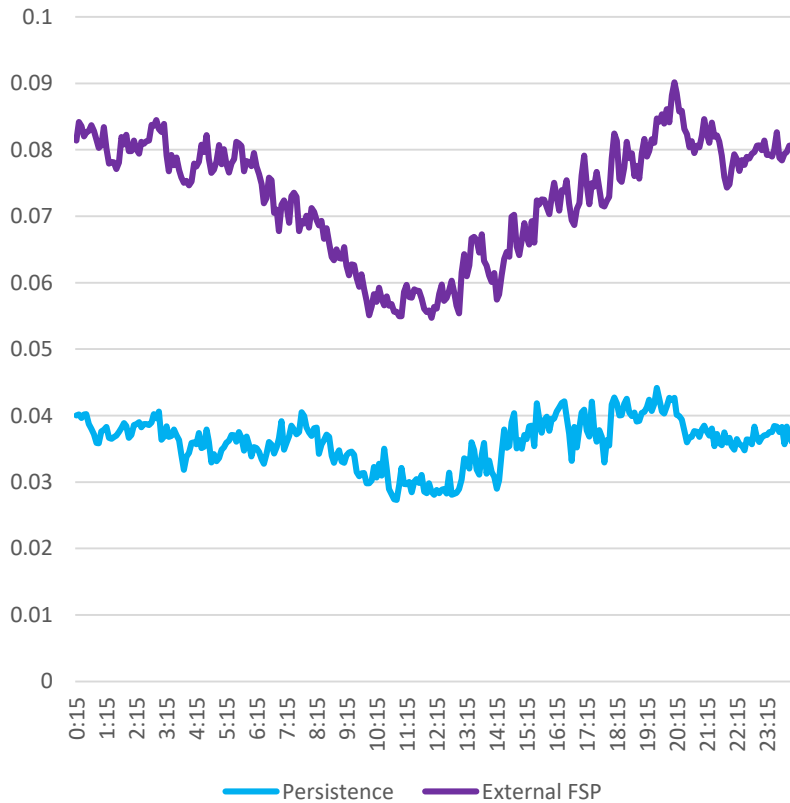


Results: Contour Persistence Works for Solar

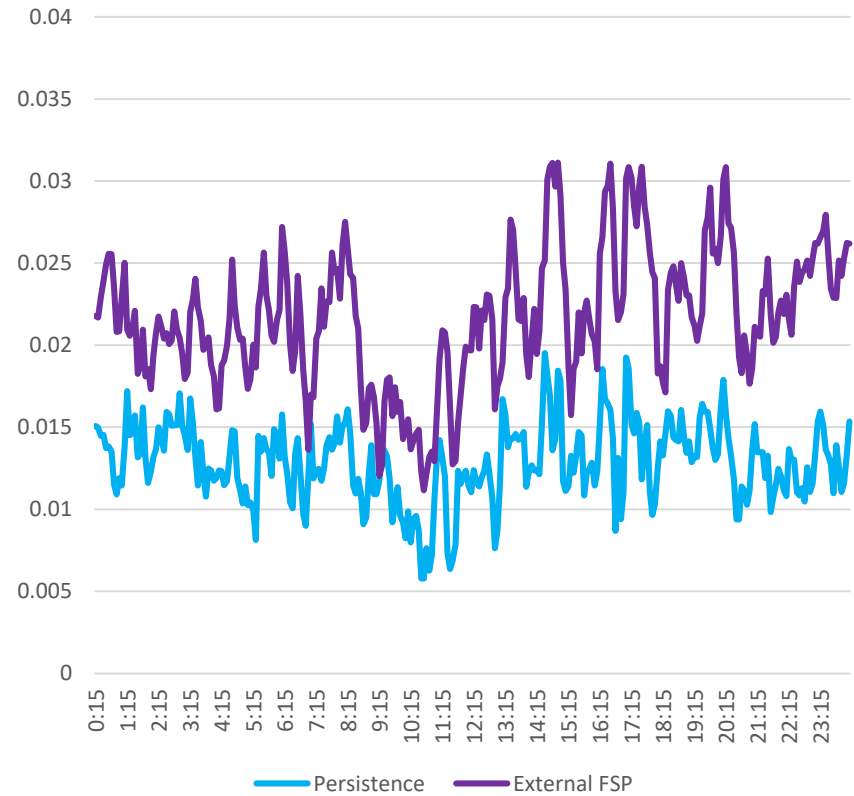


Results: RTD MAPE for Wind

Maape Comparison: Resource

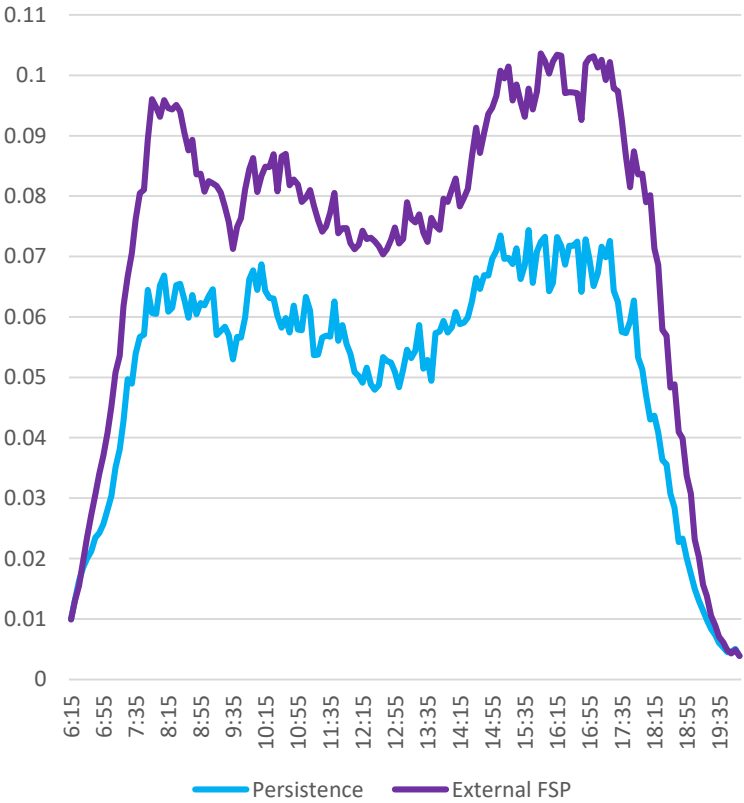


Maape Comparison: System

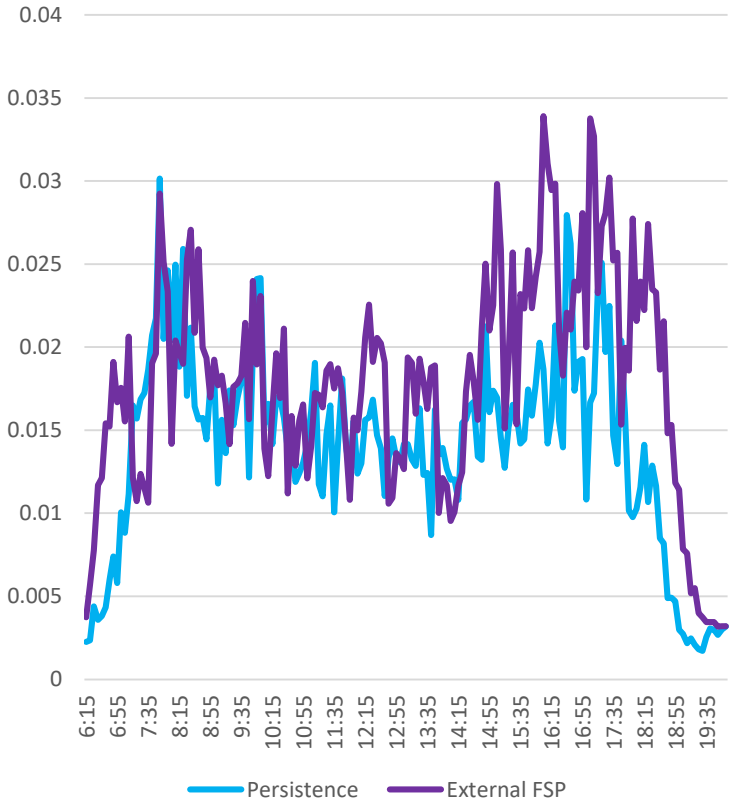


Results: RTD MAPE for Solar

Mape Comparison: Resource



Mape Comparison: System



MAPE Accuracy Analysis of Persistence for CAISO

	Persistence	External FSP	Improvement
Solar	1.56%	1.94%	19.30%
Wind	1.29%	2.17%	40.67%

Options

Processing Enhancement	Persistence Enhancement
<ul style="list-style-type: none">• Eliminates 2+ minutes from lag• No validation<ul style="list-style-type: none">• Data submitted by entity will be used in market• Can be implemented quickly• Suggest rolling 9 hour submissions of 5 minute renewable forecasts	<ul style="list-style-type: none">• Eliminates 6+ minutes from lag• Minimal validation<ul style="list-style-type: none">• Bad telemetry could end up in forecast• Timeline: Q3<ul style="list-style-type: none">• Data required for Solar Reference Curves• RTD market only<ul style="list-style-type: none">• RTPD will still use EIM submitted forecast

Current EIM Interest in Options

	VER Enhancement	VER Enhancement Launch Date	VER Persistence Wind	VER Persistence Solar
Puget			x	
Idaho	x	4/27/2018	x	x
APS			x	x
PacifiCorp				
NVE				
Portland	x			
PowerEx				

Data Needed for Solar Persistence Market Method Development

- Pmax
- Solar Resource Type
 - Example: Solar Thermal, Tracking, Non-Tracking, etc.
- Actual Metered Resource MW Data
 - 3 Years or what is available
- Latitude and Longitude of Resource

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Questions?

ISO Public

