System Management Load Forecasting

Presentation to MAC Meeting, March 2014

System Management
Presented by Dean Sharafi

Connecting people with electricity

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Purpose

Provide an insight into the difficulties in modelling Load forecasts.
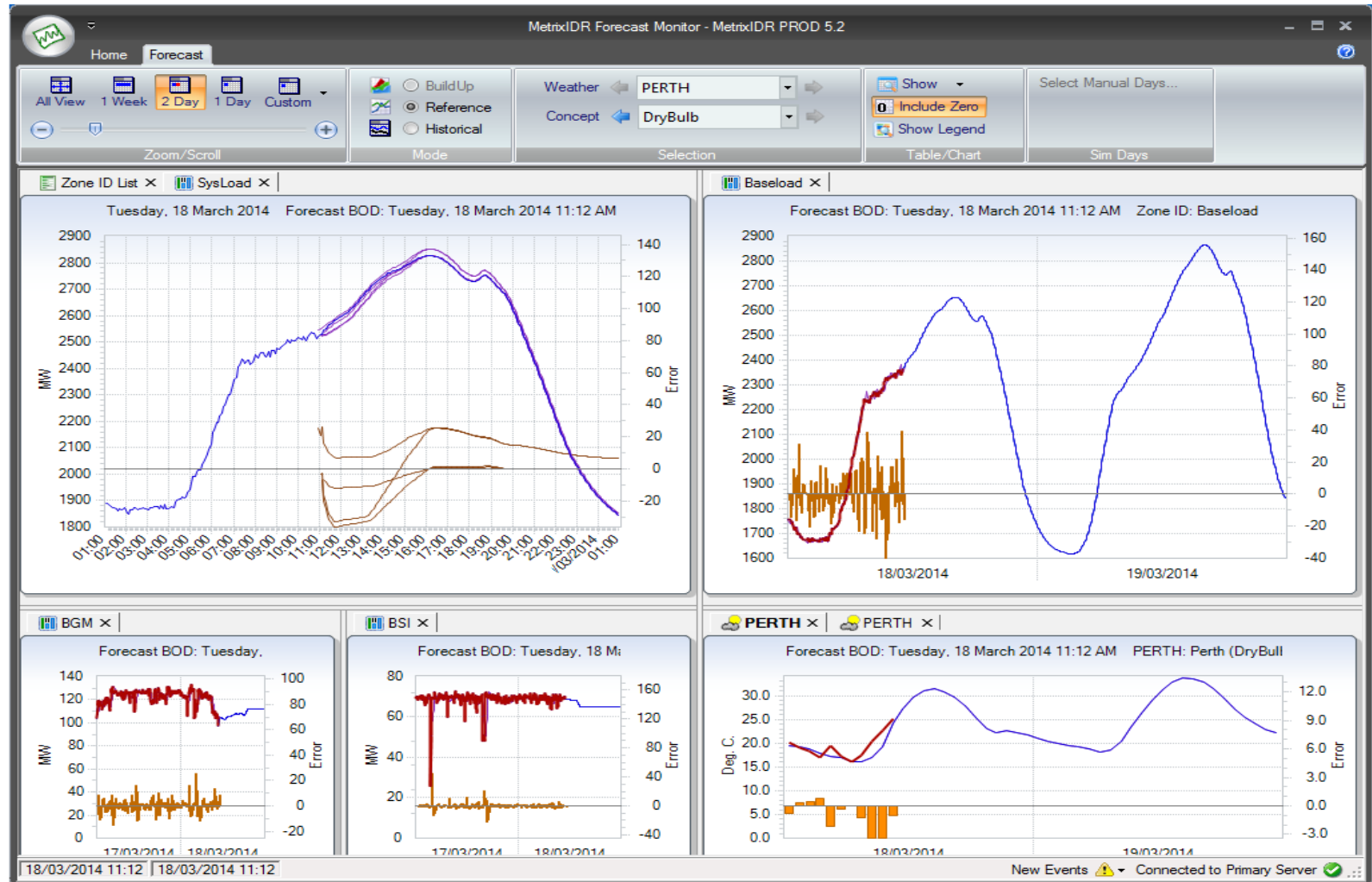
- show challenges when ONLY considering End of Interval loads to understand variability in load patterns

- show challenges with Non Conforming loads

- show challenges with events caused by generator trips and under voltage excursions (network faults)

- show effect of Embedded PV capacity on Load Forecasting stability

- show effect of "bad" data has on Load Forecasting stability

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Forecasting

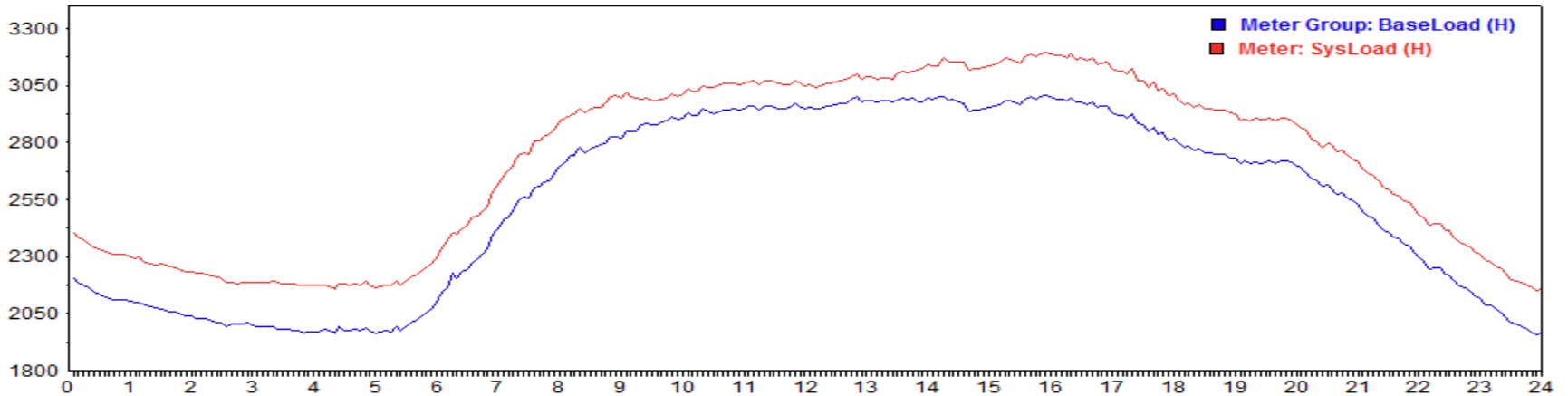$$E = mc^2$$

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MetrixIDR: How Load Forecasts are Created

Concept of Non Conforming Loads

Tuesday, December 17, 2013

Meter Group: BaseLoad (H)
Meter: SysLoad (H)

Tuesday, December 17, 2013

Meter: BGM (H)
Meter: BSI (H)

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"Noise" in 4 second Data

Real Time (4 Second Resolution)
13 March 2014 10:00 to 16:00

Non Conforming Load - PTA

PTA Daily Load Profile
(5 minute Readings)
Thursday, 6-Mar-14

Generator Trip

WAPL Generation PLUS Import and Export Profiles
Wednesday, 10-April-13

Legend: Input Load / Export; Unit Generation

Plot Area

System Load Profile
10 April 14:00 to 15:00

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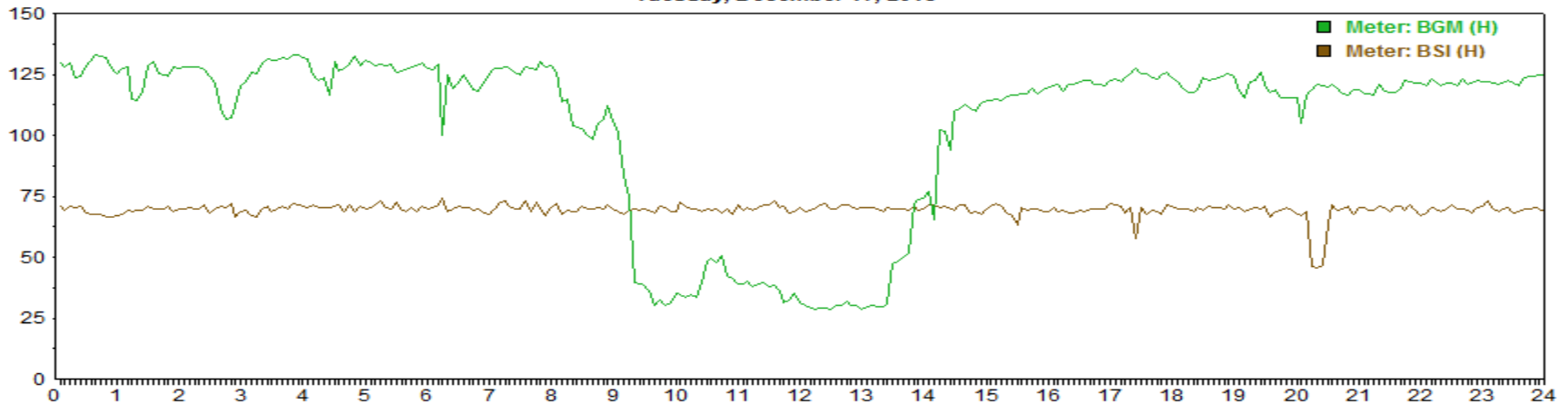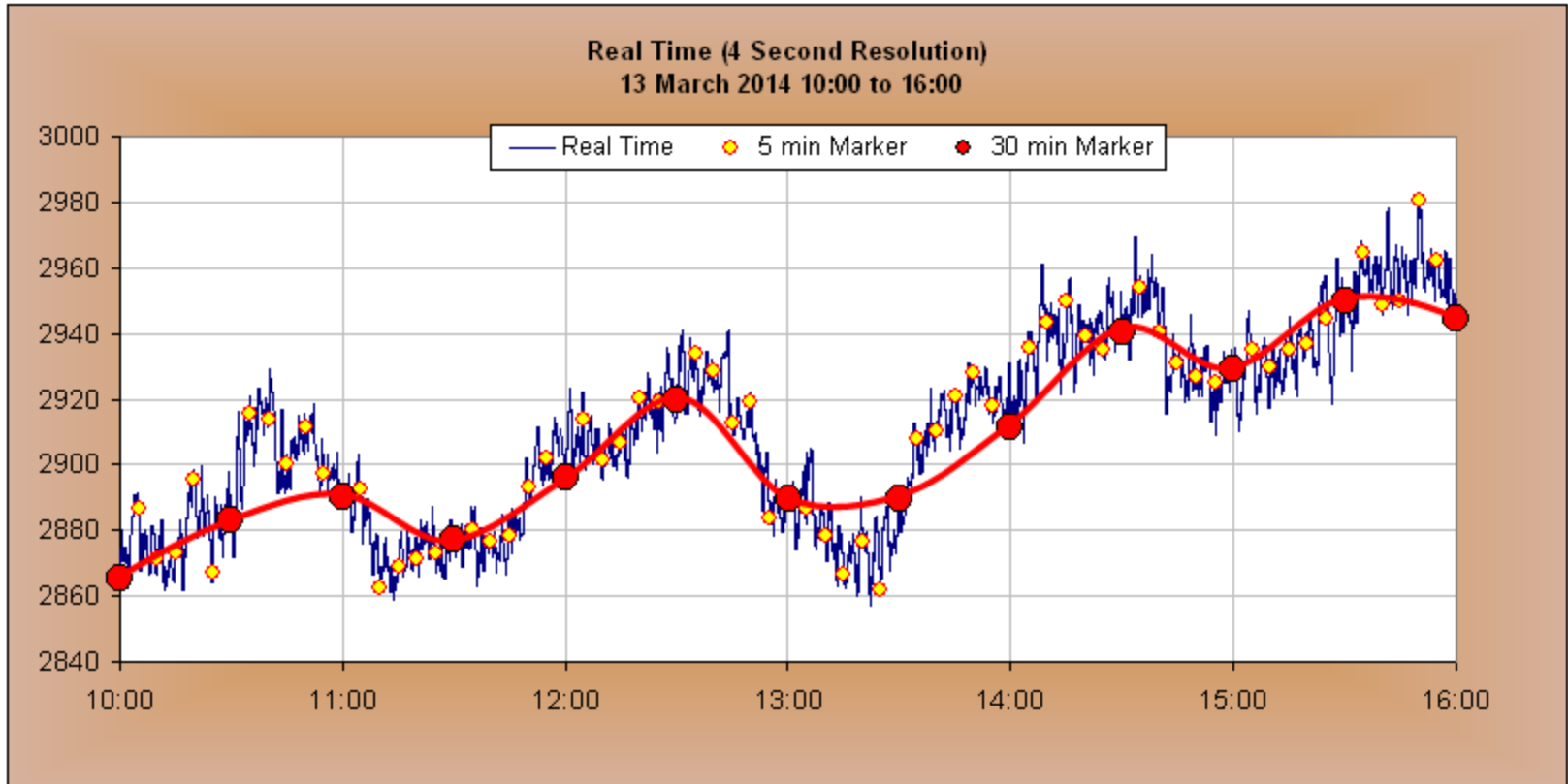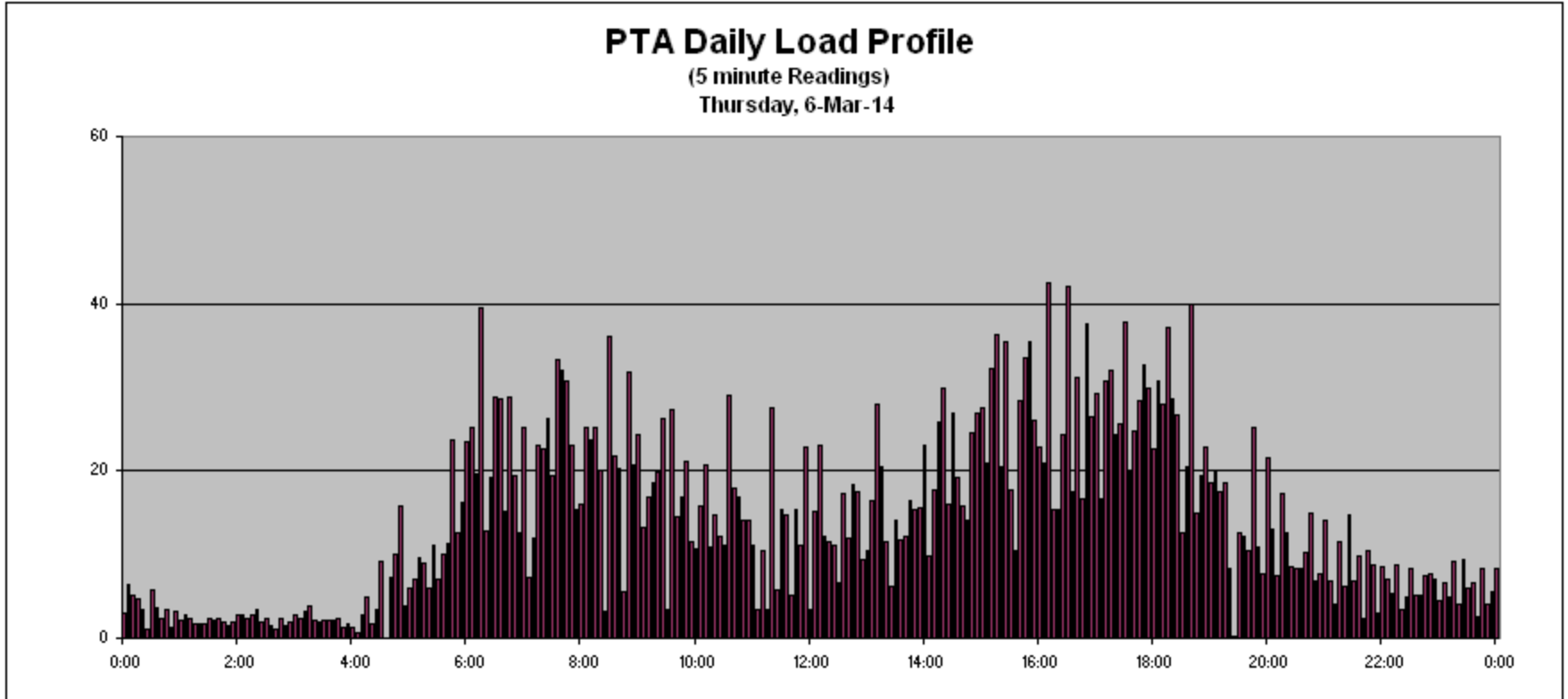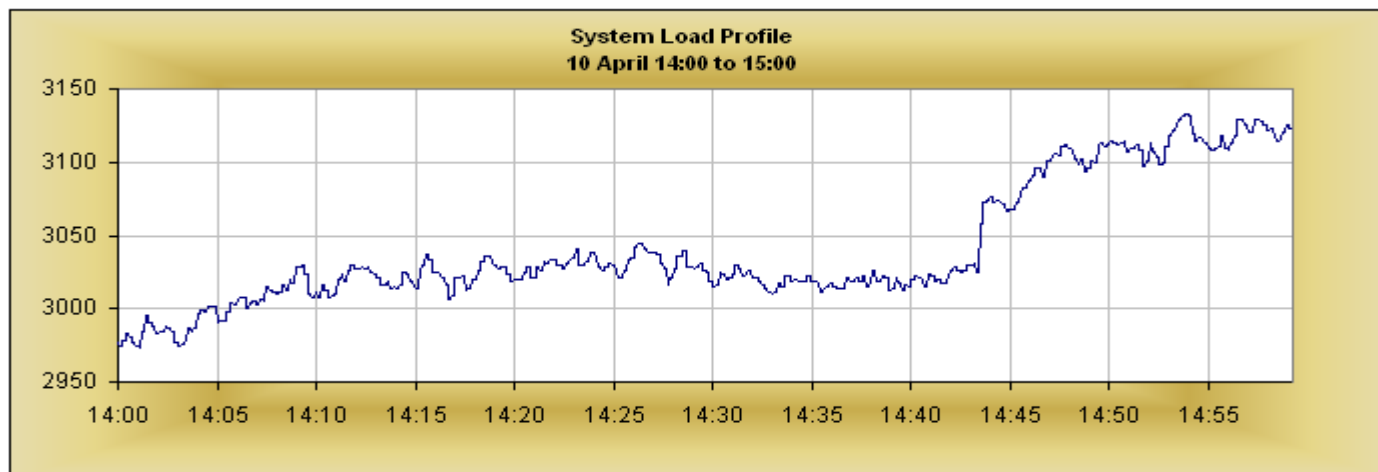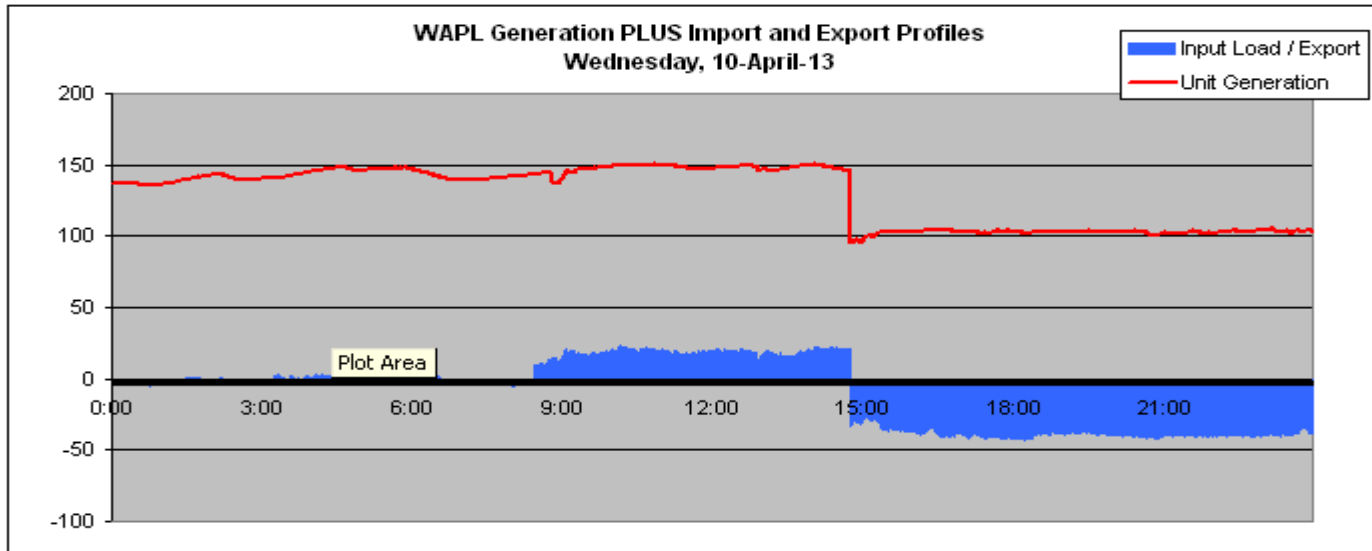
Generator Trip (Low Frequency)

26-Nov-2013 15:30

Min Freq Load: 2301 MW
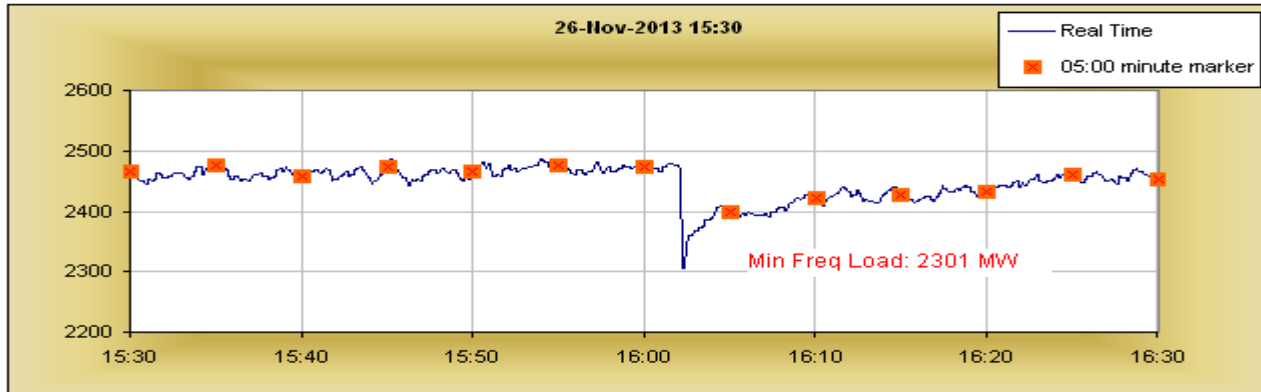
SysLoad: System Load - Auto Publish (Nov 26, 2013 16:02:21)

Tuesday, November 26, 2013

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Under Voltage Excursion

SysLoad: System Load - Auto Publish (Sep 7, 2013 07:47:22)

Saturday, September 7, 2013

Legend: ■ Actual ■ Published
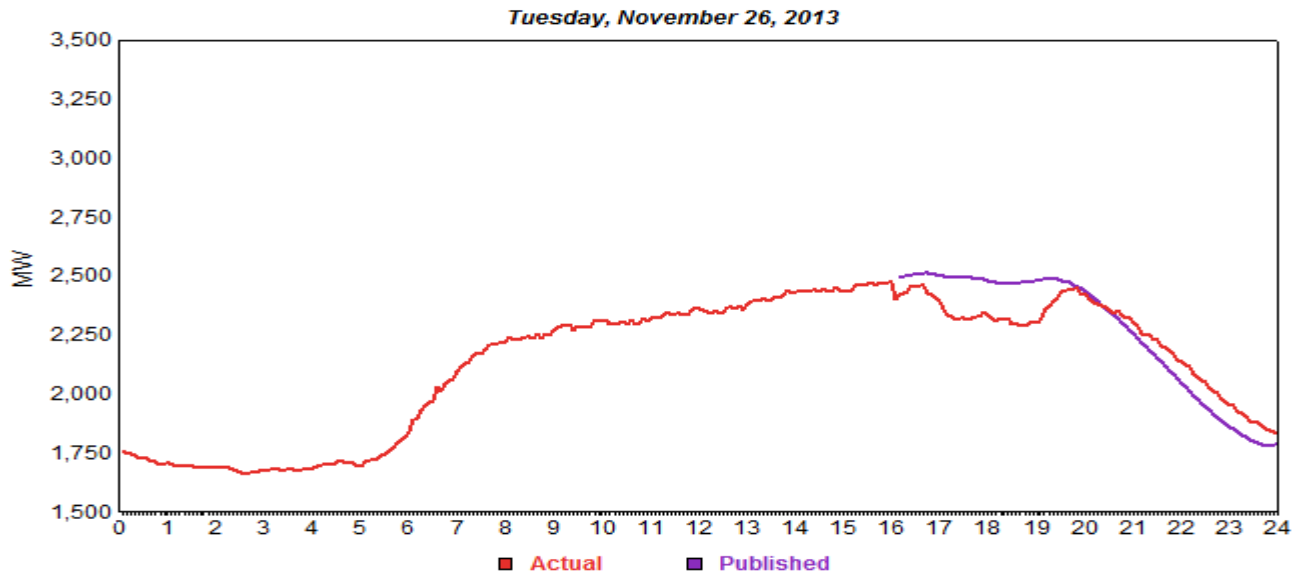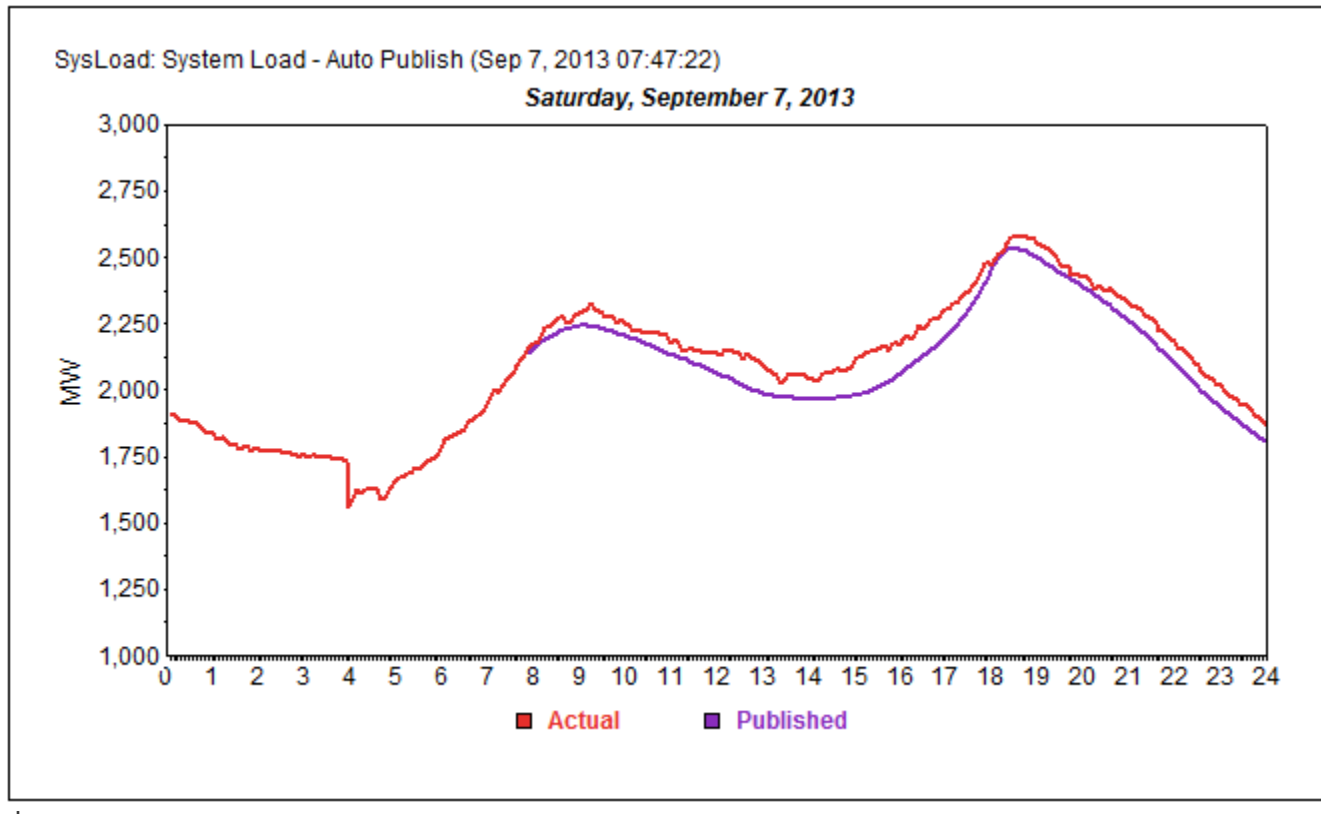
Event: "Bad" Data (Example 1)
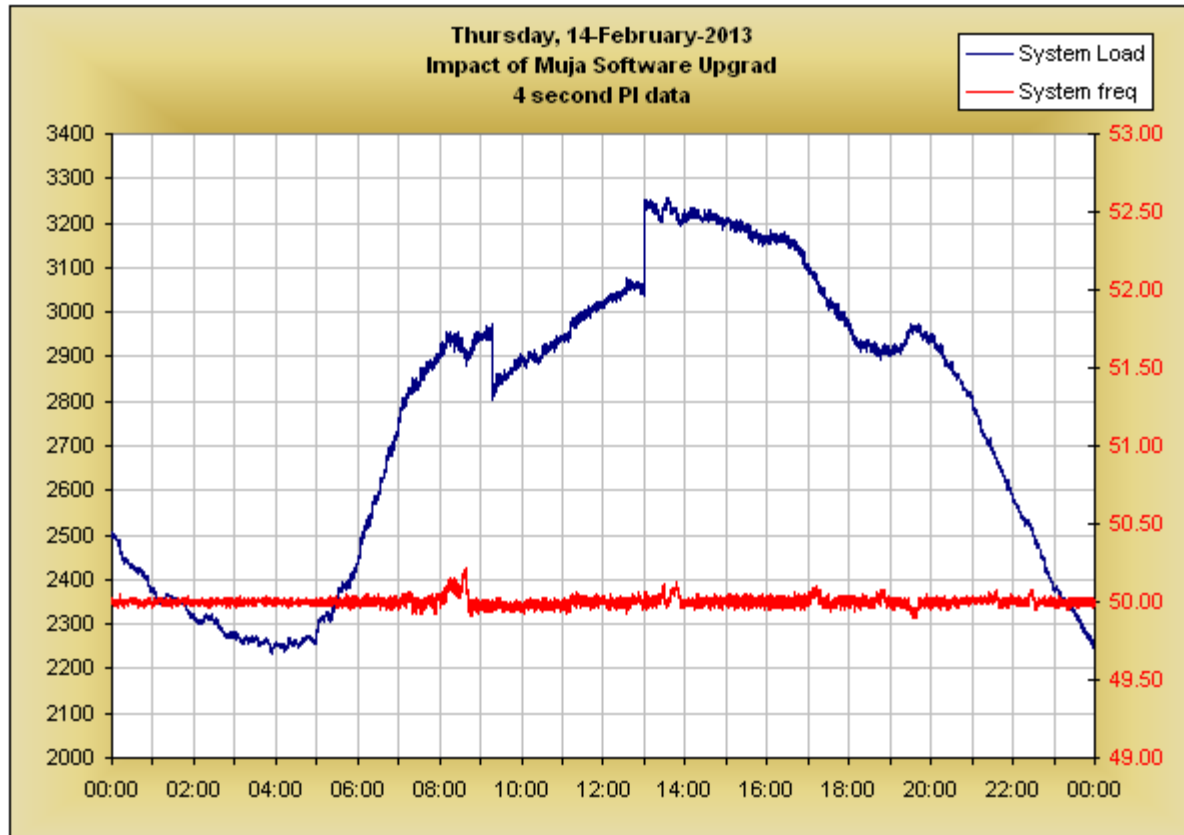
Impact of Embedded PV Generation

Predicted Daily PV Capacity

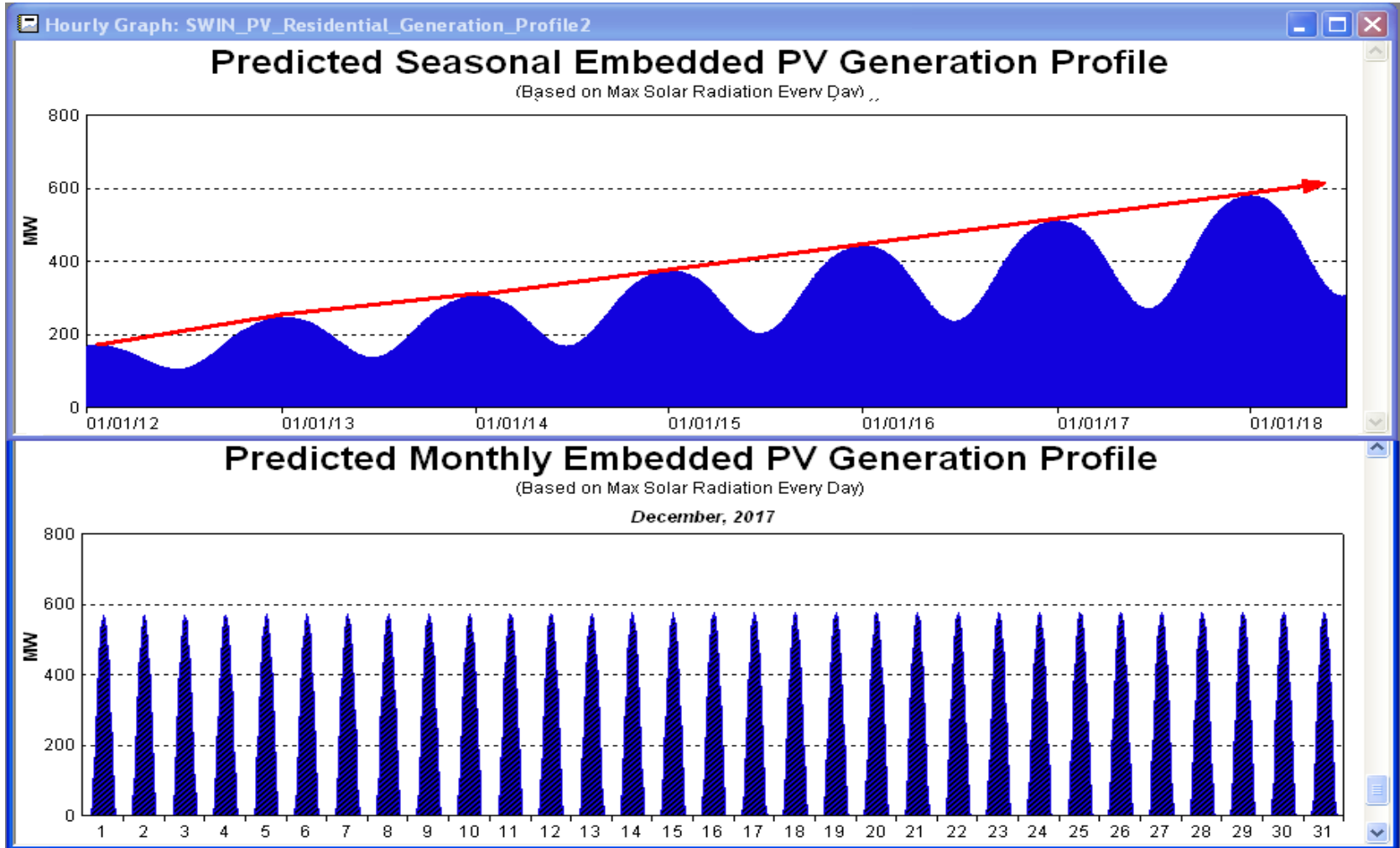# Changing Cloud Cover conditions

Simulated Market Generation Required to Backup Shortfalls in Solar PV Generation

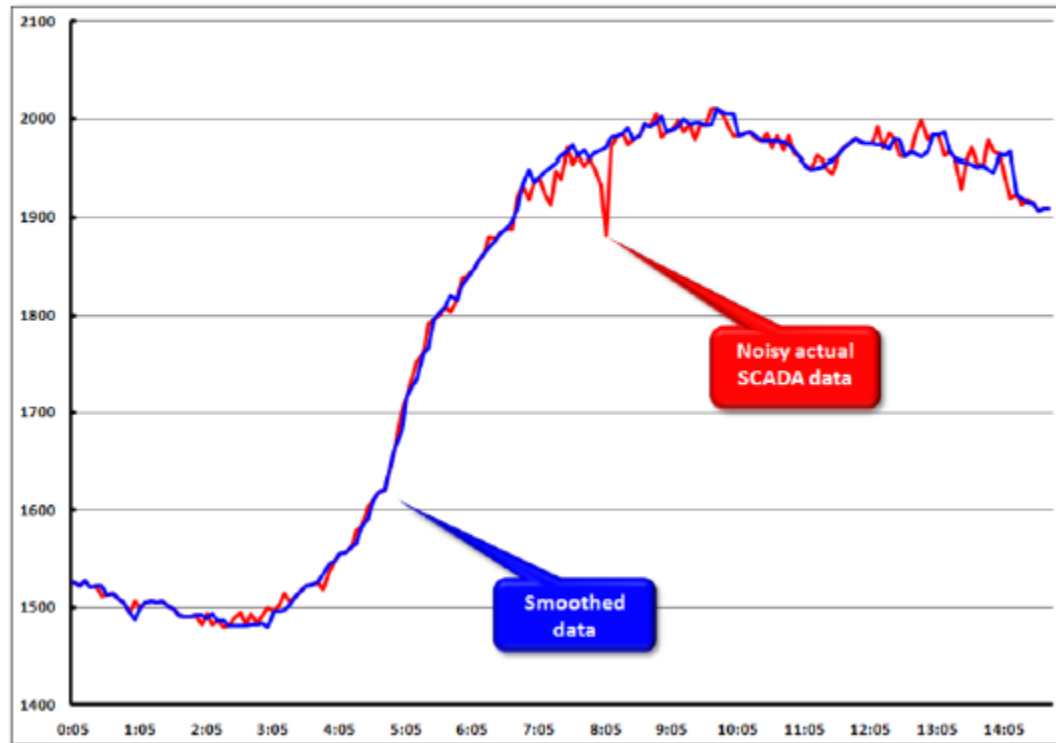Week of September 22, 2013

Week of June 30, 2013
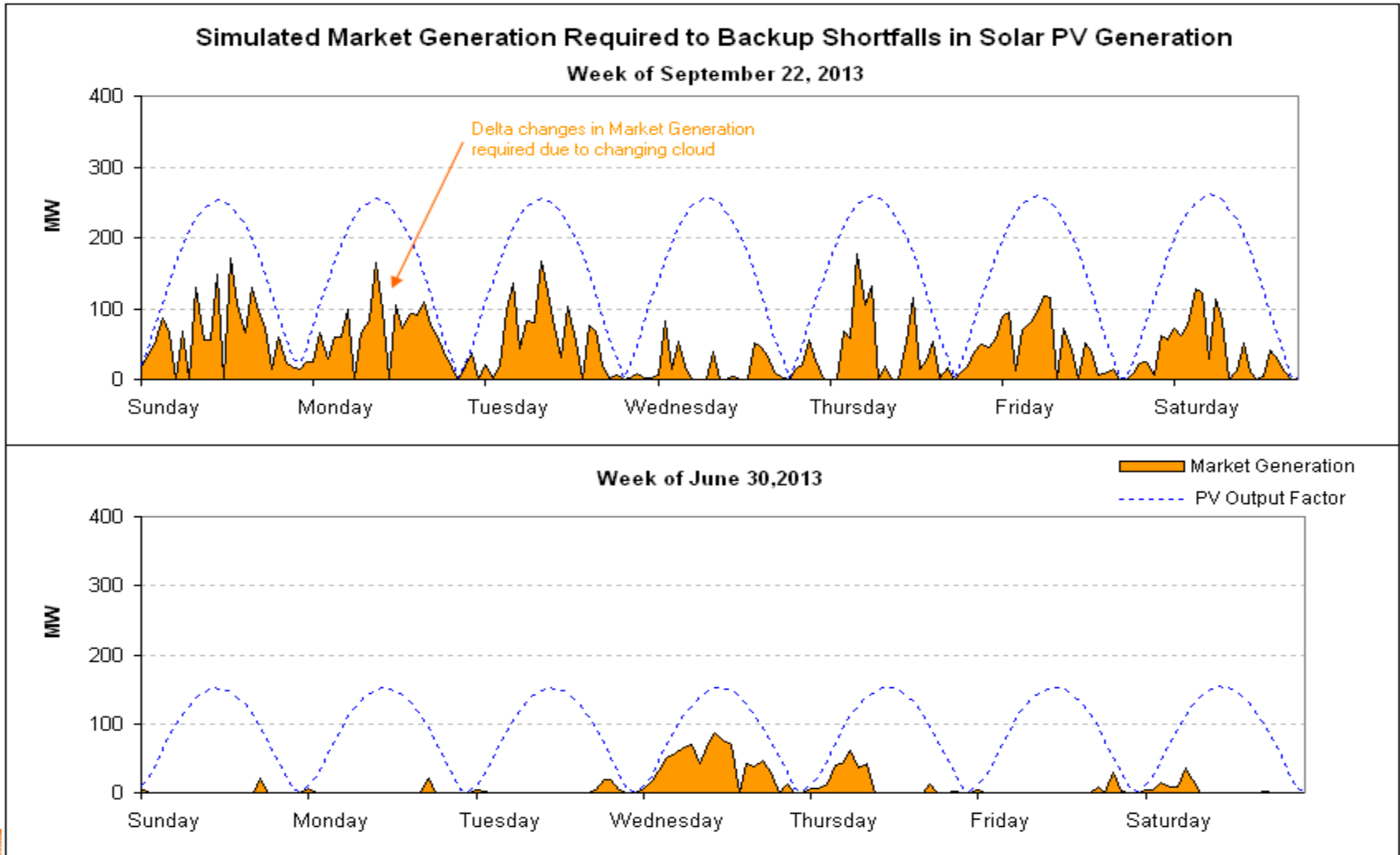
Way Forward:

What System Management is doing to improve Load Forecasts

1. Kalman filter to smooth out the noise

2. Optimise blending weights and Time of Usage parameters to produce a "better" Unified framework model

3. Introduce the concept of confidence bands around the Load forecasts

4. Minimise variation between System Load forecast and Market Load conversion process
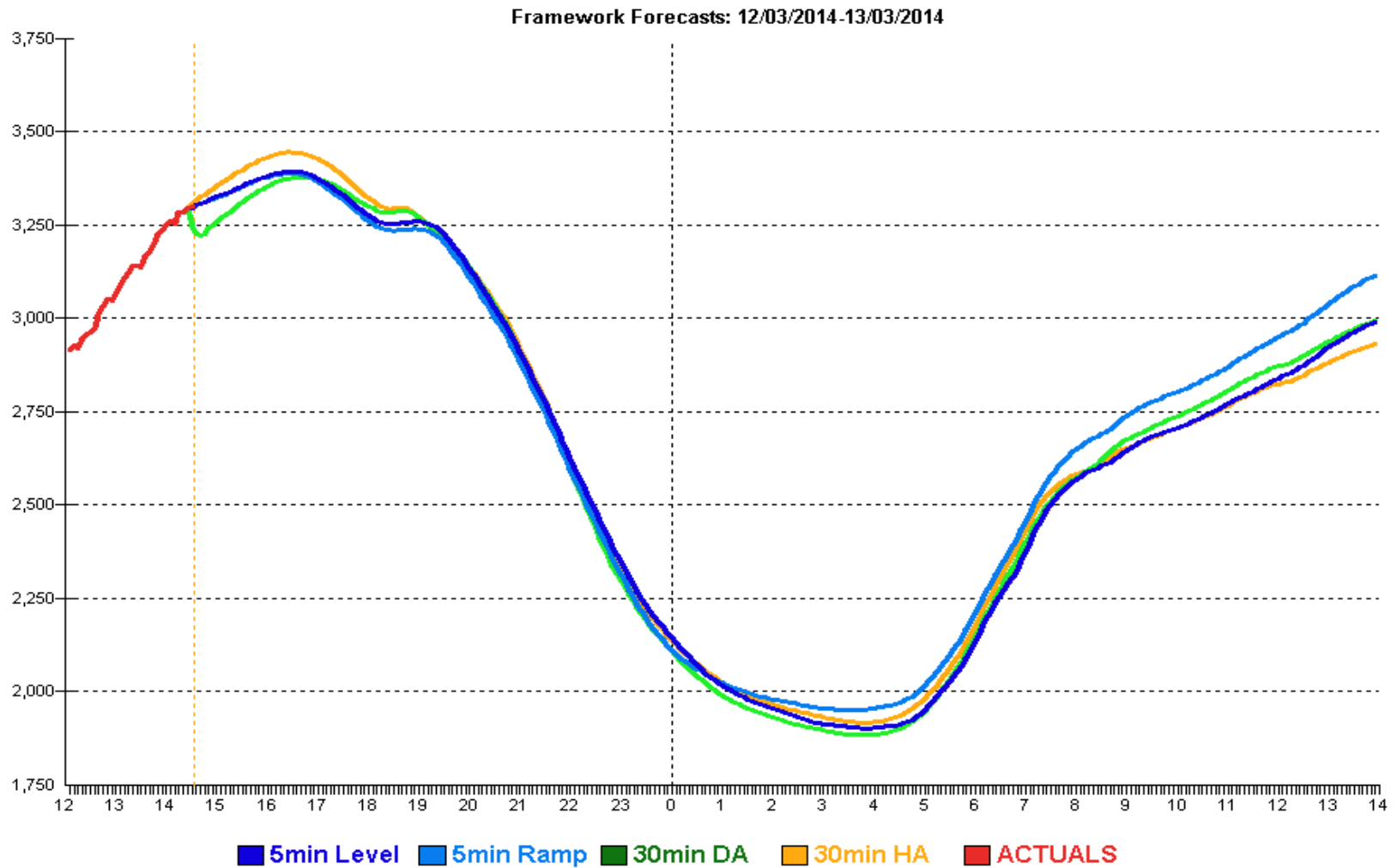
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Implement Kalman filter into 5 minute models

Figure 1: Data Quality Issues – Example of Noisy versus Smooth Data

Optimise model Blending Weight Parameters

Framework Forecasts: 12/03/2014-13/03/2014

Legend: 5min Level, 5min Ramp, 30min DA, 30min HA, ACTUALS
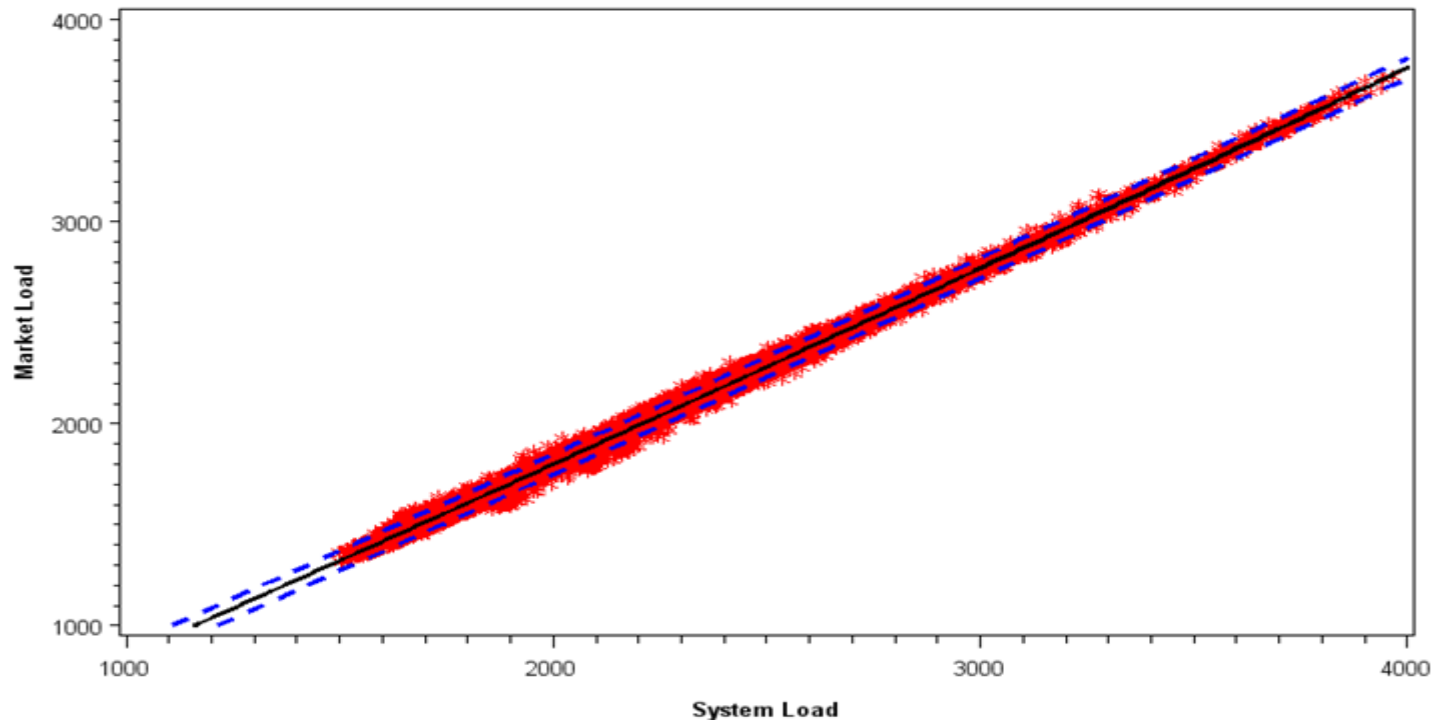
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Future Plans

- Because of the variability of the Load Forecasts, System Management intends to publish confidence bands around short term forecasts based on seasonal, time of day and weather variations.

- This information should allow the Market Participant to make a more informed bids.

- There are a number of issues which directly or indirectly affect stability and accuracy of Load Forecasts.

- System Management is also looking at consolidating short term NSG forecasts inside MetrixIDR

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Minimise variation between System Load forecast and Market Load conversion process

System Load MW vs Market Load (RDQ MW)
01 October 2012 to 31 December 2013

For More Information:

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