



The PI System at CPS Energy's Energy Market Operations

Presented by
Edward Aranda
David Kee



Abstract

- The PI System was identified as a way to standardize data from different data historians and operational systems as well as logically organize and deliver real time information and calculations. Both reliability and business operations were enhanced with the implementation of PI DataLink, PI ProcessBook, PI WebParts and most recently PI AF. This presentation will cover the evolution of the tools mentioned, the future developments envisioned within our operational framework as well as requirements that are on the horizon.



Speaker bio(s)

- Edward Aranda is an Electrical Engineer working Energy Market Operations IT as a SCADA Manager. Edward is involved in administrating the Generation Management System and the PI System. He has been working for the utility since January 2001.
- David Kee is an Electrical Engineer working in the Operations Analysis section of CPS Energy's Energy Market Operations department. David is involved in the analysis of real time generation performance from both a reliability and economic perspective. He has been working for the utility since 2008.



Agenda

- Introduction
- CPS Energy
- Background
- Challenges
- Developments of solutions to meet needs
- Architecture
- Operational impacts
- Future

About CPS Energy

- Nation's largest municipally owned energy utility providing both natural gas and electric service.
- 717,000 electric customers
- 325,000 natural gas customers
- Acquired by City of San Antonio in 1942





Background

- Centralized PI System Installed in Fall 2006
- CPS Energy transitions
 - Regulated utility – Control Area
 - Deregulated market – ERCOT power markets
- Transition created requirement to adapt operations to participate in competitive market
- Increase in analytical efforts



Energy Market Operations

- Helped transition from Zonal to Nodal Market
- Load Forecasting
- Generation commitment and dispatch
- Real Time Control
- Day Ahead Marketing, Forecasting & Scheduling
- Long Term Marketing
- Operations and Market Analytics
- Settlements



Challenge/problem detail

- Granularity of data sets were varying from 4 second to daily and yearly values.
- Different systems
 - GMS
 - MMS
 - Settlements
 - Metering
- Inefficient methods of data retrieval and analysis slowed progress



Solution

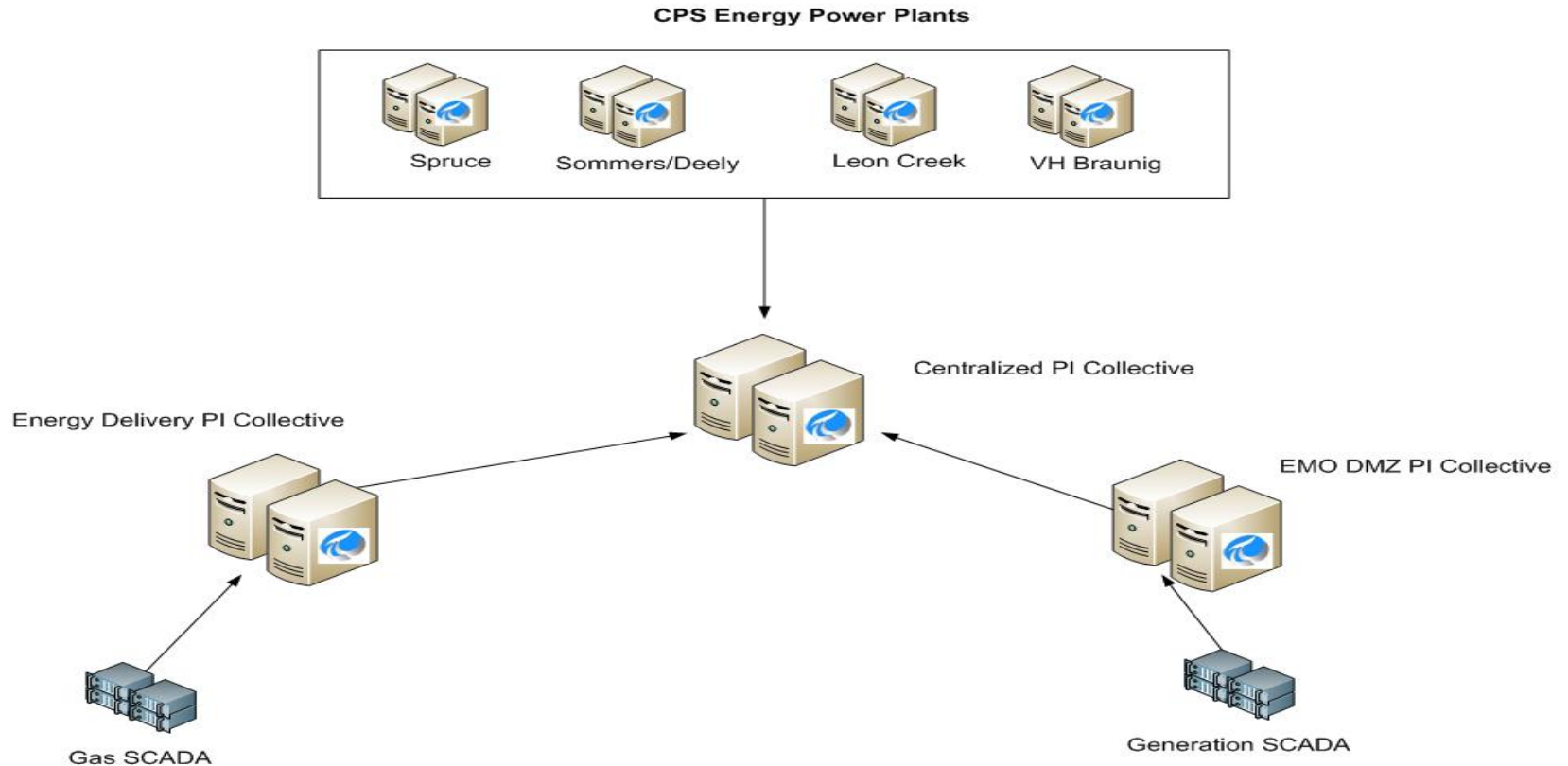
- Energy Market Operations, Plant DCS, and Gas store data in the PI System and all trusted corporate users and business applications can access real-time and historical data.
- Business Data Repository – Oracle database
- Operational data – PI System



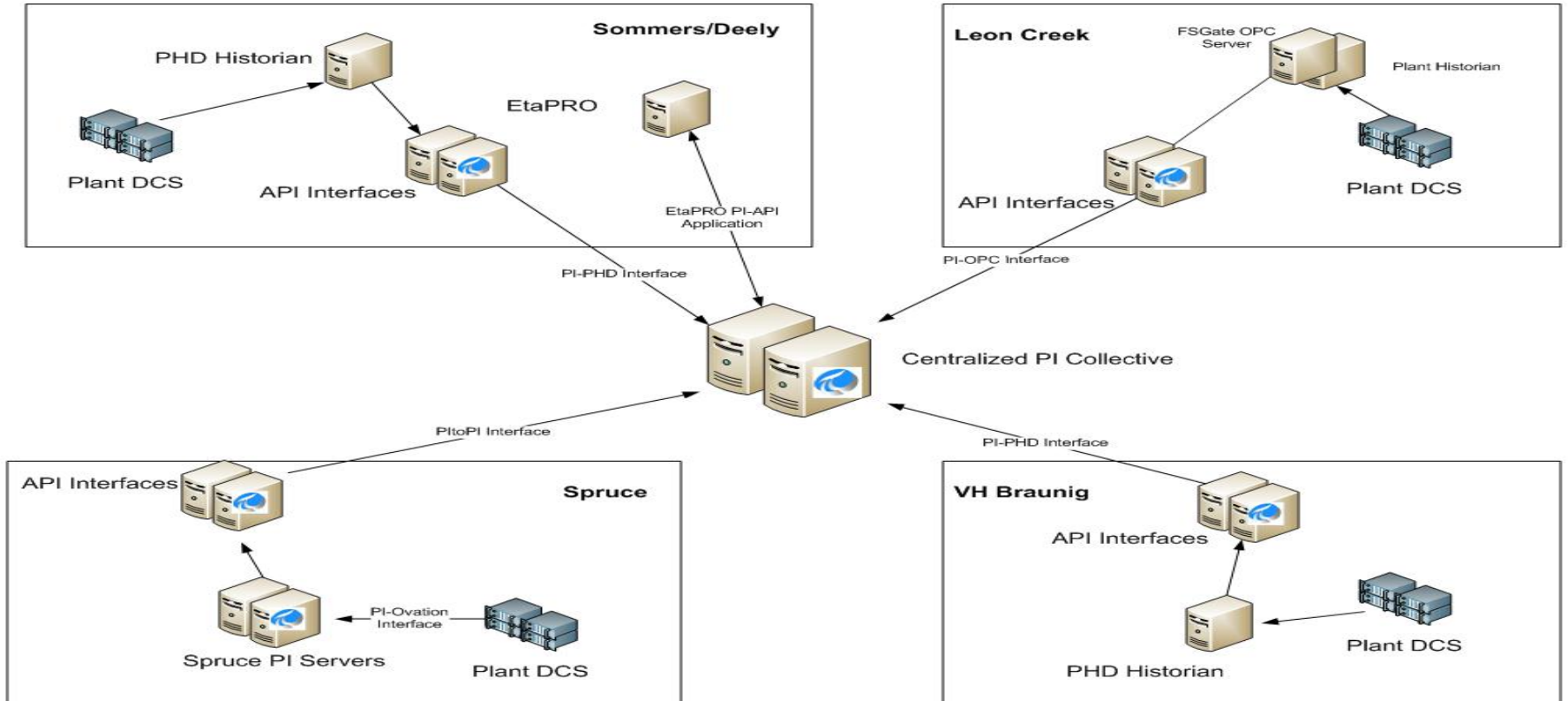
OSIsoft Products Utilized Today

- PI DataLink
- PI ProcessBook
- PI WebParts
- PI Module Database
- PI Notifications
- PI JDBC Driver
- PI ODBC Client
- PI OLEDB Provider
- PI OPC HDA Interface
- PI Server
- PI System Management Tools
- PI Tag Configurator
- PI to PI Interface
- PI Collective Manager
- PI MCN Health Monitor
- PI SDK

PI System architecture



PI System architecture





Benefits the PI System Has Brought to Operations

- Alignment with NERC CIP Requirements
- Users and applications have access to Real-time and Historical data via PI DataLink, PI ProcessBook, PI WebParts, and PI Web Services.
 - Repeatability of analysis
- Improved Visualization Tools
 - Monitoring, Analytics, Tuning
 - Dashboard's from Control Room to CEO's office
- Data Integration
- Improved Data Archiving and Access to Historical Data
- Compliance
 - Real Time Metrics
- One Version of the Truth
- Reliability
- Quality & Availability
- Scalability



Benefits the PI System Has Brought to Operations (cont.)

- Market visibility allows effective dispatch decisions
- Visibility of grid/market conditions to plants and public relations.
- Scalability
- Predictive Monitoring
 - Etapro
- Improved Key Performance Indicators
- Justification for Purchases
 - Equipment purchases, Maintenance, etc...
- Improved Alarm Notifications

Operation Displays

Home Documents and Lists Create Site Settings Help

cps ENERGY Nodal Fleet Overview Modify Shared Page

10 Nov 11 08:04:23

Nodal Fleet Overview

Unit Name	Unit Status	LMP Price \$	Actual Mw	Basepoint MW	5 Min GREDP %	HSL MW	LSL MW	Up Reg Cap MW	Down Reg Cap MW	Resp Reserve Cap MW	Non-Spin Cap MW	Plant Ramp MW/M	Normal Ramp MW/M	Emergency Ramp MW/M
STP1 (CPS Share)	Online							0	0	0	0	10	0	0
STP2 (CPS Share)	Offline							0	0	0	0	10	0	0
JKS1	Online							0	0	0	0	12	12	20
JKS2	Offline							0	0	0	0	12	12	16
JTD1	Offline							0	0	0	0	25	25	25
JTD2	Online							0	0	0	0	10	10	25
OWS1	Offline							0	0	0	0	3	3	36
OWS2	Offline							0	0	0	0	10	10	10
AVR-CC	Online							0	0	0	0	10	10	19
VHB1	Offline							0	0	0	0	5	5	21
VHB2	Offline							0	0	0	0	5	5	21
VHB3	Online							30	0	0	0	20	20	33
VHB6CT5	Offline							0	0	0	0	10	10	11
VHB6CT6	Offline							0	0	0	0	5	10	11
VHB6CT7	Offline							0	0	0	0	10	10	11
VHB6CT8	Offline							0	0	0	0	10	10	11
LCPCT1	Offline							0	0	0	0	10	10	11
LCPCT2	Offline							0	0	0	0	10	10	11
LCPCT3	Offline							0	0	0	0	10	10	11
LCPCT4	Offline							0	0	0	0	10	10	11
INDMESA1	Offline							0	0	0	0	6	6	6
INDMESA2	Offline							0	0	0	0	6	6	6
SWT3	Offline							0	0	0	0	6	6	6
SWT24	Offline							0	0	0	0	6	6	6
SWT4A	Offline							0	0	0	0	6	6	6
SWT4B	Offline							0	0	0	0	6	6	6
PAPA1	Online							0	0	0	0	6	6	6
PENA2	Online							0	0	0	0	6	6	6
CEDROHIL	Online							0	0	0	0	6	6	6
BLUWNG1	Online													
BLUWNG2	Online													

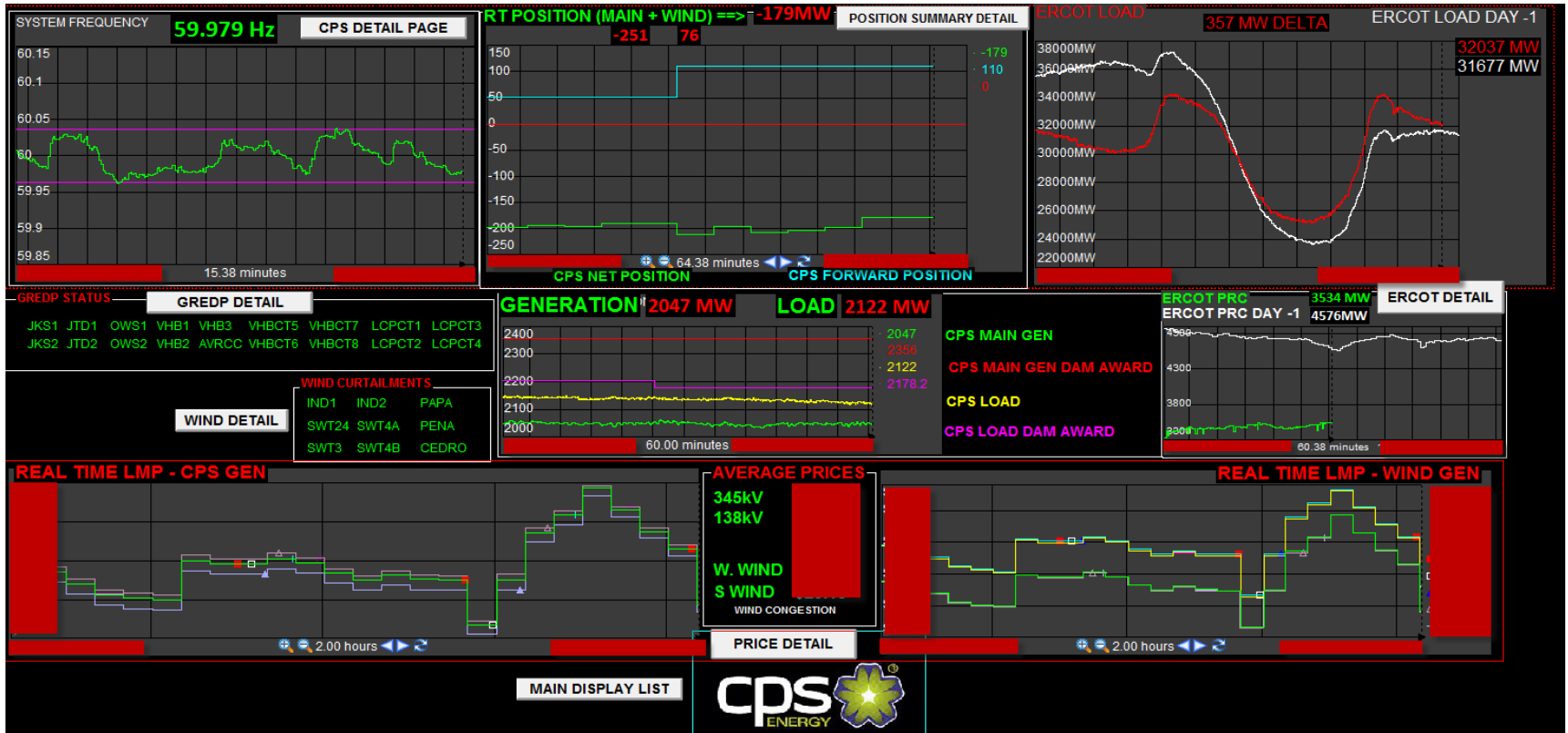
Nodal Data

- Nodal Fleet Overview
- Nodal Data - JKS1 and JKS2
- Nodal Data - JTD1 and JTD2
- Nodal Data - LCPCT1 and LCPCT2
- Nodal Data - LCPCT3 and LCPCT4
- Nodal Data - OWS1 and OWS2
- Nodal Data - VHB1 VHB2 VHB3
- Nodal Data - AVR VHB6CT5 VHB6CT6
- Nodal Data - VHB6CT78
- Add new link

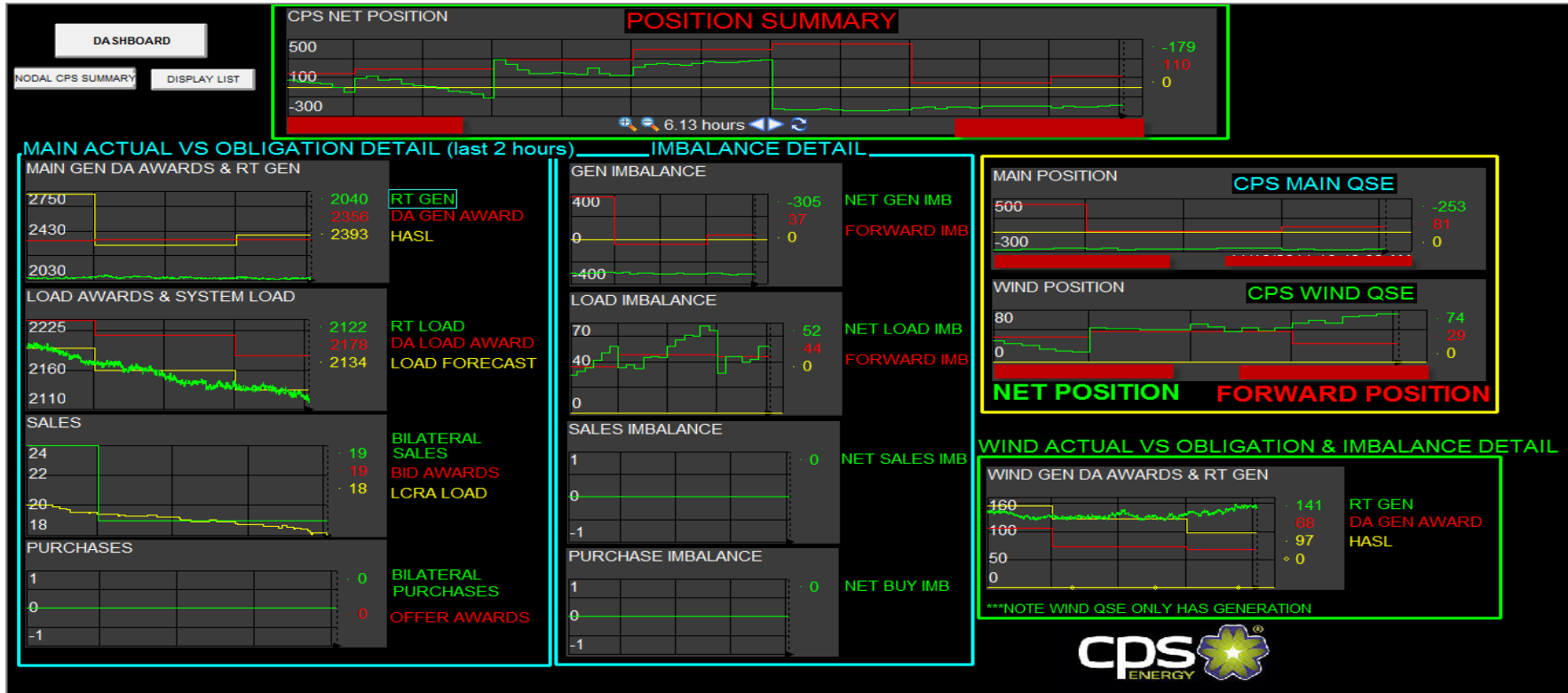
Portal Links

- Nodal Fleet Overview
- Station Overview
- Turbine Overview
- Generator Overview
- Plant Equipment
- CEMS Hourly Max
- Water Quality
- Net Imbalance LCRA
- Add new link

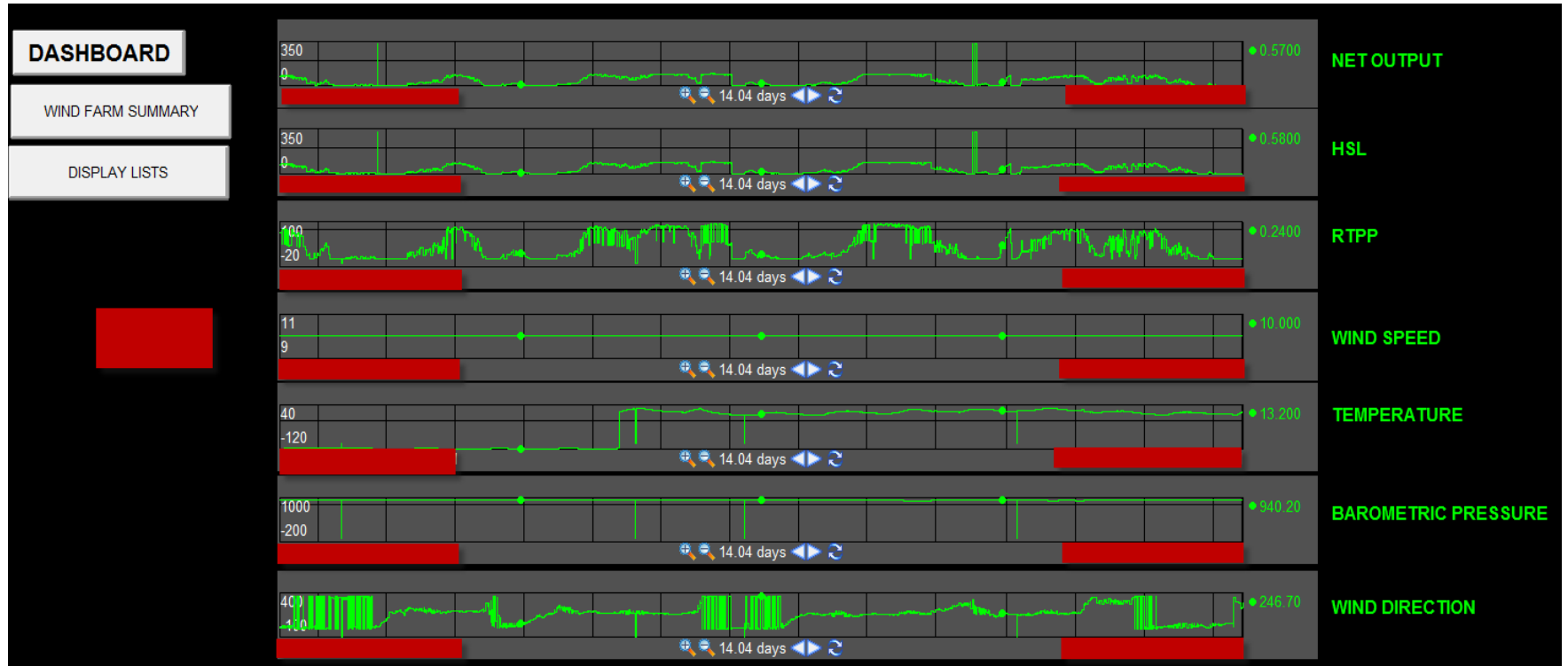
Operation Displays



Operation Displays



Operation Displays





Future plans and next steps

- Upgrade our existing Centralized PI Server to PI Server 2010
- Upgrade to SharePoint 2010 and PI WebParts
- Install High Availability PI AF Server
- Install High Availability PI IT Monitor System
- Install PI Coresight
- Install PI Web Services
- Upgrade PI APIs to OPC
- Create Additional PI Notifications



Questions

- Edward Aranda
- SCADA Manager – Energy Market Operations IT
- earanda@cpsenergy.com

- David Kee
- Generation Planning Engineer – Operations Analysis
- dekee@cpsenergy.com



Thank you