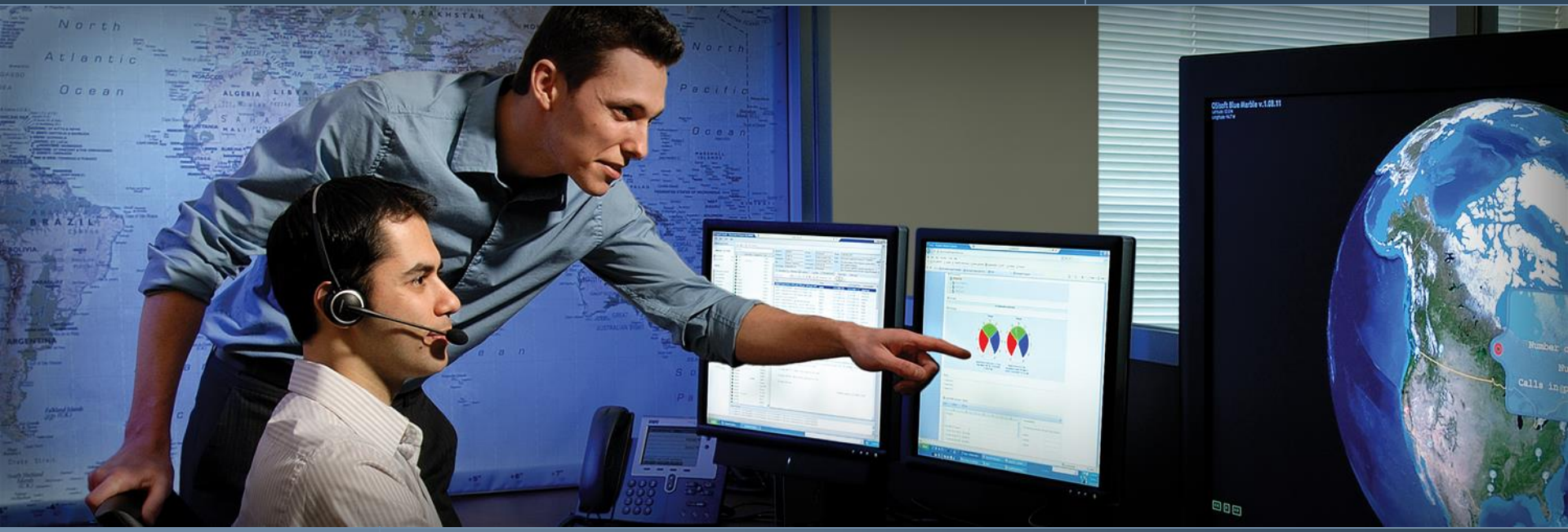
Regional Seminar Series
Phoenix / Scottsdale, AZ



Free the Data!

Kevin Doyle, Senior Analyst/Integrator, APS
Mike Jensen, Senior Analyst/Integrator, APS
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11/5/09

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Regional Seminar Series

Free the Data!

Kevin Doyle

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11/5/2009

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In the summer of 2003, we were implementing a PI system at Palo Verde Nuclear Generating Station. As you can imagine, there we plenty of reasons to delay, stall or slow down the project.

It seemed like the data, and the associated value, was being held hostage by lethargic processes, fear, and apathy.

In our frustration, we coined the phrase "free the data."

*"**Free the Data**" became the slogan of the project.*

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People are hungry for the data, and the data is ripe for harvesting.

Data

Barriers

- Fear
- Laziness
- Da ed Pol
- Ignor e
- Technical Challenges
- Lethargic Processes

The PI System

Value

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We support the APS Fossil Generation Fleet

8,802 MW – 46 units – >1200 employees

Site	Fuel	Units	Output
Four Corners	Coal	5	2060
Cholla	Coal	4	1021
West Phoenix	Gas	7	988
Ocotillo	Gas	4	330
Redhawk	Gas	2	984
Saguaro	Gas	6	415
Sundance	Gas	10	420
Yucca	Gas	8	340

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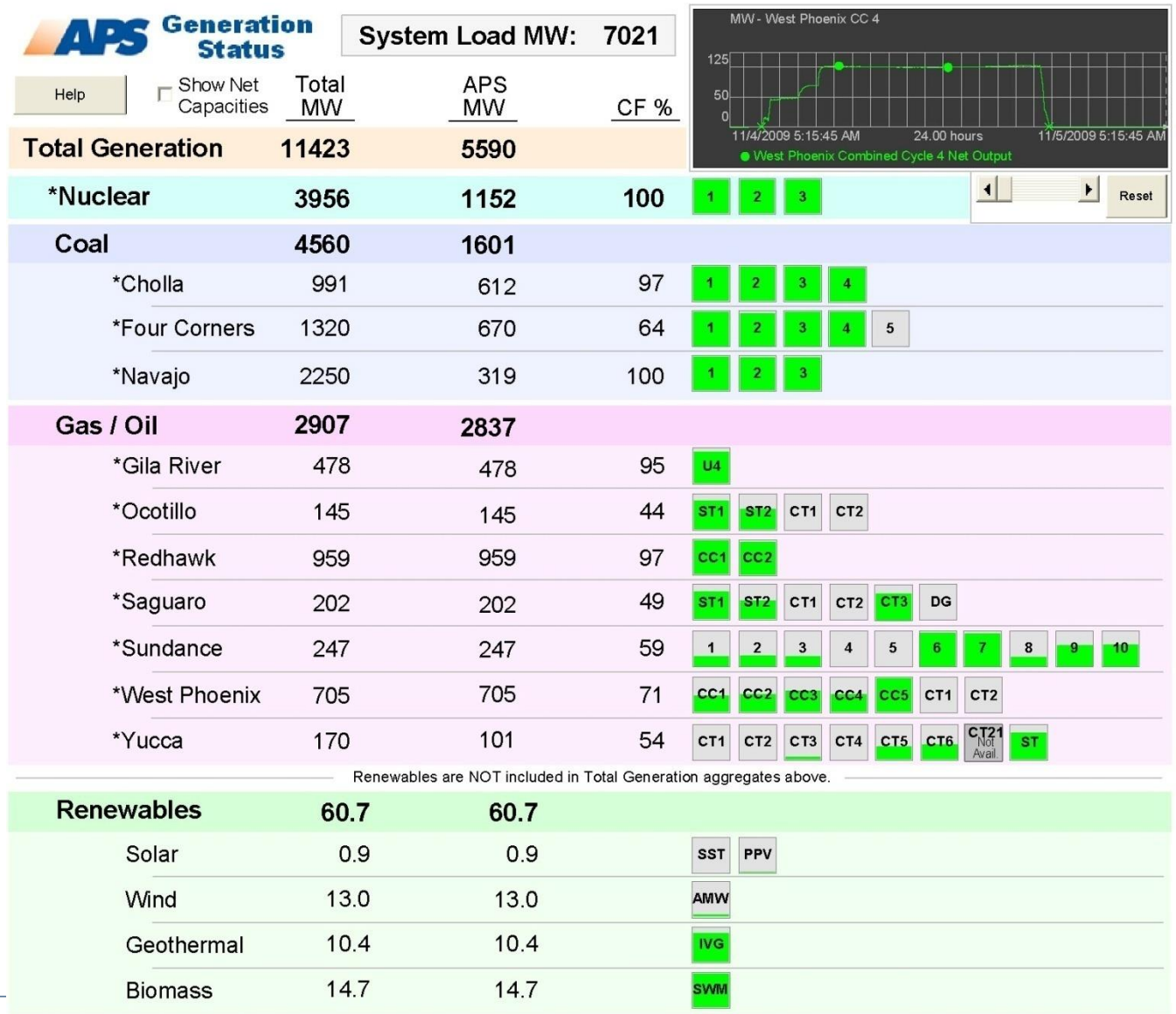
From the perspective of PI……



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A System Roadmap is not…..

- ….a plan.
  - *Plan the work……work the plan.*

  Sounds good, but things change and people get confused
- ….a budget.
  - *Justify it, then…..use it or loose it?*

    Too much up front effort and a fixed time frame
- ….a strategy .
  - *No expensive consultants required*

    Simple plain English, everyone understands

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APS PI System Roadmap

A System Roadmap is…..

- a method to…..
  - define a vision
  - divide and conquer work across organizations
  - communicate with users and management
  - prepare long range budgets
  - ensure all important areas are addressed
- a tool that is…..simple, flexible and convenient

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Take a holistic approach, recognize interdependance

APS PI System Roadmap

Layer	Definition
Platform	The PI system as a whole, the architecture
Adoption	The human side: communication, training, etc…
Visuals	Anything the users interact with
Analytics	Tools that use raw PI data to improve decision making
Modules	The abstract or semantic layer
Server	The PI Server
Interfaces	The software that moves the data into the PI Server
Sources	The sources systems: DCS, weather, web, databases, etc…

First, define the functional areas of the platform. For the PI System we chose to follow the conventions set by OSISoft and added a couple of our own. We called them layers to follow OSISoft's marketing nomenclature.

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Define an optimistic future

APS PI System Roadmap

Layer	*Vision*
Platform	*Modern utility with automated optimization*
Adoption	*Data driven decision making permeates Generation*
Visuals	*Users can find and analyze data without training*
Analytics	*Analytics leverage PI platform and are deployed within 1 month*
Modules	*Standardized modules are used for all displays and applications*
Server	*All time-series data in PI*
Interfaces	*No data lost*
Sources	*PI system is irrelevant to process systems*

Then, for each layer we stated a vision.

A vision is an ideal, most likely impractical, but very useful when planning.

Again, since it is a roadmap, nothing is written in stone. If we need to change something, we do.

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Make it actionable
APS PI System Roadmap

Layer	3 months	1 year	3 years	*Vision*
Platform	Complete Test/Dev Environments PI Reliability Project (Standard architecture and monitoring)	Version Control/Change Mgmt. Maximo process for PI changes	Enterprise License Agreement	*Modern utility with automated optimization*
Adoption		½ day training sessions Technical Refresher Course for admin/power users Business Process integration	Once a year 3 day technical training	*Data driven decision making permeates Generation*
Visuals	RtWebParts in Fossil MOSS site Managed Install for Processbook DCS displays (GRITS) Standard for estimated data	R3 Fleet Displays (MDB)	Develop display conventions	*Users can find and analyze data without training*
Analytics	Generic RDBMs interface EMIS Interface Integration with SmartSignal (xConnector) Develop starndard architecture Implement starndard architecture Implement Standard Monitoring	Integration with Maximo Integration with Neuco Integration with Matrikon Moving WP Optim server Integrating TSI em plant PI system (4	Start/Stop Runtime ACE Modules	*Analytics leverage PI platform and are deployed* *month*
Modules	Hierarchy Drafts (from MXES)	Navigation Modul Fleet MDB MXES Hiearchy Pi		*zed modules are ll displays and ns*
Server	Develop starndard architecture Implement starndard architecture Implement Standard Monitoring	PI Server 3.5 Upgra		*series data in PI*
Interfaces	Fix tag configurations Develop starndard architecture Implement starndard architecture Implement Standard Monitoring	Auto point synch EMIS (feed) Monitor Labs RegPerfect Turbine Package interfaces		*No data lost*
Sources	Operator Handhelds RENEWABLES	List data sources – prioritize Sundance DCS EMS on G/O (OPC) GADS (RDBMs) Wireless (fast, cheap, and easy)	Secondary Sources (e.g. chemistry, vibration, lube lab, auxiliary systems…) All high ranked data sources in PI	No Impact on Source System Performance

Finally, we added the major steps in obtaining our vision, making sure that we gave appropriate attention to each layer

Show progress, build confidence - Travel Log

APS PI System Roadmap

Layer	2009	*Vision*
Platform	PI MOSS site Recurring monthly PI users meeting Roadmap approved Dev Environments	*Modern utility with automated optimization*
Adoption	APS User Group Mtg. ½ day training session @ WP ½ day training session @ 4C Operations In person User Group Meeting Standing APS User Group Mtgs.	
Visuals	Pilot RtWebParts Utility Displays (YouTrend!)	*can find and analyze data thout training*
Analytics		*Analytics leverage PI platform and are deployed within 1 month*
Modules	Investigate MDB hierarchy options	*Standardized modules are used for all displays and applications*
Server	Update to 3.4	*All time-series data in PI*
Interfaces	3+ OPC inte Standard/Pr exception se	
Sources	Yucca DCS	*No Impact on Source System Performance*

In order to keep the Roadmap forward looking, we record our accomplishments in the "Travel Log."

To keep everything flexible, accessible, and versioned, we moved it to a wiki.

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Roadmap Success Stories

- YouTrend
- Blackberry PI
- Forecast weather data from the web, for Renewables

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Trending for all……

- **Goals**
  - No PI display building skills required
  - Find specific data fast
  - Easily use the data fast
- **Approach**
  - Research best practice web trending
  - Make the great PI trend functionality intuitive
  - Use web conventions, everyone knows them

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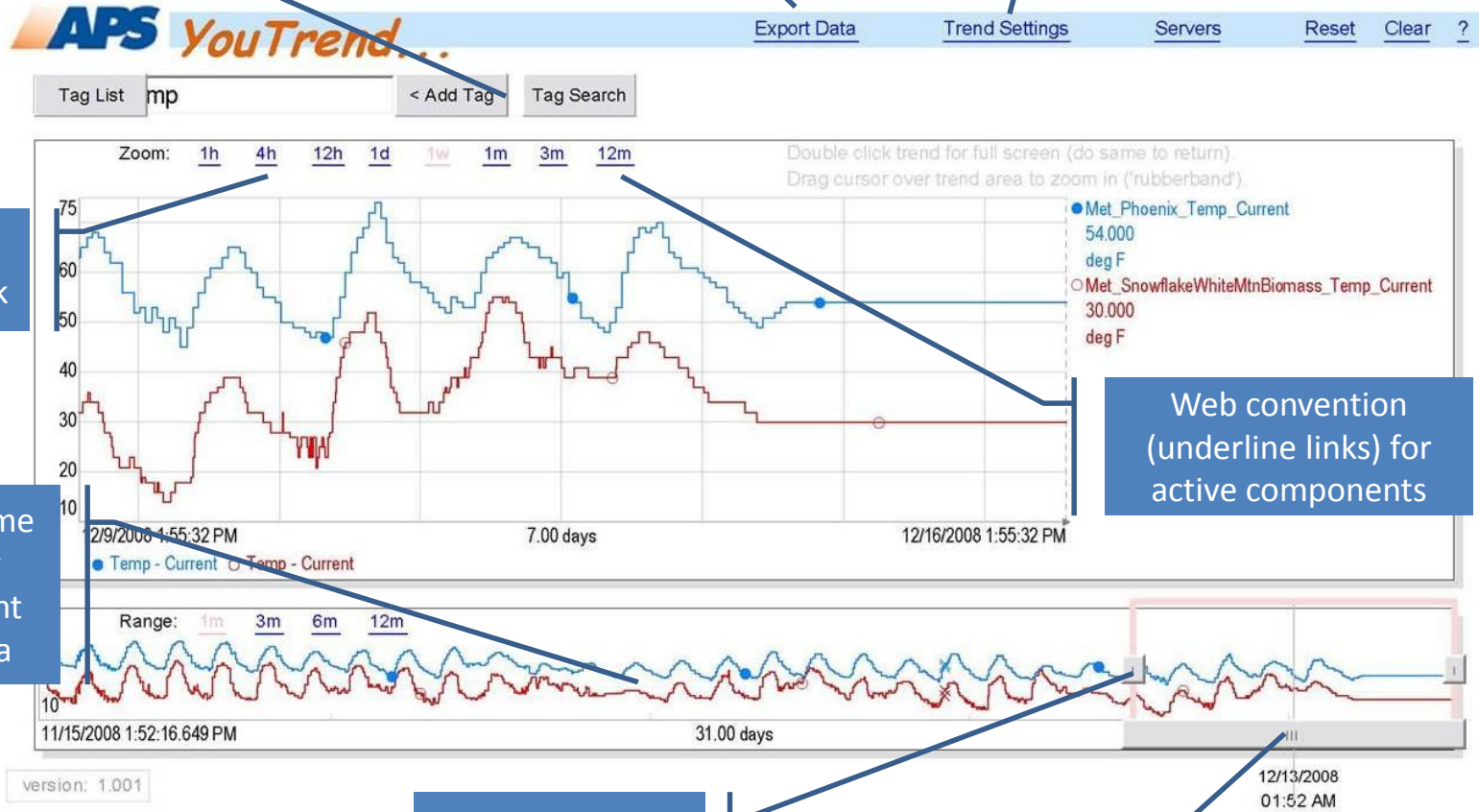
YouTrend

Search or add a tag easily

Export upper window data to Excel

Adjust trend settings with simple checkboxes in a drop down menu



Adjust the time scale with one click

Web convention (underline links) for active components

Lower, longer time scale, window shows significant changes in data

Resize the zoom window

Drag bar to scroll zoom in upper window

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Blackberry PI

---- Homemade with simple ingredients ----

- Origins
  - Executive requested fleet status on his Blackberry
  - Presented various options, from inexpensive and fast, to full blown KPI's
  - Of course, he chose the least expensive and fastest
- Result
  - html with images generated from ProcessBook, via ACE, sized for mobile platforms
  - Updated every 5 minutes
  - Viewable in any browser or webpart, platform independent

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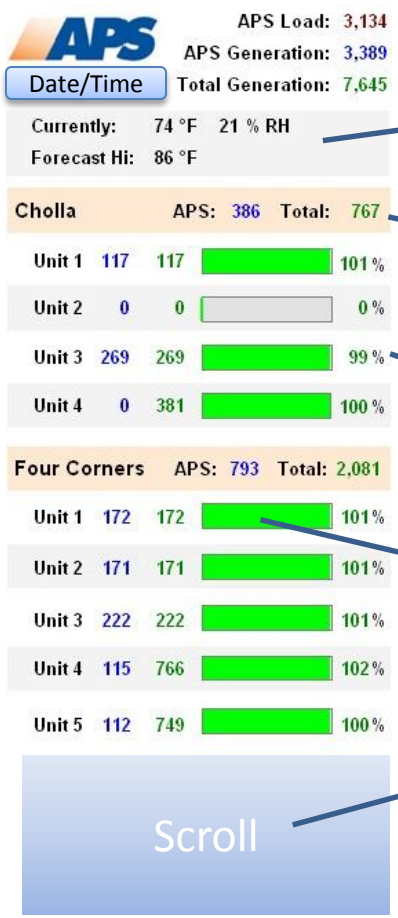
Blackberry PI



Overall Fleet Status

Relevant Weather Data

Overall Site Status

Individual Unit Status

Bar represents percent of capacity

Scrolls to view other sites

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MOSS PI

Adapted Blackberry PI for MOSS webpart (Microsoft Office Sharepoint Services)

- More compact overview
- Links vs. scrolling
- Tool tips provide detail

Doesn't sound as good……

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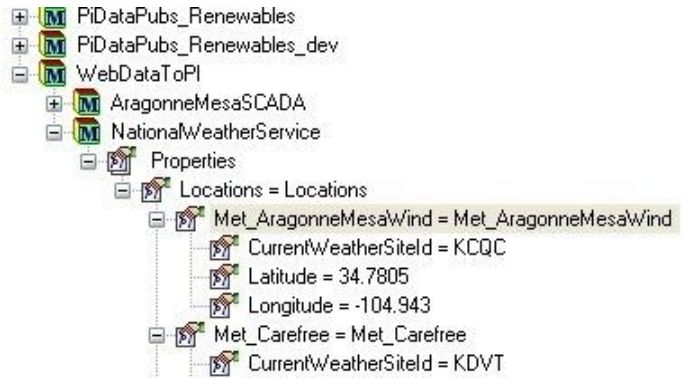
Weather Data from the National Weather Service
Renewables

- Two modes – Current and Forecast
  - Current weather from http://www.weather.gov/data/current_obs/[SiteID].xml
    - SiteID and location descriptions data driven stored in the MDB.



    - XML page parsed – though not a web service!
  - Forecast data from National Weather Service WebService from http://www.weather.gov/forecasts/xml/DWMLgen/wsdl/ndfdXML.wsdl
    - Latitude and Longitude stored in MDB with the previous SiteID
    - Soap interface handles all xml parsing and marshalling of data
- Both services are collected at 15 minutes intervals, though the services may not provide data this often.

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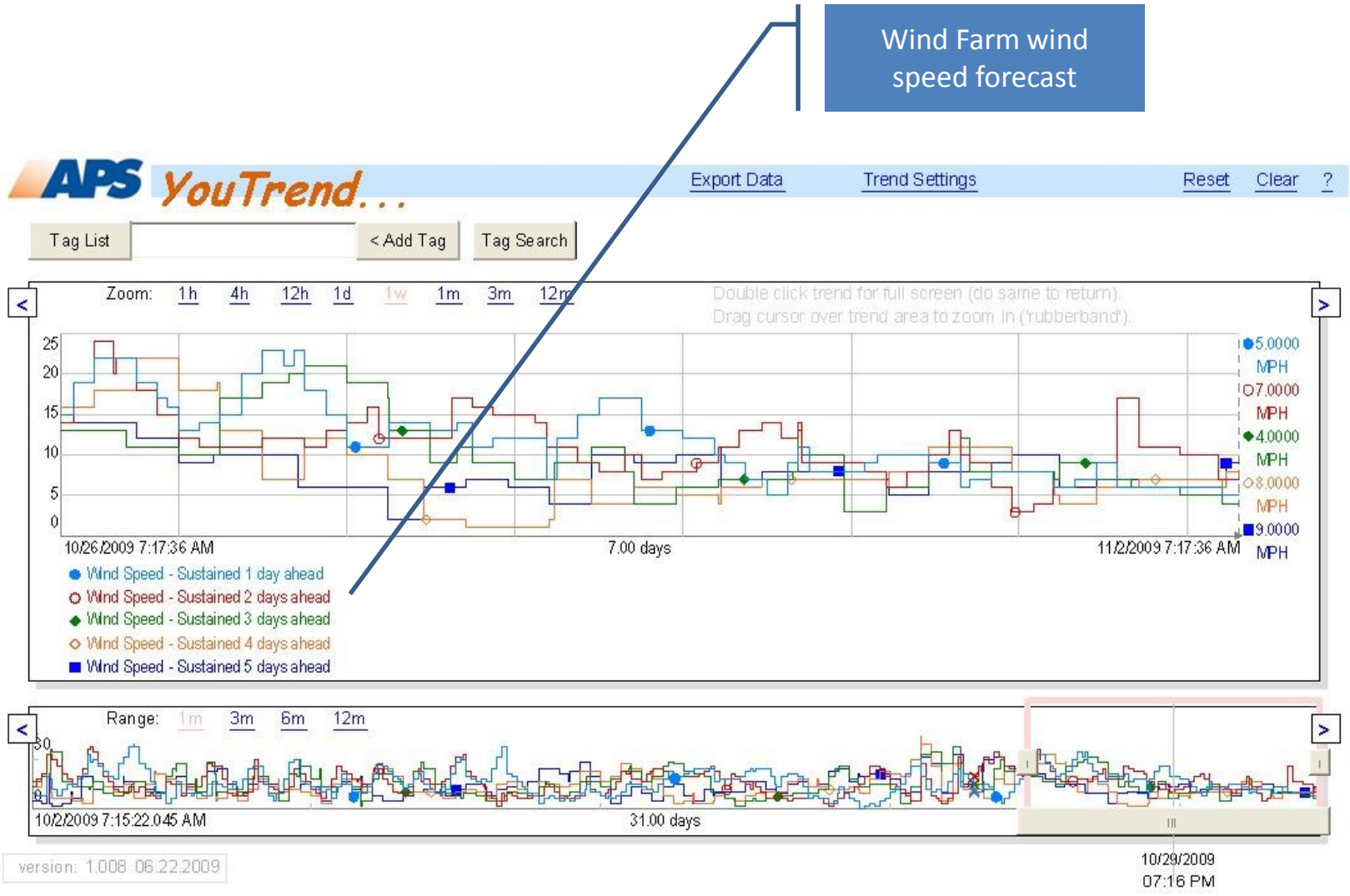
5 day look ahead for a single parameter



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Several conditions on a single day

Time slice of predicted weather conditons

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Thank you

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