

Solar Data Hub



PIX 15558



PIX 16995



PIX 17749

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**NREL Transmission
and Grid Integration
Group**

**UWIG Solar User
Group Meeting**

April 13, 2011

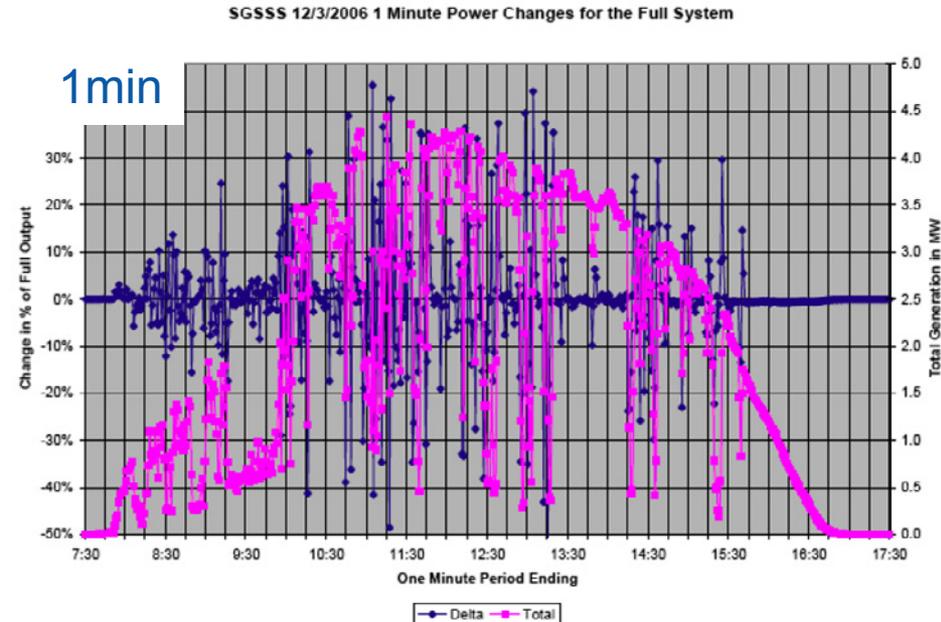
NREL/PR-5500-51372

What is the Need?

- **FEAR** and **UNCERTAINTY** among utilities about high penetrations of PV –
 - Concerns: system stability, increases in reserves, CPS2 violations, voltage regulation, etc.
- Concerns must be addressed to reach high penetrations.
- Primary barrier?

DATA!

THIS TERRIFIES UTILITIES



Source: Tom Hansen, Tucson Electric Power

Why?

- **Demand for solar is increasing rapidly.**
- Unknowns:
 - Impacts of variability on the grid;
 - Full extent of geographic diversity benefits;
 - Correlation and interaction between PV and other renewable energy resources;
 - Correlation of ramps in power production to ramps in irradiance.
- Benefits:
 - Predicted data for integration studies, transmission planning, and other studies;
 - Power production forecasts for utility operations;
 - Model and forecast validation;
 - Better knowledge, better management.
- **High-resolution solar radiation and power production data are not readily available from large plants.**
- Data collection and analysis done on an ad-hoc basis – a more sophisticated approach needed.

What We Know

For wind:

- The variability decreases with increasing geographic diversity within plants and across regions.
- Plant production does not scale linearly with capacity.
- Variability operational impacts tend to be on load following, and not on a regulation time frame.
- Load forecast errors are not linearly related to wind forecast errors.
- Studies suggest storage is unnecessary with penetration levels up to 30%.

For solar:

- Plant production does not scale linearly with capacity.
- Ramps can occur at shorter time scales than wind.
- Adjacent PV plants are more correlated than adjacent wind plants, but correlation decreases with distance.
- Solar power plants may contribute to voltage and frequency regulation within a region.
- **More solar data is needed to develop accurate models of large-scale solar plant performance and characterize solar variability.**

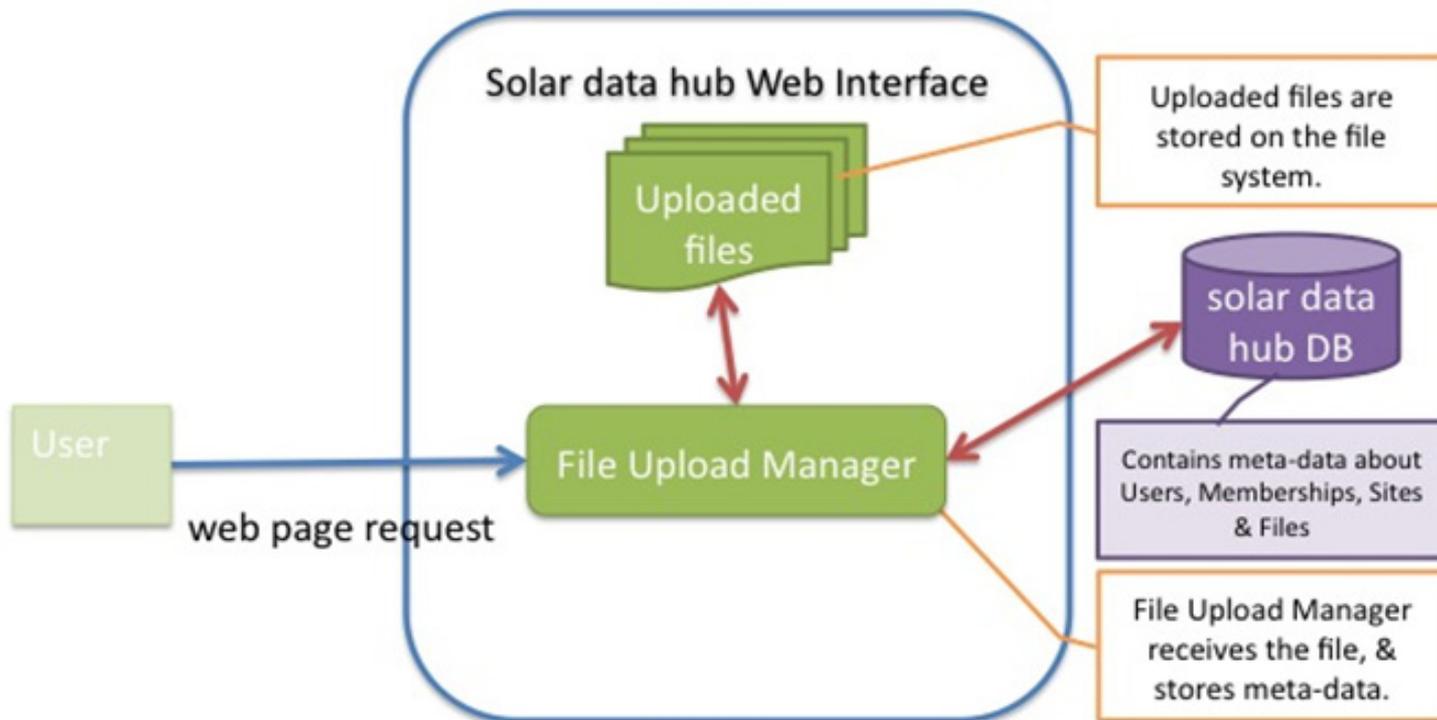
Solar Data Hub

- Born from PV Variability Working Group.
- Project Team consists of DOE labs, EPRI, and industry partners.
- Development sponsored by DOE.
- Centralized data repository:
 - Collect, manage, store, and provide access;
 - Public and proprietary information will be stored in the data hub;
 - Proprietary information will be secure and have restricted access;
 - Data quality will be evaluated through a semi-automated QA/QC process.

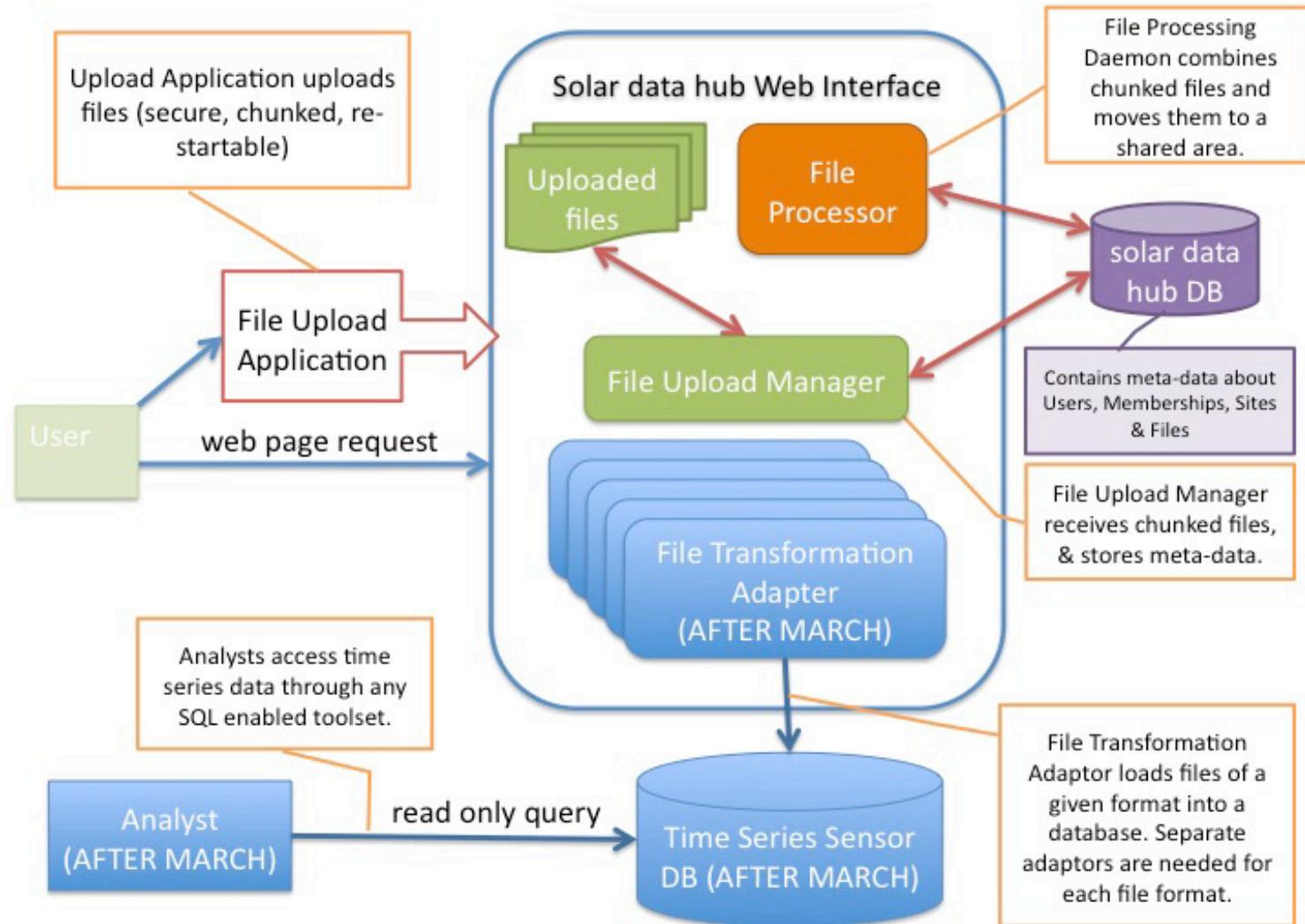
Beta Version – Went Live April 1

<http://solardatahub.org>

Solar Data Hub Architecture (March 31)



Future Version



Timeline for Upgrades (TENTATIVE)

Objective	Timeline
Add Feedback form	May 1, 2011
Semi-automated quality control of data	June 30, 2011
Basic visualization (time series plots)	August 30, 2011
Provide real-time data feed capability	November 30, 2011
Enhanced visualization and coordination with PVDAQ	January 31, 2012
Incorporate grid integration datasets	June 30, 2012