



Unidata Policy Committee NOAA/NWS Update

May 12, 2009
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NOAA's National Weather Service

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Outline

- AWIPS I Update
- NWS Strategic Plan development
- NPOESS Update
- NOAA's role in Renewable Energy



AWIPS I Update

- AWIPS I – final release being extended to fix software problems
- Last release before AWIPS Migration
- Regions have identified a series of Discrepancy Reports which affect Operations and require fixing before AWIPS Migration
- Last AWIPS I Build 9.3 released delayed from Sept 09 to Jan 10 – suggests potential delay to AWIPS Migration schedule



**National Weather Service
Customer/Partner
Strategic Plan Input**



Timeline

Phase 1

- March 8 – 26, 2009
 - *Solicit initial internal input*
- March 24 – May 1, 2009
 - *Solicit initial Customers/Partners/Individuals input*

Phase 2

- June 1 – September 15, 2009
 - *Invite internal/external review & feedback of first draft; Conduct constituent workshops and town halls.*

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NWS's Initial Analysis: *Drivers for Change*

- High interest in climate issues
 - *Increasing demands for relevant, science-based climate information to aid decisions and policy making*
- Greater environmental awareness and how it affects standard of living and well-being
 - *Increased need for accurate and timely weather, water and climate information integrated into decision-making*
- Growing national energy concerns create opportunities for implementing renewable energy
 - *Increasing demand for wind, solar, tidal forecasts, etc.*

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NWS's Initial Analysis: Drivers for Change



- Extraordinary **water resource challenges** associated with rapid development, population shifts, and climate change, especially in coastal areas
 - *Need for science-based water information at the right temporal and spatial scales*
- Increasing globalization and standardization of information systems
 - *Allows for greater collaboration, information sharing and data exchange among nations with the goal of improving accuracy of forecasts and warnings*

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NWS's Initial Analysis: Drivers for Change



- America's weather and climate industry growing in size and sophistication creates opportunities for collaboration and partnership to:
 - *Address decision support needs of commercial interests and other clients*
 - *Leverage private investment in observing systems and other weather infrastructure*
- Continuous advances in science, technology and computing power
 - *Creates more comprehensive, accurate, and precise representation of earth system*
 - *Allows for more robust, accurate estimates of risk, uncertainty, and confidence*
- Increasingly mobile and tech-savvy customers
 - *Expectation for information delivered on time, real time, any time and anywhere*

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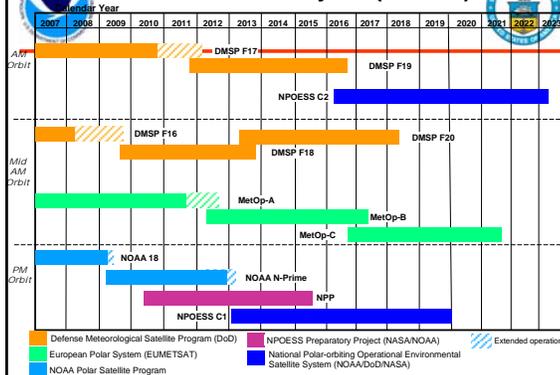
NPP/NPOESS plans



- NPP
 - *PM orbit*
 - *Payload:*
 - Visible/Infrared Imager Radiometer Suite (VIIRS), Cross-track Infrared and Advanced Technology Microwave Sounders (CrIS/ATMS), Ozone Mapping and Profiler Suite- Limb and Nadir (OMPS), Cloud and Earth Radiant Energy System (CERES)
- NPOESS C1 and C3 PM orbit
 - *Payload:*
 - Same as NPP, plus Total Solar Irradiance Sensor (TSIS), Space Environment Monitor (SEM), and communications packages SafetyNet and A-DCS/SARSAT. OMPS is Nadir only
- NPOESS C2 and C4 AM orbit
 - *Payload:*
 - VIIRS and Microwave/Imager Sounder (MIS), plus communications packages for SafetyNet and A-DCS/SARSA



Polar Satellite Flyout (12-4-08)



Assessment of NPP /NPOESS User Impacts



- NPP has experienced significant schedule overruns that has delayed its June 2010 launch date. VIIRS is experiencing technical problems, necessitating a mid-term correction in strategy
- A Tri-Agency team has assembled options to maintain continuity for the NPP/NPOESS mission
- User impacts of these options are being sought across the three agencies, and within each impacted goal and LO.



NOAA's Opportunities to Help Solve the Nation's Energy Challenge

Research Program Office, Office of Director, ESRL





Outline



- Current versus Future U.S. Energy System
- NOAA's Capabilities to Advance Renewable Energy (RE)
 - Measurement Systems
 - Observations Networks
 - Weather Forecasts, improved models, data assimilation
 - Climate Models
 - Data Collection, Verification, and Distribution
 - Data Visualization Systems
- NOAA's Crucial Role



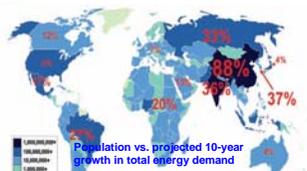
U.S. and Global Energy Demands Continue to Rise



Growth in U.S. Energy Demand



Growth in Global Energy Demand



Population vs. projected 10-year growth in total energy demand
(% increase compared to 2006 value in each country) per capita



Cooperative Agreement between NOAA ESRL and DOE's National Renewable Energy Lab (Golden)





New, monthly seminar hosted by NOAA ESRL and DOE NREL

"Sustainable Energy and Atmospheric Sciences"

- Diverse audience, e.g., CU, private industry, public
- Jan. seminar drew people, including many private companies from around the U.S.

Currently developing an MOU with NREL

March seminar addressed systems integration



NREL Director Dan Arvizu

Letter of Intent signing with Sandy MacDonald, Director of NOAA ESRL; Andy Karsner, DOE DUS for Renewable Energy; and Dan Arvizu, CEO of NREL, July 31, 2008.

www.esrl.noaa.gov/research/events/seas



NOAA has Specialized Instruments for Studying Wind



Scanning wind-sensing instrument to study LLJ, turbulence, and wind resources
Built and operated by NOAA / ESRL.

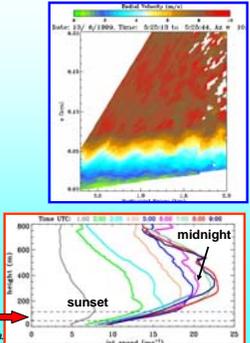
Wind and turbulence

- Images of the flow
- Profiles and time series
- Turbulence intensity
 - Could damage turbine hardware
- Shear across the rotor layer
- Power curve validation

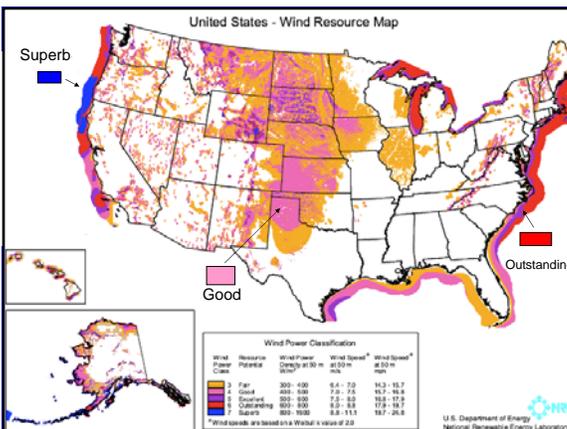
Low-level Jet – nocturnal

- Major warm-season wind resource in the U.S. (Great Plains)
- LLJ climatology-frequency, U_{max} , D_{max} , Z_{max}
- Shear & turbulence - cause rotor vibrations
- Representation in models

Turbine blades at this height

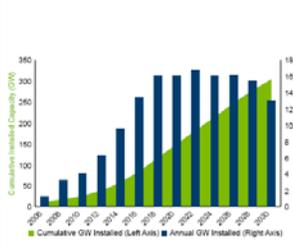


Neil Kelly (NREL) & Bob Banta, Yelena Pichuginina (NOAA), Lamar, Sept. 2003.




DOE's Vision: 20% Wind Energy by 2030





20% Wind Energy by 2030
Increasing Wind Energy's Contribution to U.S. Electricity Supply

<http://www.20percentwind.org/>

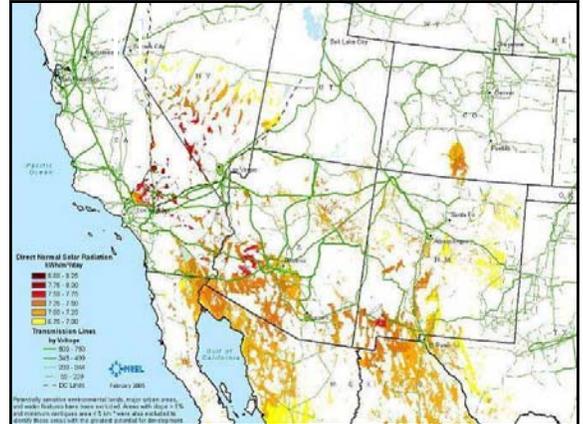




20% Wind Energy by 2030: Economic Benefits



- Report finds that, during the decade preceding 2030, the U.S. wind industry would create many good jobs.
- Support ~ 500,000 jobs in the U.S.
 - >150,000 workers employed directly by wind industry
 - >100,000 jobs in associated industries, e.g., accountants, lawyers, steel workers, electrical manufacturing
 - >200,000 jobs through economic expansion based on local spending;
 - Increase annual property tax revenues to more than \$1.5 billion by 2030
 - Increase annual payments to rural landowners to > \$600 million in 2030.



Examples Targets for Support NOAA Could Offer for Solar Energy



- > Acquire enhanced solar observational database to help evaluate current and future solar resource for spatial and temporal variability.
- > Enhance ability to infer direct solar radiation at the surface from satellite data using these validation datasets.
- > Improve cloud forecasts in models and fundamental understanding of clouds, including improved assimilation of cloud observations in NWP models.
- > Develop and validate surface solar radiation forecast products (direct and total).
- > Assimilate current aerosol and albedo data into forecast models.
- > Develop seasonal forecasts products that address regional solar energy potential in the U.S.
- > Develop data distribution and visualization tools.



U.S. Renewable Electricity Generation in 2030



<u>Technology</u>	<u>Percent of Grid Energy in 2030</u>
Concentrating Solar Power*	7
Photovoltaics	7
Wind	20
Biomass*	8
Geothermal*	9
Total	51

*Can provide baseload or near-baseload power
 - American Solar Energy Society (2007) "Tackling Climate Change in the U.S."
 These are conservative estimates of what could be practically done with existing technology. The DOE is currently developing a plan whereby the U.S. could achieve 80% of its electricity from renewable sources by 2050.



NOAA's Capabilities to Advance Renewable Energy



- Advance measurement systems
- Deploy observing networks
- Improve weather forecasts (improved models and data assimilation)
- Improve climate models and diagnosis (understanding climate processes)
- Enhance environmental data visualization systems
- Enhance data collection, verification & distribution system