



Integrated Water and Energy Planning

Groundwater Protection Council
Water/Energy Sustainability Symposium

September 28, 2010

Western Governors' Association

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www.westgov.org



The Energy-Water Nexus and Transmission Planning

Overview

- **RTEP Overview**
- **Making the Case for Energy-Water Considerations**
- **Project Goals and Benefits**
- **DOE Research Call**
- **The Energy-Water Workplan**
- **Stakeholder Engagement**



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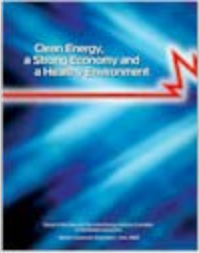


Through the leadership of the Governors, WGA brings together Western states to:

- Develop policy and address important governance issues.
- Advance the role of the states regionally and at the national level.
- Develop and manage innovative programs related to natural resources, the environment, economic development, international relations and state governance.

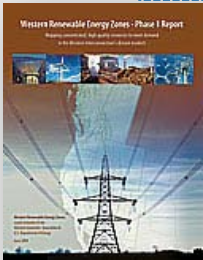


Recent WGA Energy Initiatives



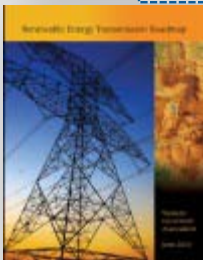
2004 - Clean and Diversified Energy Initiative

- Governors set goals of 30,000 MW of clean energy by 2015; 20% increase in energy efficiency by 2020
- Access to large-scale transmission identified as a major constraint to the expansion of renewable electricity



2007 - Western Renewable Energy Zones

- Facilitate the construction of new, utility scale renewable energy facilities and any needed transmission to deliver that energy across the Western Interconnection
- Identified zones of economical, high-quality renewable resources to aid in transmission prioritization




2010 - Regional Transmission Expansion Project

- Funded by a grant from the U.S. Department of Energy (similar projects in eastern and Texas interconnects)
- Seeks to analyze transmission requirements under a broad range of alternative energy futures and to develop long-term, interconnection-wide transmission expansion plans




Recent WGA Water Initiatives

2006 - National Integrated Drought Information System

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- Western Governors have long advocated for a comprehensive, integrated response to drought emergencies. In 2006, Congress passed passage of the National Integrated Drought Information System Act
 - WGA has worked with NOAA and other partners to establish www.drought.gov and to improve early warning systems, provide decision-support tools, and improve delivery of drought response programs for the end-users on the ground who are most affected by drought emergencies.

2008 – Water Strategies Initiative

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- The reports address a range of issues, including providing water supply to meet future demands, maintaining water supply infrastructure, resolving Indian water rights, preparing for climate change, and conserving endangered species.
 - Provide consensus recommendations for how the Western states can work with federal, local, and private sector partners to address these challenges.

Western States Water Council

www.westgov.org/wswc

- Affiliate of WGA based in Salt Lake City, Utah
- Includes Governor-appointed state water resource and water quality experts from 17 Western states



The Case for the Energy-Water Nexus

The Case for Further Analysis of the Energy-Water Nexus

- By 2030, '(water) consumption by the electricity sector alone could equal the entire country's 1995 domestic water consumption.' 2006 DOE Report to Congress
- Thermoelectric power plants account for 49% of water withdrawals nationally - 2005 USGS Water Availability Assessment
- Severe drought can reduce hydropower availability in the West by 30% and increase electricity prices by as much as 35% in the summer months - 2009 NETL Report
- "Policymakers have an incomplete picture of the impact that thermoelectric power plants will have on water resources in different regions of the country and will be less able to determine what additional activities they should encourage for water conservation in these areas" – 2009 GAO Report



Your Case for the Energy-Water Nexus

Keeping a single 60-watt light bulb lit for 12 hours requires as much as 60 liters of water

-Virginia Water Resources Research Center



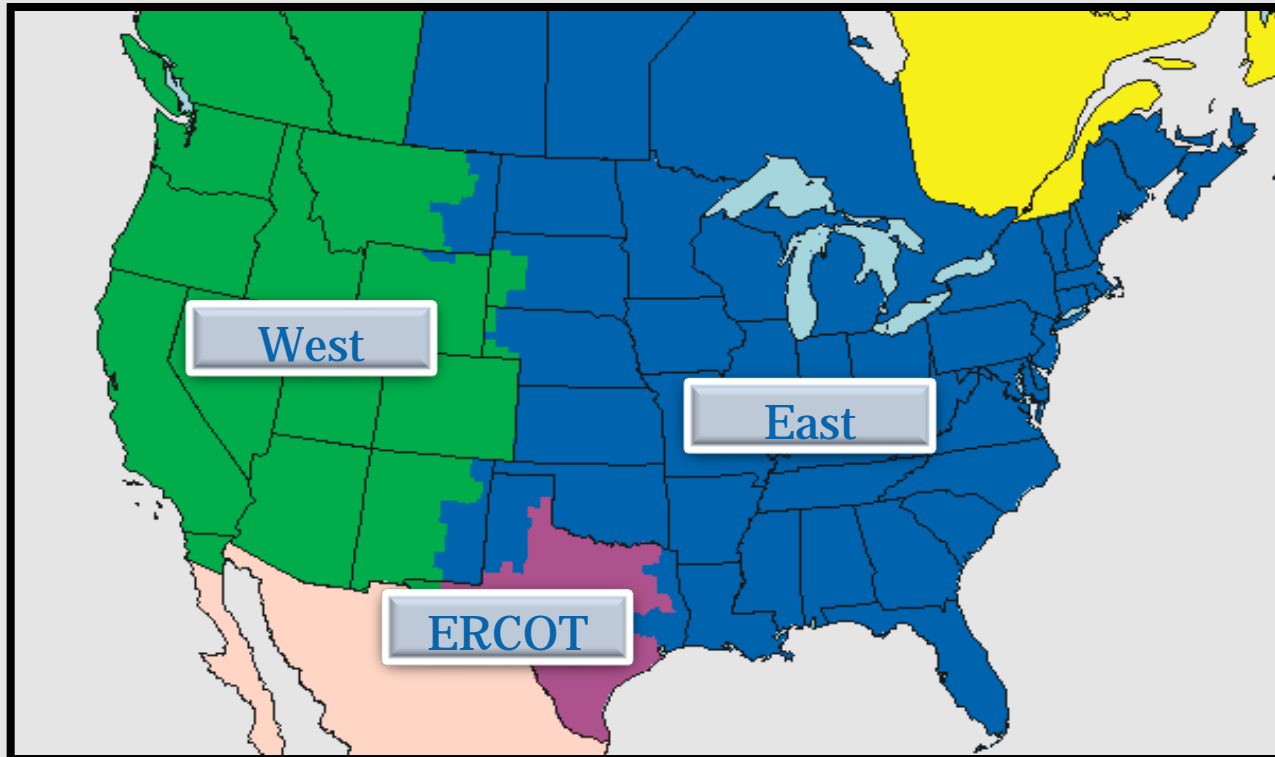
60 liters is approximately equal to 101 bottles of water



U.S. Electric Interconnections

Federal Energy Regulatory Commission Order 890

Requires public utility transmission providers to participate in open transmission planning processes at the local and regional level.



Project Goals

Project is being coordinated through the WGA and the Western States Water Council

Project Goals

1. Incorporate existing water supply assessments in Western states into a decision support framework for integrated energy-water planning
2. Evaluate electricity generation scenarios and their implications for water supply as part of Topic A (both water withdrawals and consumption)
3. Develop policies and/or programs to facilitate sustainable energy development in the context of economy-wide water availability



Project Benefits

- Position the governors to be proactive on future issues regarding water availability and energy development
- Provide a model for integrated planning in areas that have been traditionally stove-piped
- Provide context for valuing our limited water supplies



The Energy-Water Nexus: Work Plan

- Stakeholder Engagement
- Legal and Institutional Analysis
- Energy-Water Model Development
 - Water withdrawal and consumption calculator
 - Water availability and demand projections
- WECC Transmission Scenario Analysis
 - Relative water consumption by scenario
 - Drought and Climate Scenarios
 - Input into Generation Siting and Technology Mix
- Policy Development



DOE Research Call

Water/Energy Nexus Decision Support System to Assist Efforts in the Western and Texas Interconnection

- Award made to Sandia National Laboratory and a Consortium of Partners.
 - Argonne National Laboratory
 - Electric Power Research Institute (ERPI)
 - National Renewable Energy Laboratory
 - Idaho National Laboratory
 - Pacific Northwest National Laboratory
 - University of Texas



DOE Research Call

Sample DSS Interface

Power Plant Cooling Technology: Share of New and Replaced Plants using Specified Technologies.



DOE Research Call

Priority Tasks

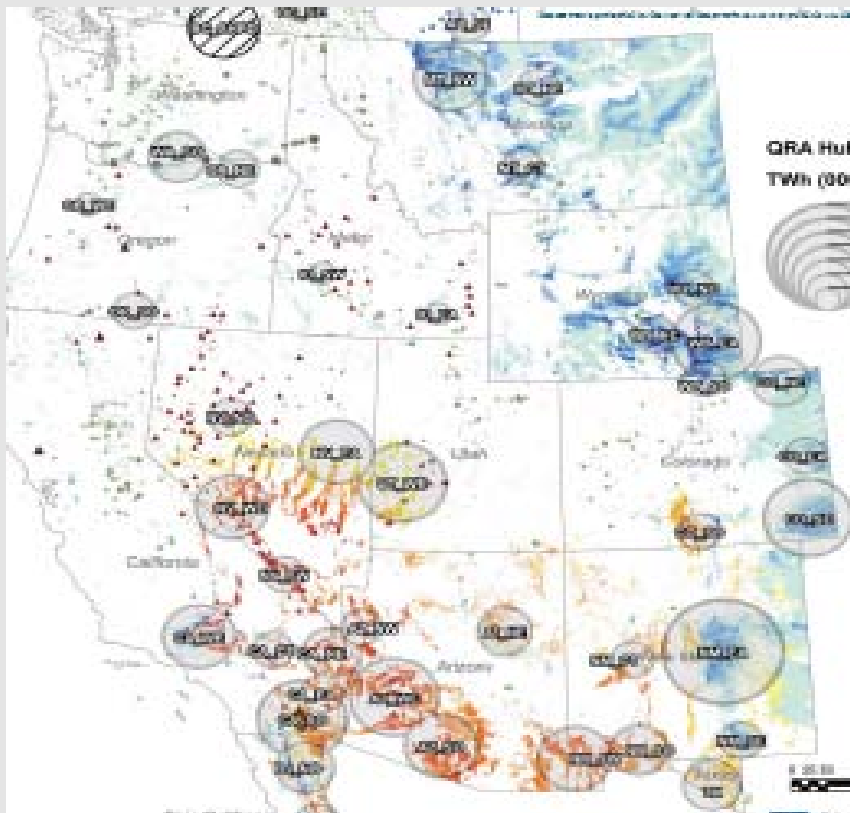
- **Water Withdrawal and Consumption Calculator for Current and Planned Electric Power Generation**
- **Water Demand**
- **Water Availability**
- **Electric Transmission and Generation Scenario Analysis**



Energy-Water Model

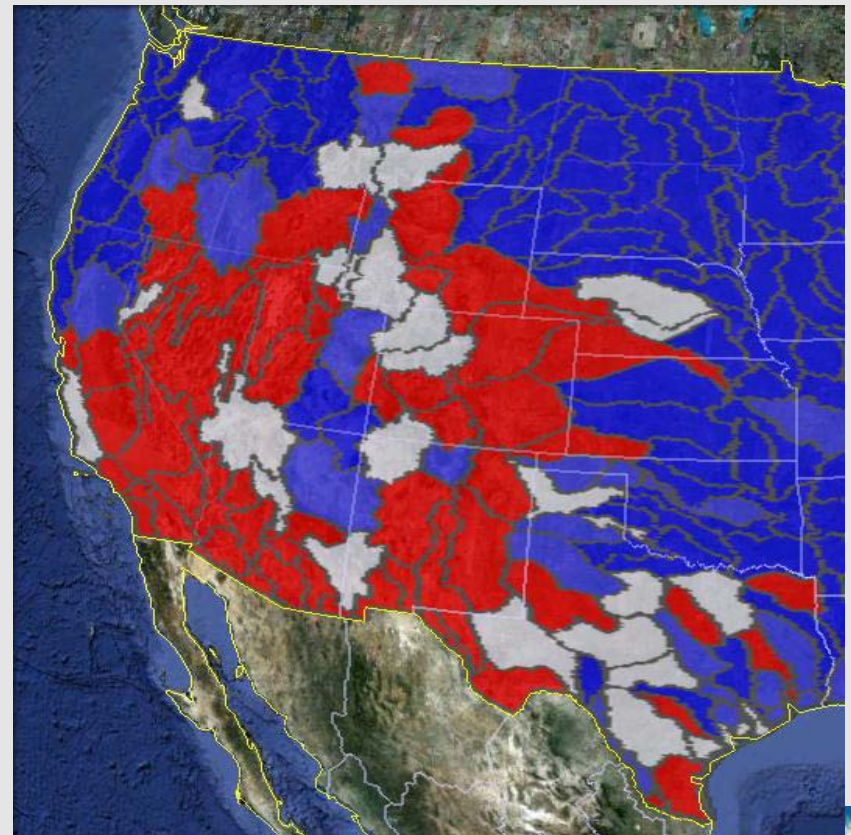
Western Renewable Energy Zone Renewable Resource Map

-Western Governors' Association



Water Availability and Demand Projections Ratio of Mean Stream Flow to Surface Water Demand

-Sandia National Laboratories



Stakeholder Engagement

Goal: Determine the Best Way to Integrate Water Supply Information into Transmission Planning

Coordinate with:

- **RTEP Decision Making Committees**
 - State and Provincial Steering Committee (SPSC) Scenario Work Group
 - Transmission Expansion Planning Policy Committee (TEPPC) Studies Work Group
 - Scenario Planning Steering Group (SPSG) and its Environmental Data Task Force
- **Interested stakeholders, including industry, NGOs, and academic experts.**
- **Parallel efforts (e.g. NOAA Western Water Assessment, UCS energy-water project)**



Challenges and Initial Lessons Learned

Cultural differences between energy and water communities

- **Terminology, fundamentally different approach to regional planning**
- **How do we promote the “acre-watt”?**

Need for consistent and comprehensive data for water demand and availability

- **Data on consumption will be critical**

Complex analysis – scope is critical

- **Drought/climate change, energy for water, lifecycle analysis, water demand**





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