

# WATER: MAY BE THE BEST NEAR-TERM BENEFIT AND DRIVER OF A ROBUST WIND ENERGY FUTURE

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**Water may be the most critical natural resource variable that affects the selection of energy generation options in the next decade. Extended drought in the West and more recently in the Southeast has moved water management and policy to the forefront of the energy options discussion. Recent concerns related to energy generation and energy security, population growth, climate change, food security, and economic development put pressure on water sources.**

Since many forms of energy generation depend heavily on water availability, it is imperative to recognize the value of wind energy as one way to potentially mitigate the impending water conflict.

**Farms high and dry**  
Farmers sweating over lack of water

amid dry skies, wells

Western droughts could become norm

Source: NREL (2002)

### Humanity's Top Ten Problems for the Next 50 Years

1. Energy
2. Water
3. Food
4. Environment
5. Poverty
6. Terrorism & War
7. Disease
8. Education
9. Democracy
10. Population

**Energy-Water Nexus:**  
Water is necessary to produce energy, and energy is necessary to obtain water.

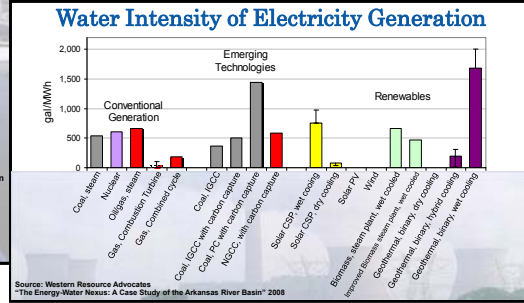
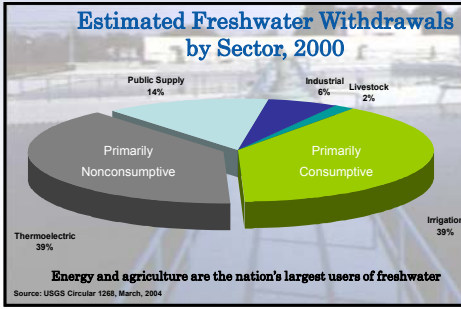
Source: Nobel laureate, Richard Smalley

### Withdrawal of Freshwater Is a National Issue

Projected Population Growth (2000-2020)  
Source: NREL (2002)

Source: EPRU 2003

Freshwater withdrawals exceed precipitation in many regions of the country. Population growth will inflict pressure over water and energy sources



### Desalination

**What is it?** Is the process by which brackish and sea water are treated and converted to freshwater suitable for consumption and irrigation.

**How much does it cost?** The cost of treating ocean and brackish water has fallen dramatically, to the point that it is now becoming comparable to the cost of developing new supplies of freshwater.

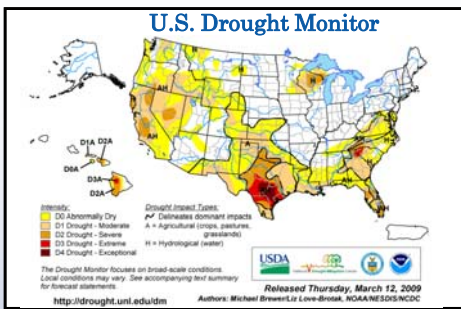
**\$2 - \$3/ 1,000 gallons (at the ocean)\***  
**\$4 - \$6/ 1,000 gallons (inland)\***

**Cost of developing freshwater supplies:**  
**\$2 - \$4/ 1,000 gallons\***

How can Wind Energy support Desalination facilities?

- Desalination is energy intensive.
- Many coastal cities where desalination plants are located exhibit good wind resources.
- Wind energy could potentially power desalination systems.
- Desalination of brackish water from saline aquifers in the Southwest could use wind energy to pump and purify water for rural communities.

\* Source: Sandia National Laboratories



### Irrigated Lands Have Great Wind Resources

Acres of Irrigated Land, 1997

Policy Challenges:

- Load vs. Resource Match
- Energy/Demand Tariff Structure

### Potential Energy-Water Conflict: Water Transfers

Water scarcity may impose constraints that could limit the U.S. ability to generate electricity in the future.

Power plants compete with other sectors in the economy for limited freshwater supply.

As water shortages intensify, many farmers find it profitable to sell their water rights, thus transferring water out of agriculture to other sectors.

Some externalities may affect the local agricultural community when water is removed from that region:

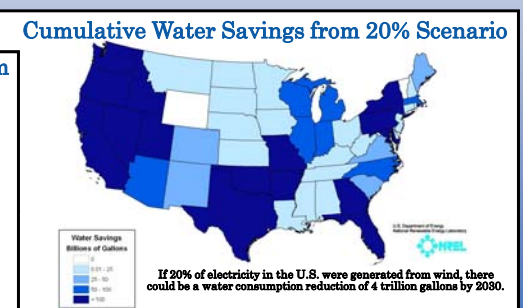
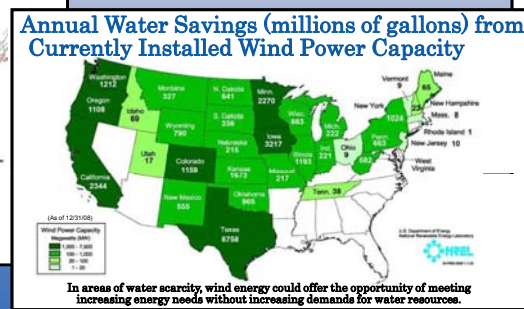
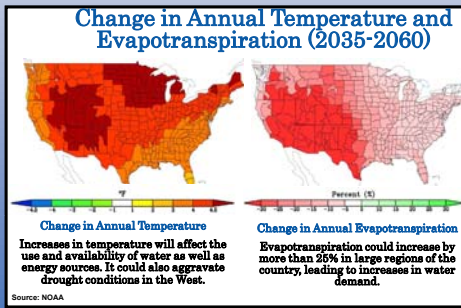
- Decrease in food production,
- Economic development stagnation
- Loss of agricultural productivity

Water quality reduction

- Biological and environmental impacts
- Outmigration
- Transitory or permanent income losses
- Job losses in sectors with links to irrigated agriculture
- Import's cost increase, etc.

Population continues to grow and demand for more food will increase demand for water in the agricultural sector. Food security becomes a concern.

An effective and fair allocation of scarce water resources is paramount to a secure energy and sustainable future in communities, regions and the nation.



"There's a two-thirds chance there will be a [water] disaster ... and that's in the best scenario." Steven Chu, U.S. Energy Secretary and Nobel Laureate  
Gertner, J (2007). "The Future Is Drying Up." (New York City) The New York Times, 21 October 2007. Available at <http://www.nytimes.com/2007/10/21/magazine/21water-t.html> (Last accessed April 2009).