

SUMMARY:
Trends and Policy Issues For The Nexus of Energy and Water

Testimony of

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Summary of *Testimony of Michael E. Webber, Ph.D.*

There are four main points:

1. Energy and water are interrelated,
2. The energy-water nexus is already under strain,
3. Trends imply these strains will be exacerbated, and
4. There are different policy actions at the federal level that can help.

Point #1: Energy and Water Are Interrelated

- We use energy for water, and we use water for energy.
- Energy for Water: US public water supply requires 4% of national energy and 6% of national electricity consumption
- Water for energy: Half of all water withdrawals are for power plant cooling (most is returned to the water source); water needs vary with fuel type and cooling system

Point #2: The Energy-Water Relationship Is Already Under Strain

- The energy-water relationship is already under strain: constraints are cross-sectoral
 - Heat waves and droughts can constrain energy
 - Energy outages can constrain water
- Corollary: with unlimited energy, we could have unlimited freshwater and vice-versa

Point #3: Trends Imply These Strains Will Be Exacerbated

- Trends imply that the strain will be exacerbated unless we take appropriate action
 1. Population growth, which drives up total demand for energy and water,
 2. Economic growth, which can drive up per capita demand for energy and water,
 3. Climate change, which intensifies the hydrological cycle (droughts and heat waves) causing more energy for water storage, conveyance and treatment
 4. Policy choices: moving to energy-intensive water & water-intensive energy.
 - Energy-intensive water: Long-haul, Deeper aquifer production, Desalination
 - Water-intensive energy: Motivation: domestic, decarbonized sources
 - ♣ Nuclear power and biofuels
 - ♣ Counter trend: natgas/Solar PV/wind lower the water use of electricity

Point #4: There are Different Policy Actions That Can Help

- Because Rivers, watersheds, basins and aquifers can span states and countries
 - There is a need for federal engagement on energy-water issues.
- There are some policy pitfalls at the energy-water nexus.
- There are policy opportunities at the energy-water nexus
 - Water conservation and energy conservation are synonymous.
 - Collect, maintain and make available accurate, updated and comprehensive water data, possibly through the USGS.
 - Invest in water-related R&D to match increases in energy-related R&D.
 - ♣ Low-energy water treatment,
 - ♣ Novel approaches to desalination,
 - ♣ Remote leak detectors for water infrastructure,
 - ♣ Air-cooling systems for power plants
 - ♣ Biofuels that don't require freshwater irrigation (algae, cellulosic)
 - Encourage resource substitution to fuels with water/emissions/security benefits
 - ♣ Natural gas, solar PV, wind
 - Support the use of reclaimed water for irrigation and process cooling.
 - Support the use of dry and hybrid wet-dry cooling at power plants
 - ♣ R&D and infrastructure swap-outs
 - Establish strict standards in building codes for water efficiency.
 - ♣ low-flow appliances, water-heating efficiency, purple-piping for reclaimed water, rain barrels, etc.
 - Invest aggressively in conservation

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