

THE EMERGING RELATIONSHIP BETWEEN CLEAN POWER AND WATER SAVINGS

BACKGROUND

In early April, Texas Governor Greg Abbott renewed his proclamation of an ongoing drought disaster in 100 Texas counties.¹ The same month, the US Drought Monitor reported that 45 percent of the state is officially in drought conditions, ranging from abnormally dry to exceptional drought.² Over 8.4 million Texans are affected by drought conditions in their area.

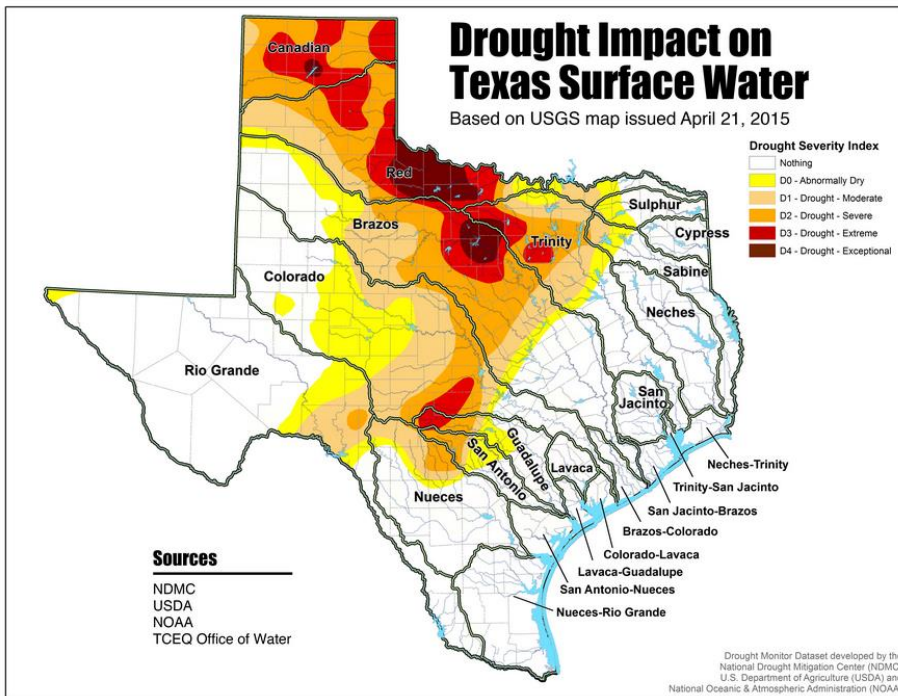
One of the best ways to save water is by making our electric grid cleaner and more efficient. Scientists and state policy makers are paying more attention to the fact that some forms of electric generation use significantly more water than others – and cleaning, heating and distributing water uses a lot of electricity.³ Changes in the electric grid can have a big impact on water savings, and vice versa. This dynamic relationship between energy and water is called the **water-energy nexus**.

CLEANER POWER = WATER SAVINGS

The water necessary to produce electricity varies based on a number of factors, including the fuel used, how efficient the power plant is and how it is cooled. Of the fuels commonly used in the Texas electric grid, for a given cooling technology traditional nuclear generation uses a lot of water, as do traditional coal power plants, which currently generate about a third of the electricity in the ERCOT⁴ grid. Natural gas combined cycle plants use a little over half as much water as traditional coal. Wind power does not require

any water for electric generation, and solar PV power uses water only for washing the panels. Energy efficiency also saves water by reducing the overall demand for electricity.

Research by our coalition and others has found that market forces are driving the Texas electric



While conditions overall have improved significantly since 2011, when virtually the entire state was in a drought, nearly 10 percent of the state is still in extreme or exceptional drought. In some areas the drought is the most severe ever recorded, so water conservation continues to be top-of-mind for state leaders.

¹ <http://gov.texas.gov/news/proclamation/20768>

² <https://www.tceq.texas.gov/response/drought>

³ <http://iopscience.iop.org/1748-9326/7/3/034034/>

⁴ The Electric Reliability Council of Texas or ERCOT oversees the wholesale and retail electric markets in the state. <http://www.ercot.com/about/index.html>.

grid toward cleaner fuels such as natural gas, wind and solar power. In addition, research has found that natural gas and renewable energy can provide all the new electric power that our state will need over the next 20 years, and state policies that encourage more use of energy efficiency (EE) and demand response (DR)⁵ can accelerate the move to a cleaner, more efficient electric grid.⁶

This is all good news for water savings. In addition to reducing carbon emissions and other forms of pollution, electricity from natural gas, wind and solar power uses significantly less water than the old coal-burning plants that powered Texas in the past.

The latest study, released in March, confirmed that when natural gas, wind and solar power replace “thirstier” coal, the switch not only reduces carbon and other forms of air pollution – cleaner electric power saves water, too. Depending on market and regulatory factors, including proposed new federal limits on carbon emissions, a cleaner, more efficient energy grid could save huge amounts of water – in some scenarios, enough water every year to fill Cowboys Stadium in Arlington with water 62 times.⁷

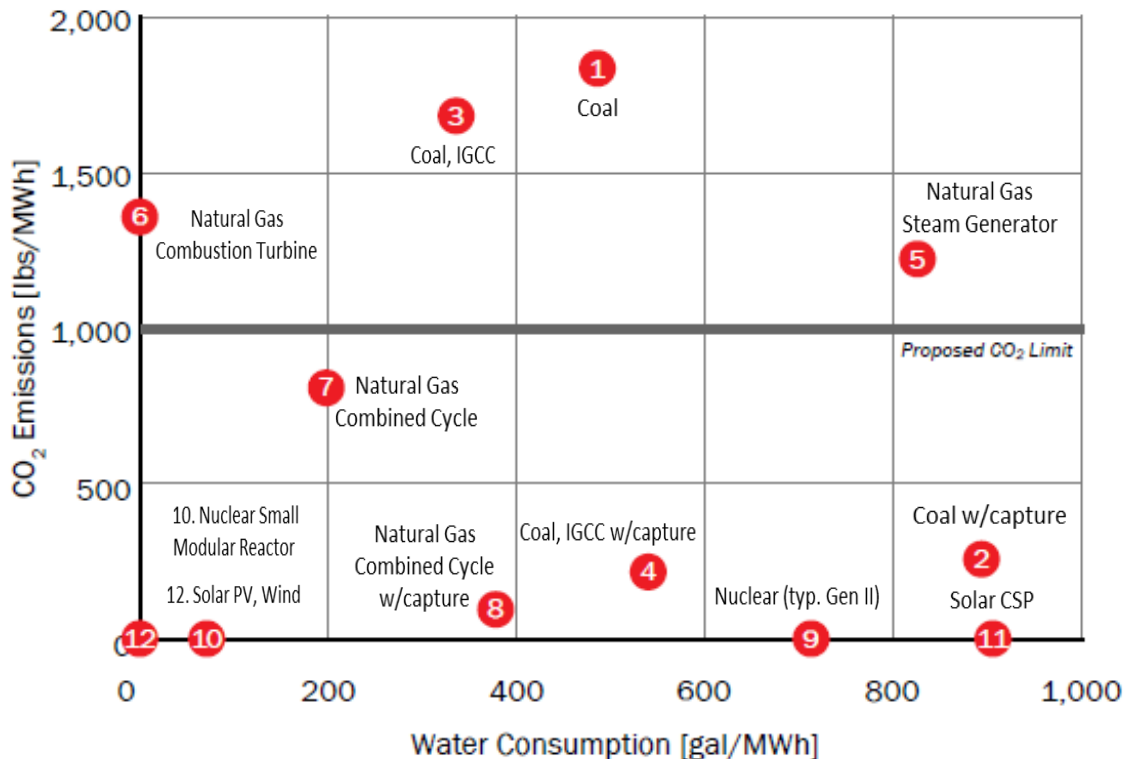
POLICY CHALLENGES

Aligning water and power planning to take advantage of the water-energy nexus can be challenging. Energy and water resources are

managed at multiple levels—local, regional, statewide and national. Water resources are managed locally, often by small public utilities, while many electric providers are large, investor-owned companies. While water markets tend to be highly regulated, the Texas electric market is deregulated and influenced by national and global energy markets.

CO₂ Emissions vs. Water Consumption

Source: DOE/NETL-2010/1397, Environ. Res. Lett. 7 (2010) 045802, Ecology and Society 16(1): 2
Graphic: Michael E. Webber, The University of Texas at Austin



The City of San Antonio is taking steps to harness the potential water and power savings of the water-energy nexus. The San Antonio Water System is working on energy conservation⁸ while the city’s municipal electric utility, CPS Energy, is helping consumers use energy efficiency to reduce the growth in electric demand. Both EE and San Antonio’s goal of 20% renewable power by 2020⁹ will help the Alamo City save water. More projects like these can help Texas transition to a clean electric grid that saves water, and water systems that save electricity. Helping water and power work together can manage both resources better.

⁵ Demand response programs reward consumers who agree to use less power during times of peak demand.

⁶ <http://www.texascleanenergy.org/2014-research.php>

⁷ <http://www.cna.org/research/2015/impacts-epas-clean-power-plan>

⁸ <http://www.saws.org/environment/energymanagement/>

⁹ http://www.cpsenergy.com/residential/information_library/strategic_energy_plan_faq.asp#question2