

# THE WATER-ENERGY NEXUS



Why Your Power Supply May Not be as Safe as You Think

The energy we rely on for virtually every activity in which we engage requires water. Water and energy production are inextricably linked, and their intersection has become a topic of increasing research and concern in the last few years. Many recent studies have shown that the amount of both needed to power modern life and business is rapidly on the rise: virtually all industrial activity, including aspects of natural resource extraction, electric energy production, and general manufacturing, requires a reliable – and often, uninterrupted – water supply. Water is the Achilles heel of our economic engine, and it is vulnerable.

In 2011, Texas experienced the worst single year drought in recorded weather history. The media was deluged with stories of water supplies perilously close to exhaustion. In November 2012, the Texas Commission on Environmental Quality (“TCEQ”) suspended diversions of water from permits issued after 1942 in the Brazos River Basin, while exempting municipal,

power generation and non-exempt domestic use water rights to protect public health, safety and welfare. In December, the Texas Farm Bureau filed suit against the TCEQ, arguing that by exempting these uses from curtailment the agency failed to follow the priority doctrine. On March 11, 2013, U.S. District Judge Janis Jack issued a decision declaring the failure of the TCEQ to ensure adequate flow of fresh water into the San Antonio Bay ecosystem during the 2008-2009 winter resulted in an unlawful taking of endangered whooping cranes in violation of the Endangered Species Act. Judge Jack ordered the state to develop a conservation plan for the whooping crane that ensures enough water remains in the Guadalupe River, whose basin includes San Antonio, San Marcos, New Braunfels, and Victoria, to sustain the cranes’ habitat in San Antonio Bay. And in late March 2013, the deputy executive administrator of the Texas Water Development Board declared 96 percent of the state to be in drought. Events like these

should be sounding alarm bells for Texas businesses, particularly those with big water and electricity requirements (which may be nearly everyone), as they lay bare the specter of regulatory and supply-based instability in Texas’s water regime and present the possibility that water scarcity may begin to affect economic activity.

The water-energy nexus is the relationship between how much water is used to generate and transmit energy, and how much energy is necessary to collect, clean, move, store, and dispose of water. Energy production uses about 15 percent of the world’s total water withdrawal, a figure that is expected to increase by about 20 percent by 2035. Nuclear energy is the least water efficient method (2,400-5,800 gallons/million BTU) of power generation, and hydroelectric power is the most water efficient system (20 gallons/million BTU). Fossil fuel thermoelectric power production requires 1,100-2,200 gallons/million BTU. Even renewable sources of energy that may not require as



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much water in the actual production of energy (such as photovoltaic solar and wind power) require water for the construction and maintenance of the generation facilities. Companies with large energy or firm, uninterrupted water needs – which may include manufacturers, tech companies, refineries, and more – should be aware of the risk water shortages present to a steady supply of electric energy and should act to minimize that risk where possible.

There are many factors that may present risk to water supplies. These factors can generally be placed in two categories: water scarcity, brought on by drought or increased demand, and regulatory restrictions, which may occur in various ways and from various governmental authorities.

Water scarcity may result from drought or increased demand on static sources.

Although the drought of 2011 in Texas was the worst one-year drought in the state's history, the drought of record in Texas is the drought of the 1950s. The state's water planning assumes a drought of that magnitude. Climatologists are unsure how long the current drought will last but there is no guarantee it will not be worse than the drought of the 1950s.

Drought is not the only reason water supplies are shrinking. More and more people and businesses are trying to get a share of the water pie. One driver in recent years has been hydraulic fracturing activities.

Hydraulic fracturing is a drilling method in which fluids are pumped into a wellbore to produce pressure and fracture the rock in order to facilitate the release of oil or gas. The process uses large amounts of water, particularly if the operator is fracturing a horizontal well. The majority of water used for hydraulic fracturing is groundwater, which may lower water tables and affect availability of water for other parties dependent on groundwater. Meanwhile, metro areas such as Dallas, Fort Worth, Austin, San

Antonio, and Houston are growing exponentially, and nearby water supplies are clearly insufficient.

Regulatory obstructions to water supplies in Texas may affect reliability even when there is not a drought. Surface water in Texas is owned by the state; surface water use requires a permit. Water permitting in Texas is governed by the maxim “first in time is first in right.” The strength or firmness of a water permit is dependent on when the permit was issued: the older the permit, the more senior the right and the more likely to receive water in times of scarcity. A senior right holder is entitled to receive the full amount of water before a junior right holder may receive any water, and Texas law allows a senior right holder to put a “call” on water, effectively suspending the rights of junior rights holders if the senior right holder's supply is threatened. In other words, if water rights – or the rights of an energy supplier – were issued relatively recently, that supply may not be there when needed. Industrial users in the Brazos River learned this first hand last November when TCEQ implemented the aforementioned suspension of rights that was issued after 1942.

Water rights holders aren't the only parties clamoring for water – the natural environment requires a share as well. All water used is, at least temporarily, unavailable to meet environmental needs. Virtually every water project outlined in the state water plan will have an effect on the environment. It has been estimated it will take 25-30 years from start to completion to construct a water supply reservoir, with much of that time spent clearing environmental permitting requirements. Groundwater projects likewise can take years. As these necessary projects are further delayed, our existing supplies are expected to serve a relentlessly growing demand.

Another environment-related regulatory risk looming over Texas water supplies is the ESA, exemplified most recently by the whooping crane decision. While Texas has appealed the ruling and it has been suspended while on appeal, the uncertainty in the meantime hangs like a scepter over surface water use. While the decision directly affects only diversions and withdrawals from one river in Texas, the precedent could be significant and could result in future litigation of a similar nature in other river systems. There are a number of other species listed as threatened or endangered that reside, full- or part-time, in or at the end of Texas river basins. Due to a recent settlement in a suit brought by the Center for Biodiversity, the U.S. Fish & Wildlife Service is legally bound to issue listing decisions soon on more than 250 additional species, many of which are found in Texas, and in its rivers.

In short, the potential threats to steady energy and water supplies for business are great in number. Companies for which a large and reliable water or power supply is essential should take steps to evaluate and protect against the risk that water shortages present for them and for their suppliers. This may mean evaluating, to the extent possible, the firmness and reliability of available water supply and the energy supply dependent on the water. Companies should also educate themselves about, monitor, and consider threats to existing water supply and the feasibility of alternative sources of water and energy in order to formulate contingency plans.

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