

Powerful Water & Thirsty Energy: A Systems Challenge Noël M. Bakhtian

A growing community, domestic and international, is being challenged by the interdependencies between energy and water. The “energy-water nexus,” as it’s typically labeled, can be broken down simply as “energy for water” and “water for energy.” Energy is vital to the provision of water, being required for water extraction, transport, heating, treating, and desalination.¹ On the flip side, water is ubiquitous in energy production.¹ In fact, roughly 50% of the water used everyday in the United States goes to the energy sector.²

The limiting factor is water, based on both quantity and quality. Although it seems we’re surrounded by water, freshwater, which makes up more than two-thirds of all energy-required water,² is a constrained resource; accessible, reliable, and sustainable supplies of freshwater represent only about 0.0003% of the global water resource.³

Not only that, but rapid economic and population growth are increasing global demand for both energy and water, further exacerbating water scarcity issues for the energy sector. By 2030, global energy demand is expected to have increased by 50%, while water demand will have increased by 40%.⁴ And then there’s the compounding factor of climate change which has the potential to spur increased energy demand (think heating and cooling) while also impacting the energy-water system via increased water temperatures, sea level rise (which will contaminate freshwater supplies), and extreme events such as drought.^{1,5}

This talk will dive into the major energy-water dependencies (e.g. thermal power plant cooling, water desalination), share major projects dedicated to the nexus around the world, and provide a framework for those seeking to address this global challenge.

1 http://www.worldenergyoutlook.org/media/weowebbsite/2012/WEO_2012_Water_Excerpt.pdf

2 calculated from <http://www.energy.gov/sites/prod/files/2014/07/f17/Water%20Energy%20Nexus%20Full%20Report%20July%202014.pdf>

3 https://www.sbc.slb.com/~media/Files/SBC%20Energy%20Institute/SBC%20Energy%20Institute_Introduction%20to%20the%20Water%20and%20Energy%20Challenge.pdf

4 http://www.dni.gov/files/documents/GlobalTrends_2030.pdf

5 <http://energy.gov/sites/prod/files/2013/07/f2/20130716-Energy%20Sector%20Vulnerabilities%20Report.pdf>