*Water use in electricity generation: the sobering facts that make a case for wind and solar power*

*Did you know it takes 100,000 gallons of water to produce a single megawatt hour of electricity?* Well according to a new report out today, it does – unless you’re using wind or solar power that is. So maybe, with much of the world battling more regular bouts of drought and water shortages it’s something policy makers need to start taking more notice of?

The proponents of the report from [*Synapse Energy Economics*](http://www.synapse-energy.com/) - prepared for the nonprofit and nonpartisan [*Civil Society Institute (CSI)*](http://www.civilsocietyinstitute.org/) and the [*Environmental Working Group*](http://www.ewg.org/) – certainly think they should. These groups warn that the huge demands on increasingly scarce water are “a major hidden cost” of a business-as-usual approach to American electricity generation.

The report, [*The Hidden Costs of Electricity: Comparing the Hidden Costs of Power Generation Fuels*](http://www.civilsocietyinstitute.org/media/pdfs/091912%20Hidden%20Costs%20of%20Electricity%20report%20FINAL2.pdf)*,* analyses six fuels used to generate electricity --- biomass, coal, nuclear, natural gas, solar (photovoltaic and concentrating solar power), and wind (both onshore and offshore). Water impacts, climate change impacts, air pollution impacts, planning and cost risk, subsidies and tax incentives, land impacts, and other impacts are all considered.

*With many – but not all - of the key energy technologies used today relying heavily on water, the headline findings make for fascinating reading:*

* *Nuclear power*has critical cooling requirements that require huge amounts of water. Roughly 62% of US nuclear plants have closed-loop cooling systems. Reactors with closed-loop systems withdraw between *700-1100 gallons of water per MWh* and lose most of that water to evaporation, the report says. *“Water withdrawals are even higher at open-loop cooled nuclear plants, which need between 25,000-60,000 gallons per MWh.”* Most of the water is returned, but at a higher temperature and lower quality, it adds.
* In addition to fouling streams and drinking water through mining and coal-ash dump sites, *coal-fired power* also relies heavily on closed-loop cooling systems, withdrawing 500-600 gallons of water per MWh. Again most of this is then lost via evaporation. Withdrawals for open-looped cooled coal-fired power plants are between *20,000-50,000 gallons per MWh.* And again, while most of the water is returned, it’s at a higher temperature and lower quality, the analysis finds.
* It may be a renewable energy source, but *biomass too has its issues and water usage is highlighted as one by this report*. With proposals for a Clean Energy Standard, biomass would become a much larger source of US electricity generation and the authors of the report urge caution on this. The report notes that a typical 50MW biomass plant “could withdraw roughly 242 million gallons of water per year and lose most of this”. *Adding 10 of these plants in a region would mean the use 2.42 billion gallons of water per year.*
* *Meantime for dedicated energy crops, water use for irrigation can also be considerable* – the report highlights one study which estimates water use for most crops is between 40,000 and 100,000 gallons per MWh, with some crops exceeding this range.
* Unsurprisingly, the Synapse report also points out that in 2010, the Environment Protection Agency (EPA) estimated that *fracking shale wells can use anywhere from two to 10 million gallons of water per well*. The water is often extracted from on-site surface or groundwater supplies. “Such huge water withdrawals raise serious concerns about the impacts on ecosystems and drinking water supplies, especially in areas under drought conditions, areas with low seasonal flow, locations with already stressed water supplies, or locations with waters that have sensitive aquatic communities”, says the report.

*The water saving options*

“By contrast, *wind and solar photovoltaic power require little water in the electricity generation process*”, it continues. Concentrating solar power requires water for cooling purposes, but new technologies are placing greater emphasis on dry cooling.

*“Solar power plants with dry cooling use only around 80 gallons per MWh – about a tenth of the low-end estimate for nuclear power and one-sixth of the low end estimate for coal-fired power generation.”*

Estimates of the lifecycle water withdrawals from wind projects, including both onshore and offshore projects, range from just 55 to 85 gallons per MWh.

Of course, neither wind power nor solar PV provide the answer to all our energy needs alone – and they both present issues for the electricity system generally and for policy makers. But with [*both sectors going through a tough period of uncertainty right now*](http://www.renewableenergyfocus.com/view/28143/analysis-obamas-war-on-coal-and-the-renewable-energy-opportunity/) (in the US and elsewhere) maybe it’s time water usage was a more significant consideration when it comes to forming energy policy.

Afterall, as Seth Sheldon PhD, CSI lead water and energy analyst notes, it was way back in 2005 that the US Congress mandated a federal water/energy roadmap. “*Nearly eight years later, that roadmap has not been produced* and either through bureaucratic inertia or fear of hard political questions, the questions are not even being asked, much less their solutions explored,” he says.

“At a time of significant water scarcity and increasing threats to water quality, we can ill afford to ignore this central question about the future of our energy choices."

He’s right of course.

[*Find out more about the other real costs of renewable energy by clicking this link and reading our recent series of articles on the issue by Gail Rajgor*](http://www.renewableenergyfocus.com/view/26122/what-is-the-real-cost-of-renewable-energy-part-5/)

Posted 19/09/2012 by Gail Rajgor