THREE MILE ISLAND ALERT

"The Water Cost of Electricity on the Susquehanna River."
Energypath, July 16, 2025

The Susquehanna River flows 444 miles from its headwaters in Cooperstown, New York, to Havre de Grace, Maryland, where the river meets the Chesapeake Bay.

The Susquehanna River is older than the Nile River, and the largest source of freshwater for the Chesapeake Bay.

The basin is one of the most flood prone areas in America with major floods occurring every 20 years.

There are 61 state parks located in the basin, and 190 sewage treatment plants which are classified as "significant, i.e., discharging 400,000 gallons per day or more.

Less than 1% of the total water used in the Susquehanna Basin is for agriculture. The Lower Susquehanna Basin holds the majority of the agricultural uses.

The basin is home to approximately 3.9 million people who utilize its water resources for drinking, agricultural, and industrial purposes.

Public water supply use account for over 400 million gallons per day withdrawn, with 200 million gallons per day consumed and not being returned to the water system.

The average monthly water bill in Pennsylvania is $31 which is lower than the cost of electricity, gas, or internet.

The average monthly electricity bill is $146. Electric bills include charges for delivery and generation as well as capacity, customer service, education, and taxes.

There is no water charge.

The Susquehanna River Basin Commission (“SRBC”) manages the Susquehanna River Basin's water resources. Consumptive water use is any water not returned to the river. Consumptive use of 20,000 gpd or more over a 30-day average is regulated. The fee is 0.33 cents per 1,000 gallons on actual use.

Is this equitable?

Do all water users have the same flexibility and impact?

Should externalities, ownership, and water security be part of the fee structure?

All of the coal, fracking, gas, hydro, and nuclear plants along the Susquehanna River are required to apply for consumptive and surface water use permits from the Susquehanna River Basin Commission. Data centers are now at the trough.

Electricity comes from power generators that need to be cooled for their thermoelectric plant to boil water to produce steam for generating electricity.

These plants consume 79% of the water in the Basin, and mainly include dispatchable fuels: natural gas (53%), nuclear (31%), and coal (10%). Renewables (4%), with the exception of hydro, are intermittent electricity producers.

Nuclear energy accounts for a 15 percent share, and 26 percent of the electricity consumed by data centers. Coal is making a come-back.

The financial cost of electric before production.

• Fuel Extraction and Fuel Production: Water is a critical resource when drilling for gas and oil or mining of coal and uranium.

• Fuel Refining and Fuel Processing: Oil, gas, and uranium require large amounts of water in the refining process.

Should we consider life-cycle costs for electricity to capture externalities?

The cost to produce electricity.

• Age. Older cooling systems are less efficient, but getting license extensions.

Coal: 50-60 years/40 years versus Nuclear: 42/40 years +.

• The majority of water used in thermal power plants is for cooling purposes.

• Cooling water temperature: The temperature of the cooling water significantly affects the efficiency of the cooling system.

• Fuel type: Coal has a higher water cost compared to natural gas. Natural gas uses much less water than nuclear.

• Uprates: More water is needed as capacity is increased.

• Water availability. Climate change and drought pressures.

Post-production water impacts include abandoned wells, coal ash, and nuclear waste in close proximity to the river.

Electric power plants' cost of electricity related to water usage is not a direct charge as it is for residential or commercial customers. It's an operational cost factored into overall production expenses.

Eighty-five percent of the Susquehanna River Basin is underlain by large reserves of natural gas. The long-term average water consumption for each well fracturing event is estimated at 4.3 million gallons.

Surface water withdrawals make up the majority of the water used for fracking, with approximately 26.3 billion gallons withdrawn between 2008 and 2018.

Nuclear plants are the steadiest and thirstiest consumer of water. Susquehanna's original application for water was 40 million gallons per day. The average daily consumptive use of water that is not returned is 29.86 million gallons. The Extended Power Uprate increased the water needed, with an upper limit of 65.4 million gallons per day, equating to nearly 24 billion gallons annually. In its license renewal the plant received more water. ($21,582)

Data Services was granted a 1,600-acre re-zoning request on land adjacent to the SSES. Amazon said the company planned to construct 15 data center buildings over the course of the next decade and use 1,920mw by 2032.

They applied for water at the SRBC. Consumptive use of 0.060 mgd (30-day average) was approved for these operations, but the amount didn't match the need. Amazon required additional water for the full build and PA Water – a regulated utility - agreed to build a 14-mile water line to the data center, and the PFAS treatment facility by 2027. The maximum day demand is projected to be 2.17 mgd in 2024 and 3.79 mgd in 2029, excluding peak day cooling demand for the data center.

The growth rate for electricity demand is likely to increase, and largely driven by data centers. The average data center uses one million to five million gallons of water per day, equivalent to the daily water use of a town with a population of 10,000 to 50,000 residents.

Data centers – unlike residential and business customers — require a consistent and steady supply of electricity 24 hours a day, seven days a week.

We can measure the economic and life cycle costs of water use for electricity. The total cost is not in your electric bill.

Water is not valued as a commodity, and there is no codified priority system. The priorities are most likely power and people, but during a drought golf courses are considered an “essential use.”

Can we measure climate change, externalities, and societal impacts, and should they be factored into the cost of water like a capacity?

• What is the priority: Computers or humans?

• At what point - if any - does the public have an opportunity to be part of the process and establish priorities?

• How will the consumption of a large quantity of water for data centers and nuclear plants which operate 24/7 impact water supplies for farms, families, and small businesses?