POWERLINE NEWS

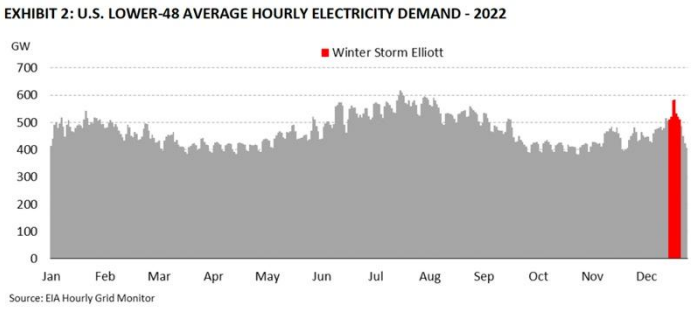
Energy Diversity – Why it Matters

MINDEN, NV — December 2025

The world is changing fast. It has been 140 years since electricity was first commercialized, 75 years since the first commercial computer, and only 30 years since the internet was widely available. In a very short time, all of civilization now depends on the flow of electrons through copper wires. Everything from ATMs to gas pumps to grocery purchases depend on uninterrupted power. What happens when the power is turned off? This is not only damaging to commerce, but can be life-threatening, especially in winter.

Case Study – Storm of the Century

During the Christmas weekend in 2022, an extratropical cyclone known as Storm Elliott created frigid winter temperatures and resulted in record electricity demand. Buffalo New York received four feet of snow in two days. 60 people died from storm related causes. Now three years later, 9 of 13 power grids having dangerously low spare capacity and there should be concern about a similar event.



In February 2023, *Energy Ventures Analysis* prepared a report on the grid functions during Storm Elliott. It summarized how power companies dealt with the record load demand and how the grid functioned during the frigid winter storm. With record power demand, 1.5 million people were without electricity.

Cold weather can affect power production. During the frigid storm, natural gas production in Appalachia dropped by 25% due to well freeze-offs and other equipment failures. TVA, Duke, and LG&E were had to implement rolling blackouts, In the Southeast, natural gas demand for home heating surged. Then gas pipeline pressure became too low to safely operate power plants and this caused many to shut down.

As the power demand surged during the storm, every bit of spare capacity was needed. Gas-fired power plants struggled to keep operating. The one source of energy that was able to ramp up was coal-fired power to meet demand. Coal plants store the fuel source onsite and electricity production can be ramped up at any time without concern about the availability of fuel.

Problem with the Energy Mix

Installed wind power cannot be increased and will only produce power based on the wind available. Solar power also cannot be increased and actually decreases on cloudy days during winter storms. Natural gas power can be ramped up, but only if there is sufficient supply of fuel. Coal power's ability to ramp up kept the lights on a prevented the effect of the Storm Elliott from being much worse than it was.

Electricity demand usually peaks in the summer due to air conditioning demands. However, the risk of power outages can be more risky during winter events. Because of the use of natural gas for home heating during extreme cold events, supplies of natural gas can be depleted even though power companies have iron-clad contracts for the supply of gas. Natural gas power plants do not have onsite storage capacity for the fuel and if the pipeline pressure is not sufficient, the power plant may need to shut down.

As natural gas demand in Kentucky spiked during Winter Storm Elliott, pressure along one of the primary natural gas supply pipelines, Texas Eastern, dropped unexpectedly. 900 MW of LG&E/KU natural gas-fired generation suddenly came offline, resulting in rolling blackouts for over 53,000 LG&E/KU customers. This was the first time in LG&E/KU history that the utility had to implement rolling blackouts for its customers.

Power generation that can be increased to match demand is known as *dispatchable power*. Power from installed wind and solar plants cannot be increased on demand. Gas or oil-fired power plants can produce dispatchable power as long as there is fuel available. Over the last decade, dispatchable power from coal plants has been taken offline and is being replaced with power sources that cannot be increased. The planned removal of 82 GW of coal power by the end of the decade means there is not enough power for another Storm Elliot event.

Clean Coal Provides Safe Spare Capacity

With modern technology, coal can be a clean source of energy and there are compelling reasons to keep this source in the energy mix. Modern coal-fired power plants now use flue gas scrubbers to remove pollutants from their air emissions. The wastewater from air scrubbing can be cleaned effectively to make it cleaner than water it would be discharged to. The EPA tightly regulates this kind of effluent and has listed the VSEP vibratory membrane RO filtration system as a best available technology for treatment of flue gas desulfurization (FGD) effluent. The VSEP system employs torsional oscillation of the membrane which allows for high concentration levels exceeding the solubility limits of calcium sulfate. At the same time, the RO membrane produces a filtrate with very low levels of arsenic, mercury, and selenium, well below the EPA effluent limits. The VSEP system is manufactured by New Logic Research of Minden Nevada and has been deployed for more than a decade for this use.

About New Logic Research

New Logic Research has been a trusted provider of advanced membrane filtration systems for over 38 years. Its VSEP technology is deployed globally across power generation, mining, and industrial wastewater applications. Learn more at www.vsep.com/industries/power-gen or contact info@vsep.com.