NUCE_2122_HW3

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Instructions

Submit a 500 work analysis predicting two major events and specific locations that in your estimation have a high probability to occur in the next five years regarding nuclear operating and construction plants

In support of this, review the list of prematurely shutdown nuclear plants, review the new plant licensing status as it exists in several states, review the projected load growth data for the key states we discussed and predict locations where two events associated with additional nuclear plants will occur.

Events to be evaluated:

I. A shutdown plant will be restarted (Do not count Palisades or TMI)
II. A partially completed nuclear plant construction restarted
III. A new contract for a new nuclear plant signed and construction begun.

Evaluate your target locations by:

- their predicted electricity consumption growth;
- the availability of purchased power from a neighboring state;
- the current fuel balance issues faced in that location;
- and any reduction in the number of resource energy plants that were originally scheduled to be constructed per the utility’s strategic plans

Submission

Vermont Yankee Restarting

Over the next five years, one of the most likely nuclear restarts will take place at Vermont Yankee in Vernon, Vermont. Originally closed in 2014 due to unfavorable market conditions and low wholesale power prices, Vermont Yankee benefited from a large hydro-reservoir system built to balance its output. With the reactor offline, that infrastructure now runs primarily on fossil-fuel peakers—an inherently

less efficient use of the reservoir’s storage capacity. New England’s regional grid operator forecasts roughly a 10 percent increase in electricity demand by 2034, driven largely by electrification of heating and transportation. Although two new offshore wind farms are slated to fill much of that gap, both projects face political headwinds and possible delays under shifting federal administrations. At the same time, Vermont has limited options for additional purchased power imports; long-term agreements with Hydro-Québec already run near capacity. The pending retirement or downscaling of several gas-fired plants—once part of the Vermont utility’s reserve margin strategy—further tightens the regional fuel balance. Reviving Vermont Yankee would not only leverage existing transmission and reservoir assets but also hedge against potential shortfalls in renewables and gas supply, making a compelling case for relicensing and restart before 2030.

ARC Tokamak Reactor

A second high-probability event involves the signing of a construction contract for the world’s first commercial fusion power plant in Virginia. Commonwealth Fusion Systems (CFS) has proposed the ARC tokamak, a 400 MWe demonstration reactor, on land already zoned for energy innovation near Richmond. Unlike fission projects that require protracted federal reviews, ARC benefits from Virginia’s newly crafted state-level regulatory framework for fusion, accelerating approval timelines. This site sits at the heart of a data-center boom that is projected to triple power demand—from about 10 GW today to 30 GW by 2040—far outpacing available generation. While the PJM Interconnection can import limited grid support from neighboring states, those markets are also experiencing tight capacity margins as coal plants retire and solar-project rollouts have been partially curtailed due to interconnection backlogs. A state-approved fusion contract, signed by 2030, would help position Virginia not only to meet its own load-growth trajectory but also to export clean baseload into the PJM pool. The ARC reactor is highly dependent on the success of its precursor test reactor, SPARC, which is slated to begin operating in 2026. Even if ARC’s timeline slips into the early to mid 2030s, the combination of soaring data-center demand, constrained renewable pipeline, and a supportive regulatory regime makes Virginia the prime candidate for a groundbreaking fusion construction start within the next five years.