

Filling the Gap in New England's Decarbonization Plans: A New View of the Electric Grid

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Project report available at https://www.nuclearny.org/wp-content/uploads/2026/04/Filling_the_Gap_in_New%20England's_Decarbonization_Plans-L_Rodberg-2026.pdf

The governors of the six New England states have announced their intention to include advanced nuclear energy in their planning to meet the growing clean energy demand. An independent analysis of New England's current decarbonization plans shows that nuclear power will be essential to providing reliable power and will be more affordable than existing plans based upon renewable energy sources.

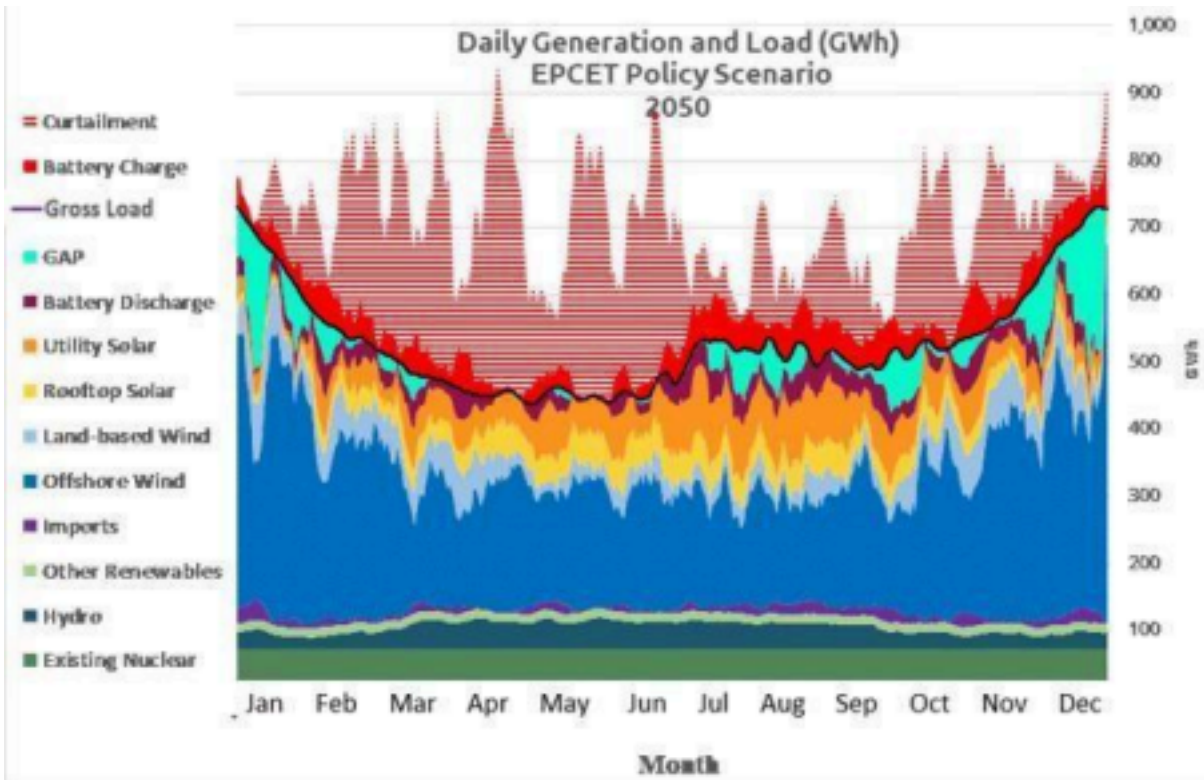
A newly developed modeling tool (HELGA) that simulates grid behavior hour by hour, identifies deficiencies in the current plans that rely heavily on weather-dependent, intermittent solar and wind generation. The analysis reveals extended periods (Gaps) when these resources cannot meet regional electricity demand.

Two major decarbonization plans were evaluated: *The Massachusetts 2050 Decarbonization Plan* and *The EPCET Plan*, prepared by the Independent System Operator for New England (ISO-NE). Both plans greatly expand electrification and significantly increase the cost of electricity. However, despite massive expansions of solar, wind (particularly offshore wind) and battery storage at a cost of hundreds of billions of dollars, these plans still cannot reliably meet electricity demand all the time, especially in winter when failure is most deadly.

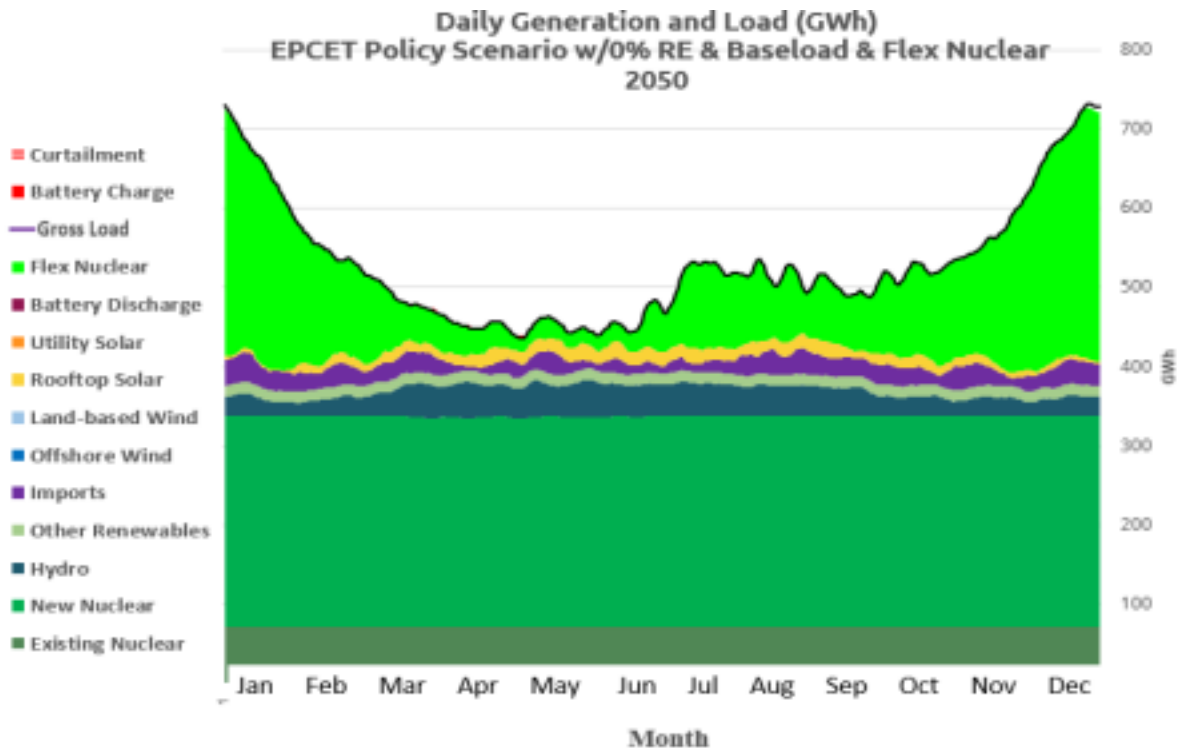
This study shows that replacing much or all of these future renewable resources with always-on *baseload* nuclear power will keep electric rates stable and avoid the environmental impacts of large solar and wind buildouts. Adding *flexible* nuclear systems that have attached thermal storage can supply the essential dispatchable power needed to meet fluctuating demand. If these flexible facilities are used during low demand periods to export energy, produce carbon-neutral synthetic fuels, desalinate water, or provide other industrial services, their cost will be comparable with today's electricity costs.

The following graphs compare the HELGA analysis of the EPCET Policy Scenario 2050 using 100% Renewables and the same policy using No Renewables and Baseload & Flex Nuclear (for full details and supporting data see Project report at link above.)

Nuclear power is the only currently available technology capable of providing clean, reliable and affordable electricity at the scale required to meet the region's needs by mid-century. New England can achieve its 2050 goals more affordably and with far less environmental disruption by incorporating Baseload and Flex Nuclear power into its strategy.

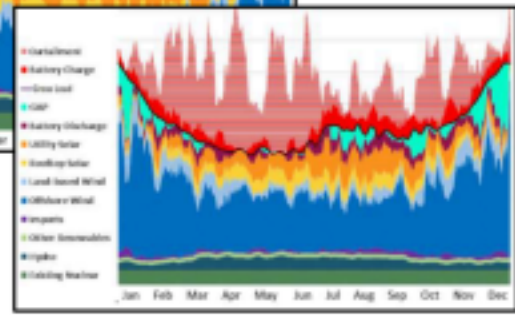
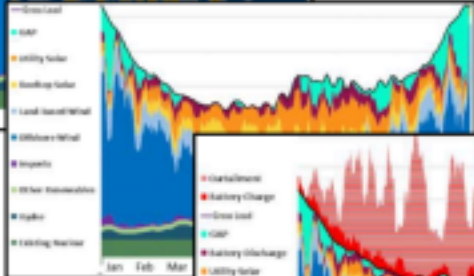
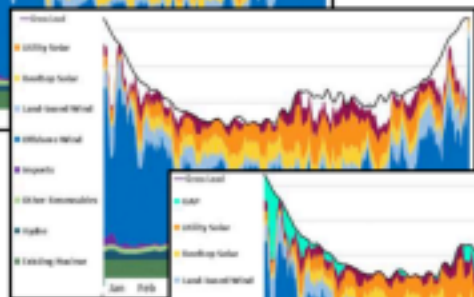
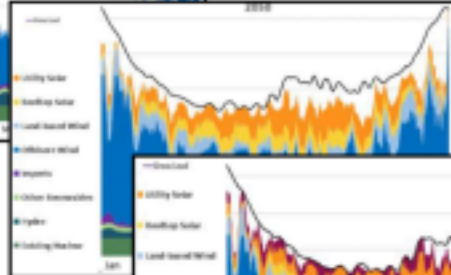
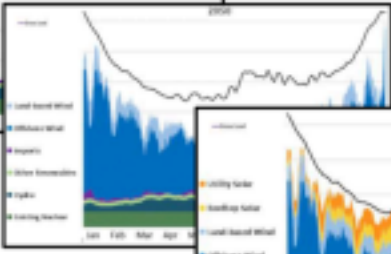
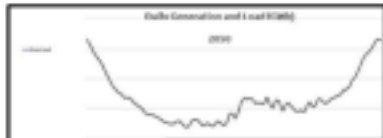


The above figure shows the HELGA analysis of the EPCET Policy Scenario for each day during the year 2050 using 2024 weather data. (For a guide to these graphs, see the following page). Note the gaps (depicted in aqua) in electric supply, especially in winter and the heat of summer. Observe also the curtailment of renewable sources (depicted in red-hatch), indicating wasteful use of these resources for much of the year. The total cost projected in 2050 is \$107.61/MWh.



This figure shows the same Scenario with baseload and flex nuclear replacing the renewables. Flex nuclear (depicted above in bright green) responds to the extra demand during winter heating and summer cooling. The total cost projected in 2050 is \$42.65/MWh, significantly less than with renewables. The steady input of baseload nuclear assures reliability throughout the year.

How to Read 2050 Daily Generation Graphs



To read a 2050 Daily Generation Graph, start from the bottom, with the sources that are unchanged from their values in 2024.

Move up to find the wind power, offshore and land-based. Moving up, you'll find the solar power, first rooftop, then utility-based.

Still moving up, you will find, in deep purple, the contribution of discharge of the batteries.

Then, just below the line representing the gross load – the demand on the grid – you'll find the Gap, the difference between the demand on the grid load and the supply from all the other available sources. This Gap will have to be filled by various types of emission-free or carbon-neutral energy sources.

Finally, above the line for the gross load, you'll find the charging of batteries in dark red. Above that, in dashed red lines, is curtailment, the excess wind and utility solar output (and possibly new baseload nuclear output) which can be produced but is not needed.