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Results from Stanford-MIT Report

Additional submitted attachment is included below.



July 17, 2023

California Energy Commission
Docket Unit, MS-4
Docket No. 21-ESR-01
715 P Street
Sacramento, CA 95814

Re: Comments on the Diablo Canyon Cost Analysis Workshop¹

We are writing to the Commission as members of a team of researchers from Stanford University and the Massachusetts Institute of Technology who produced the 2021 report [*An Assessment of the Diablo Canyon Nuclear Plant for Zero-Carbon Electricity, Desalination, and Hydrogen Production*](#). That report details how extending the life of the Diablo Canyon Nuclear Power Plant could help California meet its climate goals by providing clean, safe and reliable electricity, as well as how the plant could be enhanced for additional uses beyond electricity.

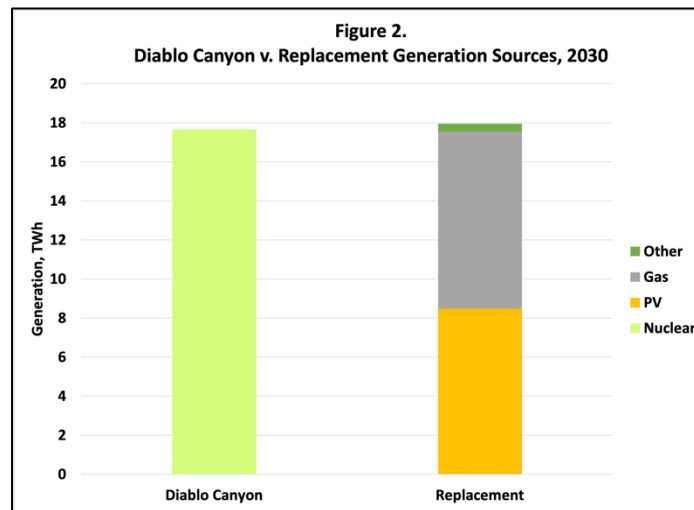
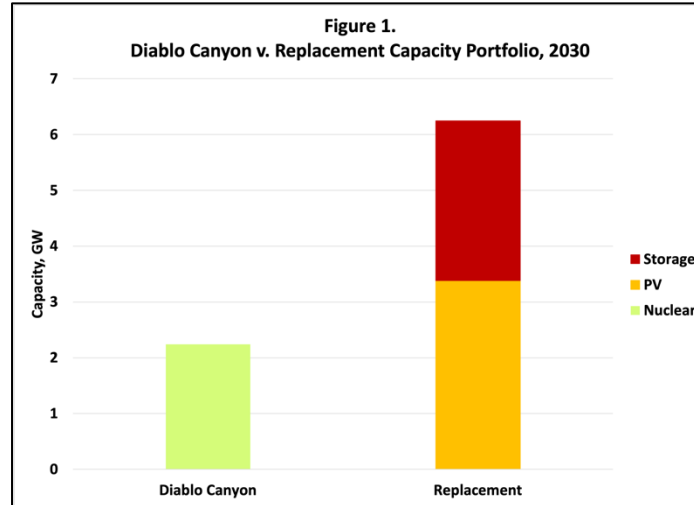
We submit this comment to call this Stanford-MIT report to the attention of the Commission as it is particularly relevant to the Commission's responsibility under SB 846 to "present a cost comparison of whether extended operations at the Diablo Canyon powerplant compared to a portfolio of other feasible resources available for calendar years 2024 to 2035, inclusive, is consistent with the greenhouse gases emissions reductions goals of Section 454.53 of the Public Utilities Code."² Chapter 1 of the Stanford-MIT report analyzed "The potential contribution of Diablo Canyon to achieving the state's zero-carbon goal for the electricity sector and its overall economic goals for 2030 and 2045 at lower cost, maintaining reliability at lower cost, supporting grid integration of variable energy, and limiting carbon dioxide emissions during the transition."

The Stanford-MIT report found that in the near term of 2025-2035, retaining Diablo Canyon would save \$2.6 billion in power system costs, as compared against an alternative portfolio of resources consistent with California's SB 100 goals and without Diablo Canyon. In addition, retaining Diablo Canyon would reduce California's natural gas use by 10 TWh annually, further reducing carbon emissions by more than 10% from 2017 levels on top of the reductions produced by the state's 47% Renewable Portfolio Standard for 2025 and 60% by 2030. Finally, the report found that retaining Diablo Canyon would bolster system reliability, mitigating the probability of brownouts.

Figure 1 shows the capacity of the Diablo Canyon power plant and contrasts that with the replacement capacity in the alternative portfolio consisting of 3.383 GW further solar PV and 2.861 GW further storage installations. Figure 2 shows the generation from the Diablo Canyon power plant and contrasts that with the replacement generation sources from the alternative portfolio. Approximately one-half of the replacement generation is from the additional solar PV capacity, while the other half is mostly from increased utilization of the existing natural gas plants.

¹ The views expressed here are those of the authors of this letter and not those of MIT.

² SB 846.



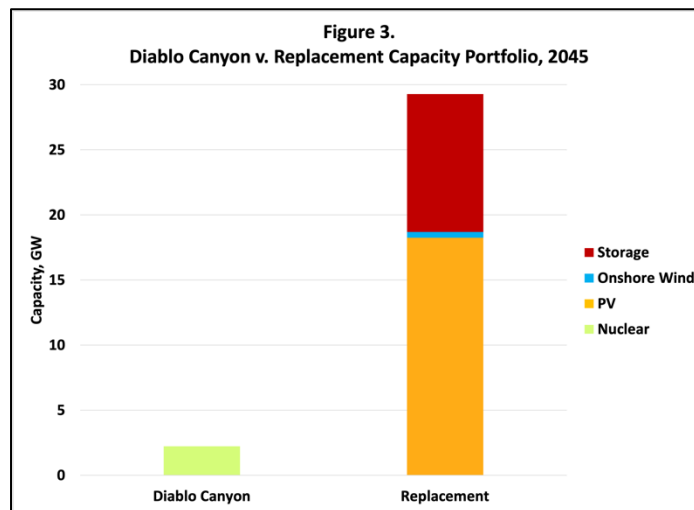
These results likely understate the cost difference between extended operation at the Diablo Canyon powerplant and a portfolio of other feasible resources. The Commission has taken note of the need to filter resources that do not compete with LSE procurements, which include large amounts of solar PV and storage installations.³ The results in the Stanford-MIT report are based on an alternative portfolio that includes 3.383 GW further solar PV and 2.861 GW further storage installations, along with increased use of the natural gas plants. On paper, these options are less expensive than other supply resources such as Gaseous Fuel Generation using hydrogen that the Commission is considering for an alternative portfolio.

³ California Energy Commission, July 7, 2023, “SB 846 July 7 Workshop Diablo Canyon Cost Comparison.” It should be noted that the state has recently been adding solar at the rate of approximately 1.36 GW per year. See California Energy Commission, Electric Generation Capacity and Energy, <https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/electric-generation-capacity-and-energy> If the Diablo increment were to be met by solar replacement between 2025 and 2030, therefore, at current deployments rates, Diablo replacement would absorb one-half of the solar increment during that period, retarding progress towards the state’s objective to replace fossil fuels with solar.

The Long Term, 2035-2045

The Stanford-MIT report also looked out beyond 2035. License extensions for nuclear power plants in the U.S. are typically for durations twenty years, which would bring the life of the plant to 2045. At that point, the plant could be considered for a further license extension for another twenty years.

The analysis in Chapter 1 found that retaining Diablo Canyon provides the electricity system with \$15-16 billion in savings across the years 2025-2050. Looking out to 2045, the figure below contrasts the capacity of Diablo Canyon with the capacity of a zero-carbon replacement portfolio serving the same load.



Sincerely,

Jacopo Buongiorno
TEPCO Professor and Associate Department Head, Nuclear Science and Engineering
Director, Center for Advanced Nuclear Energy Systems
Director of Science and Technology, Nuclear Reactor Laboratory
Massachusetts Institute of Technology

John Parsons
Deputy Director for Research
Center for Energy and Environmental Policy Research (CEEPR)
Massachusetts Institute of Technology