

Let's Be Reasonable about Diablo Canyon and Research Our Options Before Legislating Disaster

Proposed Nuclear Plant Extension is Unsafe and Far More Costly and Financially Riskier than Other Grid Stabilization Options.

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NOTE: All opinions offered in this press release are offered individually and not as a representative of any of the author's affiliations.

The Legislature Should not Mandate Nuclear without Study of Options

The climate crisis is heating up more quickly than we thought possible. It appears many climate models underpredicted the severity of the crisis, and now policy makers and grid managers are scrambling to fill a potential shortfall of power on the grid between 2025 and 2029. However, this shortfall is expected to be short-lived because offshore wind's (OSW) output curve mirrors that of solar. Production of OSW is highest at night and lowest at midday. So by 2030 when these complimentary capacities are deployed, they will to a large extent "grid harmonize" with proportionally lower utility scale storage required than the current mix of renewables. The fact that off-shore wind is likely to offer a more economic partial solution to the 100% renewable grid stability challenge was not mentioned during the recent August 12 CEC workshop that was co-presented by CAISO and the governor's staff. CAISO also did not mention during its presentation that the August 2020 blackouts were largely the result of CAISO's own miscalculated projection of demand. CAISO actually had the capacity to meet demand but were contractually obliged to export electricity to other states. Should we not also be exploring better modeling and management protocols?

There are many potential solutions to the intermittent projected grid shortfall that are far more cost-effective than a nuclear power plant designed only for continuous operation: Demand response allows household appliances such as water heaters and laundry service to be curtailed during a peak event to avoid blackouts, and optimizes their run time to peak output of renewables. According to LBNL and E3 studies, demand response can meet the total capacity of Diablo Canyon for about a tenth of the cost. Vehicle to grid (V2G) technology allows EV owners to choose to feed the grid during a peak event for compensation – like renting your EV battery pack to meet an intermittent demand event. If V2G technology were fully deployed, roughly two-thirds of all the Teslas on the road today could have supplied the necessary battery back-up to prevent the blackouts (not including other EVs), so the resource is more than adequate to meet annual heat wave-driven demand. Major manufacturers are releasing V2G capable EV models next year, and the possibility of retrofitting the existing EV fleet should be explored. When such economic alternatives exist, it is a disservice to ratepayers to push blindly forward with the most expensive and environmentally impactful nuclear "solution."

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Hydrogen peaker plant turbines are now commercially available and can be retrofitted at all of the fossil fuel plants when turbine generators require replacement. This allows them a flex-fuel option to run on either natural gas or hydrogen and the cost of “green hydrogen” made from renewable electricity is sharply dropping, making this alternative more economic. With such grid stabilization alternatives, why is the legislature in a rush to waive all regulatory requirements to subsidize a high-cost, non-economic nuclear power plant that will continue to have many times the operating cost of more economic alternatives? *The legislature and the governor seem to be making a huge mistake without proper evaluation of the opportunity costs.*

PG&E staff have stated matter-of-factly that they expect to distribute the higher cost of Diablo Canyon operations across all ratepayers in the state through the Power Charge Indifference Assessment (PCIA), which means that keeping Diablo Canyon open will add financial burden to community choice aggregators (CCAs) and directly slow the deployment of renewables on the grid. Some CCAs have targeted 2030 as the date by which they intend to be 100% renewable and they are credited for doubling the speed of our transition to a 100% renewable grid. PG&E’s strategy to shift the additional cost of Diablo operations onto the backs CCAs which operate as not-for-profit power purchasing agencies run by municipalities (your city council), is likely to serve their interest in eliminating CCAs altogether. Whereas the legislature and the governor say that DCPD provides “carbon free” power that will keep the grid cleaner, their strategy will in fact have an opposite effect, undermining the financial viability of CCAs and perhaps causing their failure. If the projected 2025-2029 generation shortfall is the result of delays in offshore wind and vehicle to grid deployment – the \$1.4B giveaway to PG&E should be redirected to accelerate these more economic alternatives.

Nuclear is Not as Safe as All the “Experts” Will Tell You

At the Recent August 12th CEC Workshop on Diablo Canyon extended operation, one nuclear expert after another called in from every corner of the US to support the extension and assure that there are no hazards associated with nuclear and that “no one has ever died from exposure to nuclear waste”. (Remember Chernobyl). David Weisman from the Alliance for Nuclear Responsibility likened this to playing Russian roulette with 100 chambers and a bullet in one of them. “Nuclear is safe until an accident happens.” The Fairewinds Report on Diablo Canyon submitted to the CPUC in 2016 makes a clear case that one of Diablo’s nuclear reactor vessels has suffered severe embrittlement (now the worst in the nations fleet). (<https://www.fairewinds.org/nuclear-energy-education/arnie-gundersen-fairewinds-associates-testimony-to-the-cpuc-31-1-17>) The radiological embrittlement is due to metallurgical design flaws in the Unit 1 reactor vessel, and if an emergency shutdown were necessary, the reactor vessel would be at risk of failure. Rather than address this issue when it was discovered in 2002, PG&E filed for a deferment to avoid further embrittlement testing which was required every ten years and the Nuclear Regulatory Commission (NRC) granted this pass on safety testing. It is difficult to understand why the NRC would grant this pass or reach the conclusion that embrittlement is not a safety concern. PG&E’s staff has recently stated reactor embrittlement “is not a concern” but has not provided hard data they say supports their conclusion. Combine the embrittlement with seismic concerns and dozens of other deferred maintenance issues at the plant and there is potential for a serious safety issue. If embrittlement poses ANY additional risk to the public, Unit 1 should be immediately shut down.

Nuclear is not as Economic as the “Experts” will Tell You

The Fairewinds Report also reveals a clear track record based upon PG&E’s own filings, that they are very poor at projecting both capitalization and operating costs. Between 1979 and 1987 PG&E’s

estimated total capitalization estimates increased from about \$1.5B to nearly \$6B. (Fairewinds Report, p.6). More recently, Diablo's operating budget increased from about \$320M per year in 2011 to over \$450M per year in 2017, a roughly 40% increase (Fairewinds Report, p.10). It is hard to imagine that these costs will go down or that Diablo Canyon will be immune to supply chain problems that have affected many sectors of the renewable energy market. Many nuclear plants are closing elsewhere, so the support infrastructure for nuclear will be affected by these other closures. Historically 40% of PG&E's operating budget goes to Diablo Canyon while it produces only 22% of PG&E's generation output, meaning that it is the most expensive energy on the PG&E grid.

Ratepayers and CCAs are Likely to Shoulder the Burden

During a recent meeting with PG&E officials, I specifically asked about the social justice ramifications of continued operation: if the relatively high operating costs of DCCP become the burden of ratepayers, it will disproportionately fall on the backs of low income ratepayers who pay a disproportionate share of their income for electricity, and are therefore more likely to suffer the consequences of heat wave related peak demand outages. PG&E's staff responded that they intended a more equitable solution: and their intention was to "distribute the higher operational costs to ratepayers statewide through the PCIA" (power charge indifference assessment). Community choice aggregators (CCA's), are city and county-based agencies run by local officials who take over only the power purchase agreements from PG&E, and they have doubled the speed of the transition to renewables in the state. The PCIA charge was originally created to compensate big utilities for large investments they made in solar and wind when the cost of these was much higher per installed kW of capacity than they are today. The PCIA is also intended to "sunset", and would naturally diminish over time as new, more economic renewable generation sources come on line. Continued operation of Diablo Canyon extends this hidden tax on renewables indefinitely and will directly impact the financial viability of not-for-profit CCAs and thereby slow the greening of the grid for another decade. To make matters worse, how the PCIA charges are calculated are confidential and not disclosed to CCAs, so PG&E is not required to be transparent about this accounting with the CCAs who currently pay these fees. CCAs fought for transparency and have lost.

The V2G Solution is Inherently More Economic

Vehicle to grid Technology is clearly the most economical solution to grid stability. The cost of an EV battery is justified by its daily use and value to the vehicle owner, so "renting" this resource for a few hours during peak heat events each year and compensating EV owners is the only way to provide this periodic battery back-up supply without a significant capitalization cost. EV owners should also be able to opt-in to lower-rate programs that automatically adjust charging rates to actual peak solar output on the grid, charging quickly when there is surplus solar and more slowly when there is not (demand response). There is legal precedent for mandating V2G programs for EVs now on the basis that the grid-harmonization of EVs greatly reduces their total system emissions. Doing so is tantamount to emissions controls on combustion vehicles. Slowing the adoption of EVs by consumers as CEC staff suggested, or suggesting that EVs are creating grid management problem ignores the realities of the V2G solution. Spending the earmarked \$1.4B on rapid implementation of EV-grid integration strategies is a far better and lower-risk investment in grid stability than continued Diablo Canyon operation. Policy makers need to consider total life-cycle costs of every option before making irreversible decisions to invest in high-risk solutions that will slow our pace to meet the climate challenge.

People Shouldn't Die

If we enter a 4-year period with less grid stability, widespread incentives or support can be offered to disadvantaged households for battery backups on essential medical equipment. Central Coast Community Energy, a CCA that serves a 5-county region between Santa Barbara and Santa Cruz, already has a program to offer low to no-cost battery back-ups to people dependent on medical devices. However, the legislature should move quickly to set aside a special fund for senior citizen facilities and residences wherein those most vulnerable to heat stroke can receive higher funding levels for HVAC electrification and install of air-conditioning. The fear of medical equipment failures and consumer safety should not be used as an argument to extend Diablo Canyon's legacy of creating highly radioactive waste that remains "too hot to hold" for up to 250,000 years. The failure of the federal government to make good on its 1950's era promise to create a federal repository is proof enough that the not-in-my-back-yard argument may prevent a federal repository from ever happening. This means that material which remains hazardous for 250,000 years will remain in dry cask storage containers that are rated for 100-years and they will likely remain at Diablo Canyon – a ticking time bomb for our children and grandchildren. We cannot risk nuclear contamination as a cost we must pay for "grid reliability". When the risks and societal costs are so high, nuclear should not be considered either "green" or "clean". Such characterizations are misleading.

Expand the Research Collaborative to Create a National "Marshall" Plan

As a cofounder of the "Green Infrastructure Research Collaborative" at Cal Poly's Institute for Climate Leadership and Resilience (ICLR), I can testify that the research model works and should be expanded so that decision makers and regulators can implement a just and equitable energy policy to meet our climate challenge responsibly. Unlike in-class sponsored projects of the past, the research collaborative model taps into multiple disciplines across many classes working in parallel to produce the various chapters of a more concise and readable feasibility study. By delegating the various chapters to specific disciplines, you create a more comprehensive understanding of financial costs and risks, potential environmental impacts, technological challenges, regulatory and permitting barriers – not just for one project, but on a range of projects at different proposed sites that can be cost and benefit-compared. Such "cost trade-off analyses" enable government decision makers at the city, county or state levels to make informed decisions about infrastructure investment at little to no cost, and it would bring investors to the table early on in the process to help filter the lowest risk and most "bankable" projects. This model should be supported at the state level to greatly accelerate development timelines and reduces risk of "sunk costs" into more expensive feasibility studies that take years to produce.

Conclusion

We cannot trade climate mitigation and nuclear safety for grid reliability and heat wave safety - a false trade-off, because there are more economic solutions that can meet all of these challenges. When there is a serious possibility that there will never be a federal repository and the spent nuclear fuel may be housed at Diablo Canyon for centuries to come in dry casks designed to last only 100 years, subsidizing an energy source with such horrific potential environmental impacts is beyond all reason. What has happened to our sense of humanity and social justice that we justify continued operation of Diablo Canyon without even investigating the more viable, just and cost-effective alternatives? *What is the huge hurry to approve a legislative action that would forego environmental and cost studies when that is precisely what is needed to make an informed legislative decision? Policy should not fly blind.*