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CGNP Comments to CEC 21-ESR-01 - 02 21 23

ABSTRACT: The California Energy Commission (CEC) has recommended that it is prudent to pursue extension of Diablo Canyon Power Plant (DCPP) â€œuntil the state can confirm that the necessary resources are on-line or CECâ€™s assessment of alternatives shows viable alternative resources are available to meet the needs that DCPP would have provided otherwise.â€

Californians for Green Nuclear Power (CGNP) is heartened by CECâ€™s recommendation. Yet, it is generally acknowledged that investment in alternative sources of energy capable of providing an equivalent supply of reliable, baseload electricity would cause an exorbitant financial burden on California electricity customers.

CGNP thus recommends, should Diablo Canyonâ€™s operating license be renewed for the expected 20-year term, that the plant remain operational at least until its new license expiration date in 2045. We offer several reasons in support in our 40-gage long comments.

Additional submitted attachment is included below.

Comments on California Energy Commission's "Draft Clean Energy Investment Plan"

(21-ESR-01)

Californians for Green Nuclear Power

The California Energy Commission (CEC) has recommended that it is prudent to pursue extension of Diablo Canyon Power Plant (DCPP) "until the state can confirm that the necessary resources are on-line or CEC's assessment of alternatives shows viable alternative resources are available to meet the needs that DCPP would have provided otherwise."

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For Nuclear Plants, Age is Just a Number

Nuclear plants reaching the end of their first operating license period are often portrayed as "aging", as dangerous, or as prone to failure. These misperceptions date back to the 1950s, a time when the durability of steel, concrete, and other materials used to manufacture the mechanical and structural parts of nuclear plants was untested in that application. Materials had never before been exposed to the high levels of radiation, temperatures, and pressures they would be expected to endure over extended periods of time. Thus early engineers at the Atomic Energy Commission (later the Nuclear Regulatory Commission), out of an overabundance of caution, demanded nuclear reactors be relicensed after a period of only 40 years. It was significantly shorter than the lifetime of gas- or coal-power plants, even though a reactor's constant operating temperature avoided the constant stresses and fractures common in coal boilers and gas turbines.

Performance over time exceeded expectations. Now, experts believe a reactor's vessel and other main components are capable of lasting over two license periods (80 years) - even as long as a century[1].

[1] "What's the Lifespan for a Nuclear Reactor? Much Longer Than You Might Think", https://www.energy.gov/ne/articles/whats-lifespan-nuclear-reactor-much-longer-you-might-think

Keeping existing plants running as long as possible thus implies enormous cost savings for California electricity customers. The capital cost of building DCPP will be completely repaid by the end of its current license, in 2026, with the only remaining costs being Operations and Maintenance (O&M). According the US Energy Information Administration, O&M costs for US nuclear plants are 2.3¢/kWh - the lowest of all dispatchable sources of energy other than hydropower[2].

Can Renewable Solar and Wind "Replace" Diablo Canyon?

Whether it's even possible to replace DCPP's value with renewables is questionable. Much investment has been devoted to the premise large, grid-scale batteries would be able to store renewable energy when it's available, to be used later when it isn't. But achieving that goal has proven more difficult – and expensive – than previously thought. There are several problems with the assumption:

1. **In practice, batteries aren't charged by exclusively clean energy.** Though banks of batteries are often shown installed next to solar or wind farms, they're built there for purposes of appearance only. Virtually all grid-scale batteries are charged by a grid mix – by whatever sources of energy are currently generating electricity to the grid. If any component of that electricity was generated by burning fossil fuel, storing it in batteries raises carbon emissions. One study has shown that grid-scale batteries always result in an increase of grid-wide carbon emissions, anywhere from 104 kilograms of CO2/megawatthour to 407 kgCO2/MWh[3].
2. **Excess capacity is limited.** The same energy from a solar farm cannot be used to both charge batteries and power the grid. That means extra solar capacity must be built simply for purposes of storage, while other capacity is used to power the grid.
3. **Batteries are expensive.** To power California for a single cloudy day with batteries, at today's prices, would cost more than $432 billion in battery capacity – roughly twice California's total annual budget[4].
4. **Batteries wear out.** The maximum lifetime of Li-Ion batteries depends on many factors, but a lifetime between 10-15 years is expected. In the best possible case, California electricity customers would be forced to spend $2,300/year on batteries alone.
5. **Not a single grid in the world is powered by renewables + batteries.** No grid in any location, of any size, has been reliably powered by renewables + batteries. So when renewables are added to a grid mix, what ends up filling in when they aren't available?

When Wind and Solar Arrive at the Party, There's Always an Unexpected Guest in Tow

Generation plants powered by methane, aka "natural gas", produce more of California's electricity than any other source. Certainly all of the growth in renewables must be displacing some of that fossil fuel with clean electricity from the sun and wind?

It would seem that way, but it isn't.

In-state natural gas consumption has remained largely steady over the last two decades, despite millions of solar panels and thousands of wind turbines installed. The reason? Gas is needed, even more ,to fill in

[2] https://www.eia.gov/electricity/annual/html/epa_08_04.html
[3] "Bulk Energy Storage Increases United States Electricity System Emissions", https://pubs.acs.org/doi/abs/10.1021/es505027p
[4] CA annual consumption 278 TWh, assumes battery cost of $567,000/MWh

the gaps when they aren't available. When a cloud covers the sun above Topaz Solar Farm, somewhere some gas turbine running in "spinning reserve" is read to start generating electricity to fill in its missing clean electricity with the dirty kind. Same with wind farms, when a sudden lull in the wind brings all the turbine blades at Altamont Pass to a gradual stop.

Though California has made great progress at reducing emissions over the last two decades, much of it has come from improvements in vehicle efficiency. Reductions in emissions from electricity has slowed to a stop and is creeping back up again, and its all because of the dependence of renewables on natural gas.

K.I.S.S. (Keep it Simple, Stupid)

A maxim of engineering states "In any system, unnecessary complexity always results in decreased reliability." It applies in cars, to airplanes, to computer systems, even to Human Resources (when excessive hiring results in compartmentalization – too many people doing simple jobs). The same is true when powering an electricity grid, but it's a lesson that has already been learned.

In the 1880s, when the first electricity grids were installed in New York City and Philadelphia, they were a mess. Every customer had a different set of wires running from a neighborhood coal plant to their home. Poles up to 100 ft. tall carried hundreds of wires – and because electricity generators competed with each other, sabotage by linemen was common. Standards for plugs and sockets were all but non-existent; catastrophic fires were rampant.

Over the course of decades Edison Electric, Westinghouse, and other companies learned to simplify. They learned a fat wire coming from the power plant could carry power to another neighborhood, where it could be split among thinner wires, and those split again to individual customers. They gradually realized this "radial topology" was the most efficient and reliable way to distribute electricity to the greatest number of people.

In 2023 many renewables advocates blame reliability issues on an "aging" grid. Though it's true some electrical components are reaching the end of their useful life, electricity cables themselves are extremely durable - at doing what they were designed to do. They fail faster when the grid is run backwards, however: when sources of generation are pushing electricity into the thin end of the wire, instead of the fat. It happens in large communities when homes with solar panels overload local distribution grids, or when a large solar farm in a remote area must transmit electricity to a big city along transmission built to serve only a few customers spread far apart.

Advocates view the push toward a distributed generation ("DG") as progress. They view complexity as an improvement, and look forward to a day when black-box computer models will design lush tapestries of transmission lines and microgrids, where anyone can sell generated or stored electricity to anyone else, and have someone else pay for the wires.

Californians for Green Nuclear Power views DG as a big, costly step backward for grid reliability, efficiency, and reducing carbon emissions - and we have history on our side.

To support the CGNP's above recommendation to run DCPP at least until 2045, here are excerpts from the CEC's February 14, 2023 "Diablo Canyon Power Plant Extension-Draft CEC Analysis of Need to Support Reliability".

ABSTRACT:

The Diablo Canyon Power Plant Extension – CEC Analysis of Need to Support Reliability addresses a requirement in Senate Bill 846 (Dodd, Chapter 239, Statutes of 2022) for the California Energy Commission (CEC) to determine the need to extend the operation of the Diablo Canyon Power Plant (DCPP) for 2024–2030. The analysis is based on a CEC assessment of the state's electricity reliability based on forecasted demand and supply for that period. Based on CEC's analysis, the CEC staff recommends that CEC determine that it is prudent for the state to pursue extension of DCPP. This determination is driven by the risk that sufficient electricity resources may not be built in time to reach the ordered procurement and to address potential grid demands in extreme heat events associated with climate change.

INTRODUCTION:

The Diablo Canyon Power Plant near San Luis Obispo is owned and operated by Pacific Gas and Electric Company (PG&E). The Diablo Canyon Power Plant produces about 18,000 gigawatt-hours (GWh) of electricity annually, which is about nine percent of California's current in-state generation. The two reactor units are licensed by the United States Nuclear Regulatory Commission (NRC) to operate until November 2, 2024 (Unit 1), and August 26, 2025 (Unit 2). In 2016, PG&E announced a joint proposal with several parties to increase investment in energy efficiency, renewables, and storage, while phasing out nuclear power. PG&E's application to close Diablo Canyon, including aspects of the joint proposal, was approved by the California Public Utilities Commission (CPUC) in January 2018 with PG&E withdrawing its application for a licensing extension in February 2018.

Extreme heat events and wildfires in recent years, however, have highlighted the need to plan for additional risk to California's energy reliability. Senate Bill 846 (SB 846, Dodd, Chapter 239, Statutes of 2022) provides a path to extend Diablo Canyon Power Plant operations beyond 2025 if it is needed to support grid reliability. *The bill also directs the CEC to determine whether the state's electricity forecasts for 2024 through 2030 show potential for reliability deficiencies if Diablo Canyon Power Plant operations are not extended beyond 2025 and whether extending operations to at least 2030 is prudent to ensuring reliability and consistency with the state's emission reduction goals.* (Emphasis added.)

Reliability

The reliability assessment approach used for this report looks at forecasted demand and supply for 2023–2032. Although SB 846 requires only considering 2024–2030, the CEC included the analysis developed for the Joint Agency Reliability Planning Assessment, which covered 2023–2032.1 The analysis shows that under the current resource adequacy planning standard, the CPUC's procurement orders, Decision (D).19-11-016 and D.21-06-035, are sufficient to eliminate shortfalls through 2030. *However, significant grid reliability risks persist through 2030 under increased demand conditions, such as those experienced in August 2020 and September 2022 compared to the forecasted demands. These risks are compounded by the risk of coincident wildfires impacting transmission lines bringing electricity imports to California.* (Emphasis added.)

Need for DCPP to Support Reliability

While CEC staff has concluded that current authorized procurement will meet current resource adequacy planning standards from 2024 through 2030, risks remain to grid reliability. The rate of development needed to meet the procurement levels ordered is greater than the recent record-setting development that has been occurring in the state. Development is being impacted by supply chain issues, particularly for solar and storage, and interconnection and permitting delays, resulting from the large number of projects coming on-line that require detailed safety and environmental reviews. Climate change also is impacting grid reliability by causing more frequent extreme events beyond what current planning standards account for, such as record-setting heat, droughts, and wildfires that can impact transmission.

CEC staff has determined that it is prudent for the state to pursue extension of the Diablo Canyon Power Plant through 2030 to mitigate the risks imposed by the dependence on an unprecedented speed and scale of development and of increased frequency and intensity of climate-driven extreme events. CEC staff has determined that this is consistent with the state's emission reduction goals. (emphasis added.) Staff also notes that additional analysis to be conducted this year will further inform the process. CEC will conduct a cost comparison of extending Diablo Canyon Power Plant to developing alternative resources. The CPUC will conduct a reliability analysis and make a determination of the extension by December 31, 2023.

1 Kootstra, Mark, and Nathan Barcic (CPUC). 2023. Joint Agency Reliability Planning Assessment. California Energy Commission. Publication Number: CEC-200-2023-002.

Permitting

Lengthy local permitting requirements can also create delays to project development. There are projects under development in at least 40 counties and more than 100 cities in California. Projects are being developed in localities that may have never had to permit energy projects. Some of these localities are faced with a steep learning curve in conducting reviews and issuing permits on technologies new to them. While land-use permits have always been a potential construction project delay, the most significant emerging issue is permitting energy storage. *Recent energy storage fires are resulting in closer scrutiny of storage projects to ensure they meet fire code.* (Emphasis added.) AB 205 provided an alternative process allowing eligible energy generation and storage facilities to optionally seek a permit from the CEC. As part of that process, the CEC must find that the project will comply with all applicable laws, ordinances, regulations, and standards, or if such a finding cannot be made, that the facility is required for public convenience and necessity and there are not more prudent and feasible means of achieving public convenience and necessity.6

6 Public Resources Code, Section 25545.8(b) [referencing Public Resources Code Section 25525].

Recommendation

Given the potential delays in resource build out to meet ordered procurement and increasing risks of climate-related threats to grid reliability, *CEC staff recommends that the CEC determine that it is prudent to pursue extension of DCPP* (emphasis added) until the state can confirm that the necessary resources are on-line or CEC's assessment of alternatives (due September 30, 2023) shows viable alternative resources are available to meet the needs that DCPP would have provided otherwise.

While analysis of the state's electric system reliability indicates that the state can meet the current resource adequacy planning standards over the next 10 years, *the analysis projects shortfalls if the state experiences extreme heat events such as it experienced in 2020 and 2022.* (emphasis added) The analysis is also predicated on the ability to build new clean energy resources at a pace not seen before and in the face of supply chain, interconnection, and permitting delays. It is also predicated on the ability of LSEs to be able to secure imports in an increasingly competitive western market.

Extending DCPP has a decided advantage in the sense that it is a firm, low-carbon resource. This extension allows the state to rely less on natural gas and more on clean resources for the grid. (emphasis added) CEC staff notes that additional analysis will be conducted by the CEC to compare the costs to extend DCPP to alternative resources (due to the Legislature by September 30, 2023) and by CPUC in its DCPP proceeding (decision anticipated by December 2023). These analyses will further inform the decision to extend DCPP.

Here's one of CGNP's recently-published Press Releases that supports DCPP extended operations.

FOR IMMEDIATE RELEASE

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Diablo Canyon Power Plant, slated for demolition, was given a breath of new life on September 1, 2022, when California's legislature authorized operation for an additional five years.

Governor Newsom Signs Historic Legislation to Save Embattled Nuclear Power Plant

Arroyo Grande, CA Sept 2, 2022 – Independent nonprofit Californians for Green Nuclear Power (CGNP) applauds the environmental leadership of California Governor Gavin Newsom in signing SB 846 (Dodd) earlier today. GSS_9121_1-20220902164401 (ca.gov) CGNP, founded by scientists, is dedicated to environmental stewardship. "Governor Newsom's team worked long and hard to establish California as a true climate leader today while protecting ratepayers and California public safety," said CGNP Legal Assistant Gene Nelson, Ph.D.

- CGNP President Carl Wurtz said in a September 1, 2022 press release. "This has been the culmination of a decade of work for CGNP, of thousands of hours of research, filings, outreach, and testimony. It's unfortunate it took the lights going out for many to appreciate Diablo Canyon's value, but better late than never."

- Hudson Sangree of *RTO Insider* in his September 1 article wrote, " Grassroots advocacy group Californians for Green Nuclear Power (CGNP) has pushed for the move since before many politicians were convinced that keeping the plant open made sense. Newsom and other officials gradually came around to CGNP's point of view as the state struggled to maintain grid reliability starting with the rolling blackouts of August 2020."

- Dr. Nelson continues, "CGNP is optimistic the likely funding from the U.S. Department of Energy's Civil Nuclear Credit program to Diablo Canyon's owner will help to reduce California ratepayer costs while insuring our future grid reliability. The current California heat wave has already forced some of our state's fossil-fired plants off line. Having reliable power for our residents is a matter of life and death."

Here's what *Energy GPS* reported on the Moss Landing Battery Fire. In contrast, nuclear power from Diablo Canyon has established a far stronger strong safety record since the plant began operations in 1984.

Lessons from Moss Landing

Wednesday, October 12, 2022

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https://www.energygps.com/Newsletter/b/Newsletter-Lessons-from-Moss-Landing-2280991

Early in the morning on September 20th, a fire broke out at the PG&E Elkhorn battery located at Moss Landing in Monterey, California. Firefighters stood back and let the blaze burn itself out while working to prevent spread, adhering to the current protocol for battery fires. There were no reported injuries and the fire was contained to a single Tesla battery Megapack. However, the nearby highway was closed until the evening and residents were forced to hunker down in their homes. The Shelter-in-Place lasted most of the day as there were concerns over the presence of hazardous materials in the air. Recent reports released indicate there was no risk to human health. The event represents the most recent fire in a string of battery incidents across the globe and shows the progress made in increasing safety during these events, as well as the continued risk at these sites.

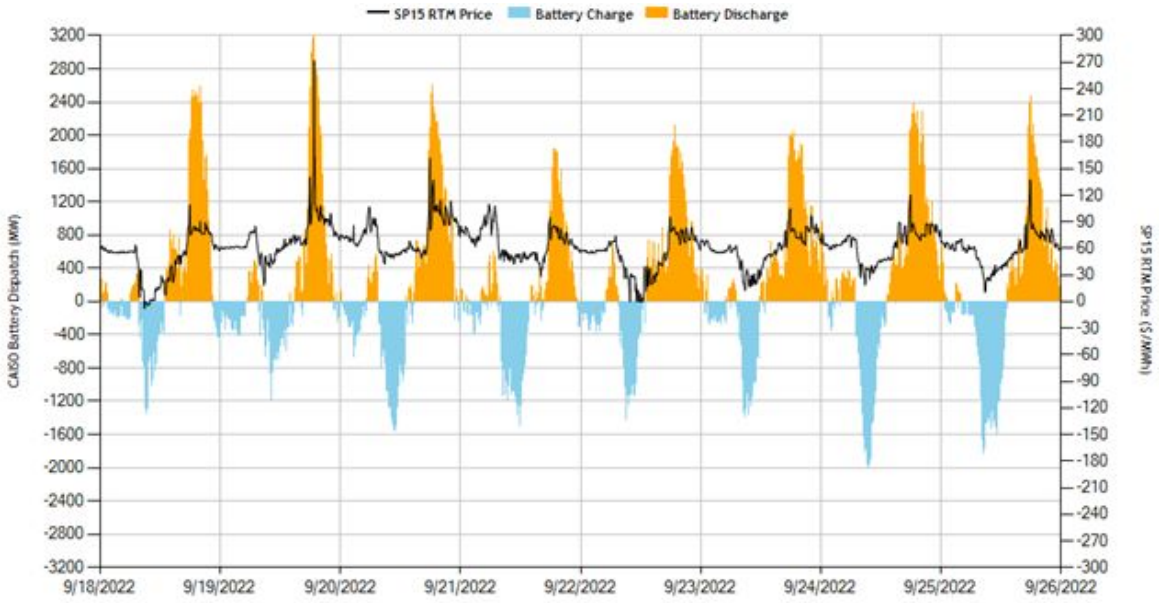
Figure 1 | Elkhorn Battery at Moss Landing (Source: Tesla)

This was not the first incident at the Moss Landing site, shared by the PG&E Elkhorn battery and batteries owned by Vistra. Vistra faced an extended shutdown after a faulty heat suppression system turned on, spraying their batteries with water and causing short-circuiting. They have since revamped their systems and are fully back online. Similarly, Tesla has made safety improvements after a fire at a site in Australia spread between multiple battery packs. Other improvements in the industry have included new

ventilation systems and a switch to lithium iron phosphate (LFP) chemistry and away from nickel manganese cobalt (NMC) chemistry which was used in the Elkhorn batteries and in electric vehicles. Being a relatively new industry, new safety standards will continue to form and hopefully the events that inspire them will continue to decrease in their impact to human health and safety. The review of the events from September 20th and any subsequent improvements are still being conducted.

At EnergyGPS we've covered batteries extensively over the last few years as the industry has developed. Most recently, we delved into their role in the September heat wave in CAISO in an article titled 'Laboring (Day) in the Heat – CAISO Batteries' and explored new battery data in 'CAISO Pulls Back the Curtain on Batteries'. We also publish a daily battery dashboard with figures including the one below that displays the charging and discharging of the CAISO battery fleet alongside real-time SP15 prices.

Figure 2 | Battery Operations and SP15 RTM Price



Here are four articles from Carl Wurtz of CGNP that support extended DCPP operations:

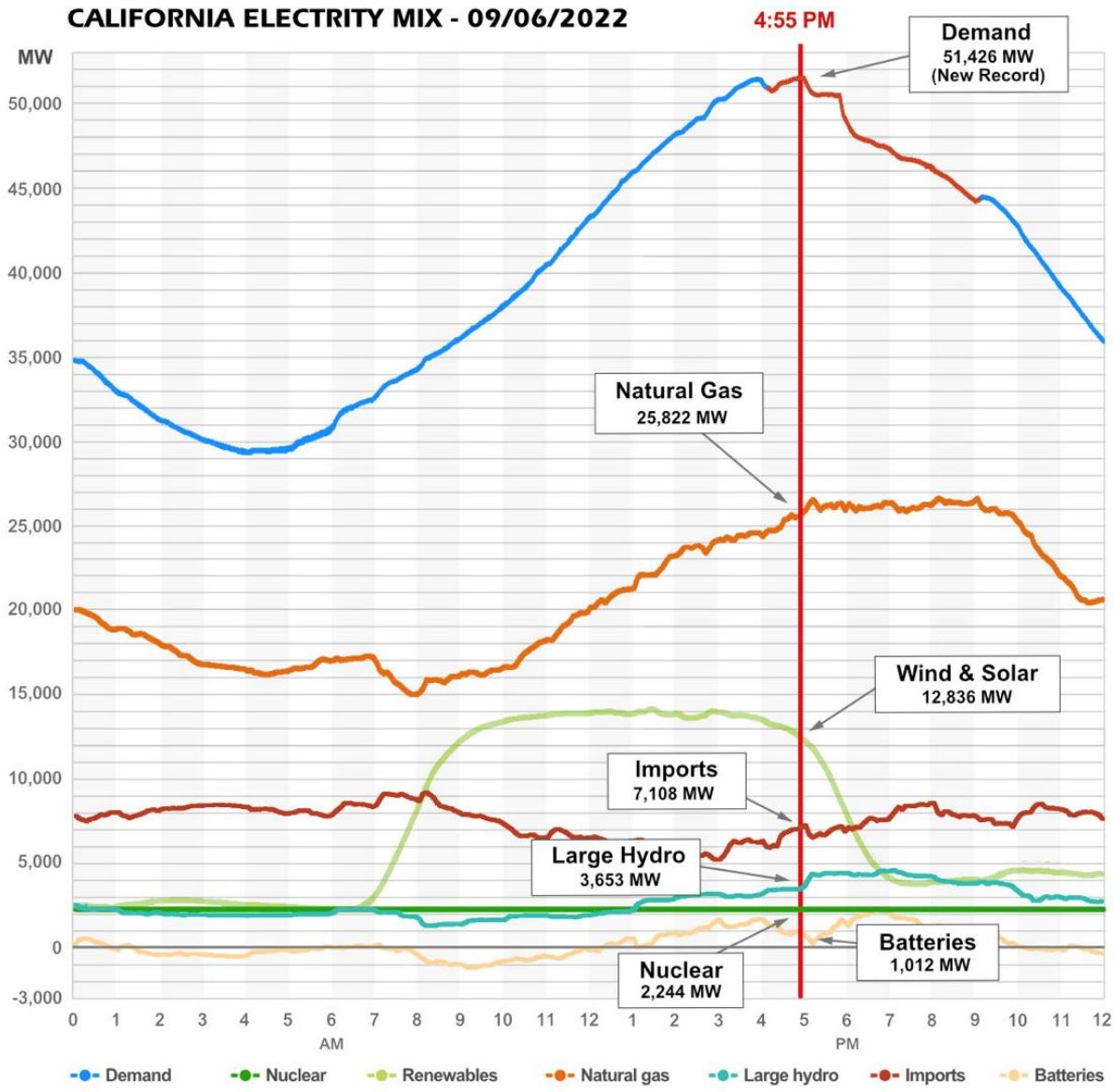
Electricity Transmission Pylon at Dusk. (Photo: chuyuss/Shutterstock)

Lessons Learned From California's Averted Power Crisis

Dispatchable vs. Renewable Electricity: Without nuclear and gas-fired electricity, California would be left at the mercy of the sun and wind for its power

By Carl Wurtz, September 21, 2022 2:50 am
https://californiaglobe.com/articles/lessons-learned-from-californias-averted-power-crisis/

Shortly after 4:55 PM on Sept. 6, California's electricity grid set a new record. Briefly, residents and businesses were consuming electricity at a rate of 51,426 million watts, and the grid was stretched to its limit. Were it not for consumers reducing consumption in response to an urgent plea texted to 30 million cellphones, rolling outages initiated by system operator CAISO could have spiraled into a system-wide outage, shutting down the state and all of its businesses, and putting public health in jeopardy.



On electricity grids, supply of electricity must, at all times, be adjusted to meet demand precisely – no more, no less. For determining what led to California's near-disaster, the image above is revealing:

- The top line (blue and red) shows demand – how much electricity consumers were using during that day.
- The lines below it show the various components of supply – what sources were used to meet demand (the heights of each of these lines added together is equal to the height of the demand line at any given time).
- **During peak demand, over half of California's electricity was being supplied by natural gas-fired electricity.** At that time, gas plants were releasing 11,600 tons of CO2 into the air per hour.
- One-fourth of peak demand was met by wind and solar.

- **Three-fourths of CA electricity imports are generated by out-of-state gas and coal plants.**
- Assistance provided by batteries was negligible (1.9%).
- **Between 9AM and 4PM solar generation was curtailed (deliberately limited) to 14,000 megawatts**, so that natural gas could be ramped up in time to provide missing power after the sun went down.
- California reached peak consumption nearly ½ hour after CAISO's plea to reduce consumption was issued.

Most forms of renewable electricity, including wind and solar, are intermittent – they aren't always available to meet demand. In contrast, dispatchable sources like natural gas, coal, and nuclear, with an abundant supply of fuel in store, may be dispatched as needed.

California's grid mix that day shows that, without nuclear and gas-fired electricity, California would be left at the mercy of the sun and wind for its power. It shows that dispatchable electricity will always be necessary to assure grid reliability, and that without the carbon-free electricity provided by Diablo Canyon and a new generation of advanced nuclear plants, meeting our state's ambitious climate goals will be impossible.

Carl Wurtz

Carl Wurtz, President of non-profit Californians for Green Nuclear Power, grew up within a strong pro-nuclear culture not far from Argonne National Laboratory and FERMILAB in Chicago. Carl is a lifelong environmentalist and clean-energy advocate, and credits his pro-nuclear leanings to spending his youth in a state which generates more than half of its electricity with nuclear energy.

Diablo Canyon Nuclear Power Plant. (Photo: slocounty.ca.gov)

Grid Expert: Replacing Diablo Canyon Nuclear Plant with Renewables 'Can't Be Done'

To go 100% renewable would drive electricity prices four to five times higher

By Carl Wurtz, January 28, 2023 9:15 am

https://californiaglobe.com/articles/grid-expert-replacing-diablo-canyon-nuclear-plant-with-renewables-cant-be-done/

With recent legislation limiting the lifetime of California's last remaining nuclear power plant to eight more years, the debate about replacement power has once again been thrust to the forefront of environmental concerns: will higher emissions after the shutdown of Diablo Canyon doom California's efforts to meet climate targets?

Though generating electricity with nuclear power produces no CO2, California agencies believe the answer is "no." Every five years the California Air Resources Board (CARB) develops a plan to determine what sources will be needed to deliver clean electricity to 30 million customers. And though California has set ambitious carbon reduction targets for 2030 and 2045, the only sources which qualify in CARB's Scoping Plan fall under the arbitrary category of "renewable" energy. They include energy from solar panels, wind turbines, burning biomass (chipped

lumber), and geothermal wells, but inexplicably neglect nuclear and hydroelectricity, which are actually America's two largest sources of clean energy.

In 2016, when PG&E announced its decision close Diablo Canyon, the news was met with elation from large environmental groups. Calling the decision "historic", the Natural Resources Defense Council was ebullient. "It is the first time any utility owner has committed to a plan to replace retiring nuclear generation with 100 percent, zero-emissions, clean electricity-generating [renewable] resources that are also lower cost," read one press release. However, similar promises were never kept when California's other nuclear plant, San Onofre, was closed in 2012. Its output was replaced by electricity from gas-fired power plants, driving state CO2 emissions 35% higher.

Keeping California's grid running without power-on-demand from gas and nuclear power plants is a tall order. Intermittent power from solar and wind farms dramatically complicates grid management tasks for California's Independent System Operator (CAISO), and though massive batteries have been deployed in hopes they might be able to smooth the rough edges of power from the sun and wind, improvements have been minimal. Too often, CAISO is forced to fall back on electricity from gas and out-of-state coal plants to keep the lights on.

Limitations of "Black Box" Computer Models

No electric grid in the world is currently powered by renewable energy and batteries alone. Yet California planners believe investment, together with help from computer models simulating how power flows might unfold in coming years, can make it happen.

Skeptics aren't so sure. The model RESOLVE, from vendor Energy and Environmental Economics, Inc. (E3), serves as CARB's grid-planning centerpiece. A "black box" computer model, RESOLVE spits out detailed solutions to grid planning problems – but like all predictions, they are dependent on what assumptions have been made about what will probably happen, in some probable situation. A maxim of computer science states that output from a computer model can be no better than its input ("garbage in, garbage out").

What's the input for RESOLVE, i.e., who are the programmers making those assumptions? E3's website reveals only one of E3's senior staff members has formal training in electrical engineering, with activities limited to work in New York and other eastern states. The model's Product Manager has less than ten years of practical experience in designing energy systems, and is credited with one unpublished analysis sponsored by a solar panel manufacturer. Moreover, E3 offers no independent review of results delivered by RESOLVE. Does the model actually deliver on its promise of identifying "optimal long-term generation and transmission investments in an electric system"?

There is No Substitute For Experience

One of RESOLVE's critics is Dr. Gene Preston, an expert in transmission adequacy studies and power supply reliability. His resume includes a Ph.D. in Electrical Engineering and a lifetime of experience working for the Electric Reliability Council of Texas (ERCOT), as well as consulting for utilities in the U.S. and abroad.

When I asked Preston whether Diablo Canyon could be replaced by renewables and batteries, his answer was unequivocal.

"No – can't be done. Because December energy production of wind and solar is too low, it would require burning a lot of gas to compensate, and to go 100% renewable would drive electricity prices four to five times higher than what they are now. Missing from E3's analysis are the cost and difficulty of building new transmission lines, especially those for offshore wind. The public will not stand for the number of new power lines needed to power California with just wind and solar from remote locations."

Above all, Preston is a pragmatist. He believes models overcomplicate problems rooted in fundamental physics, and by doing so, can exacerbate them. In February 2021, when complications from Winter Storm Uri brought the Texas grid close to total collapse, Preston was one of the first experts contacted by ERCOT to determine what steps must be taken to avoid a recurrence.

"There still isn't enough energy and enough battery storage to carry us through another storm Uri," he maintains. "When ERCOT says, 'we have an adequate system', and we don't have a storm Uri, then they're probably telling the truth. But Uri is an exceptionally difficult problem for us. We'll need 28 gigawatts of gas capacity during [another] Uri, and we still don't know what the gas cost us in 2021. It was enormous. It literally wrecked our economy."

On January 12 California's Public Utilities Commission (CPUC) announced it would vote to determine whether Diablo Canyon Power Plant would be shut down permanently – even if its pending license renewal application is approved by the Nuclear Regulatory Commission, even if owner PG&E receives federal funding for the express purpose of keeping it open. Like San Onofre, there's every indication shutdown will increase California CO2 emissions by 9 million tons, the equivalent of 1.7 million more cars on the road. Yet CPUC's five commissioners – four attorneys and one administrator – will make one of the most consequential environmental decisions in California history. Their decision will be based on the output of black-box computer models, ones favoring outcomes that maintain reliance on gas-fired power plants indefinitely.

If that's the best Californians can expect for their environmental future, it isn't good enough.

The Failure of California Electricity Policy in One Image

April 2, 2022 7:50 am

https://californiaglobe.com/articles/the-failure-of-california-electricity-policy-in-one-image/

The Failure of California Electricity Policy in One Image

Veteran energy watchers know that a time-graph of electricity consumption on an electrical grid tells a story

By Carl Wurtz, April 2, 2022 7:50 am

In a few weeks it will be one year since the article "California just hit 95% renewable energy. Will other states come along for the ride?" appeared in the ***Los Angeles Times***. Its author, reporter Sammy Roth, had learned that California briefly generated 95% of the electricity consumers were using from renewable sources a few days earlier, and he was elated. Either he believed, or he wanted us to believe, that it was only a matter of generating 5% more of our energy from wind turbines and solar panels and California would cease emitting greenhouse gases into the atmosphere. We would achieve something no other country, city, or community worldwide had achieved before.

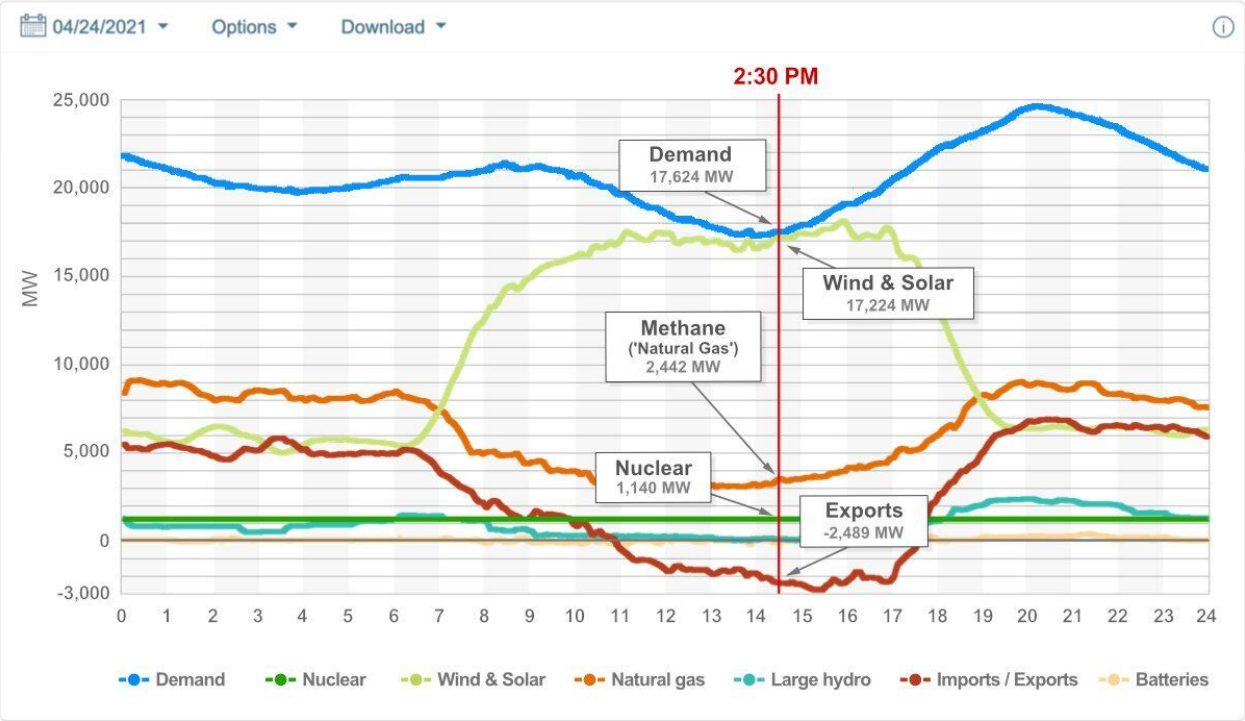
Like the rings of a tree, veteran energy watchers know that a time-graph of electricity consumption on an electrical grid tells a story. All of its curved lines, from one moment to the next, are interrelated – when one goes down, it might cause another to go down; two others might appear to be linked – but every shape has a part to play. Though I knew Sammy's claim wasn't true, I had to know *why* it wasn't it true – why it couldn't have happened, even for four seconds.

I started by downloading graphs of what happened on April 24, 2021 – precise figures for supply (generation) and demand (consumption), available at the website of the California Independent System Operator (CAISO). As you'll see, it didn't require much investigation before the monument to solar and wind energy Roth had erected would start to crumble.

The graph below was cobbled together from several others. Some explanation:

- Time moves from left to right. The left side corresponds to 12:00 AM on April 24, the right corresponds to 12:00 AM the next morning.
- The blue line at the top shows electrical demand, measured in megawatts (MW) – the amount of power California consumers were using at each moment of the 24-hour day.
- The other lines below it show supply – how CAISO is meeting demand (at any time, the heights of all the other lines combined is equal to the height of the blue one).
- For four seconds at about 2:30 PM (red vertical line), California solar and wind generated 94% as much electricity as customers were consuming.
- At the same moment, however, natural gas plants were generating 3,442 MW and Diablo Canyon Power Plant was generating 1,144 MW – together with renewables, there was too much supply.

- If supply doesn't precisely match demand on an electric grid, it can cause a system-wide outage. Thus California had to export 2,489 MW to keep the grid from going down (dark red line).
- Because Arizona, Nevada, and Oregon didn't need or want our electricity, we had to pay them to take it (euphemistically labeled "negative pricing"). It's an expense borne by California electricity customers.
- During peak consumption (8 PM), wind and hydro are the only significant renewable resources available. Solar is providing no electricity at all.
- At that time, when electricity is most expensive, California is forced to import more than 1/4 of its electricity from other states.



Q: Why are natural gas plants running at all, if there's too much renewable electricity?
A: Because solar and wind are unpredictable, fast-starting gas turbines must operate in "spinning reserve" to smooth their output. If a cloud covers the sun over a solar farm gas turbines must ramp up to fill in the gap in generation. Or, if the wind suddenly picks up at a large wind farm, they must ramp down to prevent overloading the grid.

Q: Then we can't just power the grid with solar and wind?
A: That's correct. Powering a grid with either requires natural gas to be at the ready, to smooth out any abrupt changes that may occur.

Q: Why does solar energy flatten out in the middle of the day, when the sun is high in the sky?
A: Because solar would produce too much electricity at mid-day, system operators are forced to curtail solar – to request operators shut their farms down. And solar farms are paid to turn off their output – another expense borne by California electricity customers for which they receive nothing of value.

Q: So, having "free" solar and wind is more expensive than without it? And having renewables on the grid actually forces us to burn more fossil-fuel gas?
A: Yes, and yes.

Q: What about batteries? Can't they fill in the blanks for solar and wind?
A: No. Electricity produced by all grid-scale batteries in California is shown by the yellow line (it's hiding behind the graph's x-axis). For the purpose of making any significant contribution to grid electricity, batteries are useless.

California's nuclear plant, Diablo Canyon, is scheduled to permanently close in November 2025, to allow investors to build other more profitable ways to generate electricity. Now, when they tell you their ways will lower carbon emissions and you tell them they're wrong, you'll be able to tell them why.

The Failure of California Electricity Policy, Part 2

https://californiaglobe.com/articles/the-failure-of-california-electricity-policy-part-2/

It isn't a lack of renewable electricity that is holding California back; it's that renewables provide too much electricity at the wrong times, and not enough when the time is right
By Carl Wurtz, May 2, 2022 7:50 am

When "The Failure of California Electricity Policy In One Image" was published in early April, comments left by readers seemed to indicate they had overestimated California's progress with clean energy. That might have been expected; my op-ed had explained why "California just hit 95% renewable energy," a claim made by California's Independent System Operator (CAISO) last year, was either a distortion, was inept, or was an outright lie.

This year CAISO offered a followup – but I'll warn readers, any hope their error would be redeemed would be in vain. Our ISO, it seems, has doubled down. It now claims that at 3:40 PM on April 3 of this year, electricity on California's grid had hit "an all-time peak of more than 97% renewables." Whether intentional or not, CAISO's claim again wildly exaggerates the value of renewables to the grid it's charged with operating.

April, 2021

CAISO claims a grid powered by 83% renewable energy for a matter of seconds is "powered by 95% renewable energy".

April, 2022
A CAISO press release announces that California's grid, briefly powered by 79% renewable electricity, "hit an all-time peak of more than 97% renewables", adding that it "broke another record, giving glimpse of a zero-carbon future."

Here's why:

- to determine the percentage of renewable electricity Californians were using April 3 requires comparing the power generated by renewables to the power of all sources added together – not simply to in-state demand (if some power is exported or used to charge batteries the grid mix remains unchanged).

- At 3:40 PM, all sources combined were generating 22,782 megawatts (MW), while renewables were generating 18,058 MW, or 79.3% of the current grid mix. CAISO's 2022 claim thus exaggerates the contribution of California's renewables by a generous 23%.

Some might argue that generating 79% of California's electricity from clean sources deserves recognition. If correct, it would be an achievement on par with that of 1980s France, which lowered its CO2 emissions by 75% with a rapid buildout of nuclear power. California's achievement, however, was a fluke, a mistake that lasted for a few seconds.

In contrast, France's nuclear plants have provided a full ¾ of the country's electricity for decades.

It isn't a lack of renewable electricity that is holding California back – it's that renewables provide too much electricity at the wrong times, and not enough when the time is right. It's attempting to lower carbon emissions by using resources that require gas-fired electricity to back them up, or keep them from destroying the grid. It's putting blind faith in solutions that may work for flashlights, or even electric cars, but will never be practical for providing the immense power needs of an electrical grid (enough battery capacity to power our state for one day, and the extra solar and wind infrastructure to charge it, would cost at least twice California's annual budget).

But most of all, California's environmental policy is failing for a lack of honesty. The only thing remarkable about comparing last April's grid mix to this year's is their sameness – despite all of CAISO's hyperbole, we're making little or no progress at lowering climate emissions. Some have simply been exported by replacing in-state gas consumption with "unspecified imports," a euphemism for electricity from out-of-state gas and coal plants.

We still need to *curtail* (limit) solar production between the hours of 9 AM and 3 PM to avoid overloading the grid, and we still need to pay our neighbors to accept our unwanted electricity at mid-day. Our solar farms are still generating no electricity at 8 PM, when clean electricity is needed most, yet we build more, and more, and more of them – as if making the sun shine at night was a problem that could be solved by more investment.

It should be obvious that California can't possibly meet its climate goals continuing on this errant path, yet we soldier on anyway. There's a chance, of course, that preventing the worst effects of climate change is already impossible. But worse would be failing to prevent them because our leaders didn't have the humility to admit they were wrong about how to get it done.

Here's what the *Los Angeles Times* reported on February 8, 2023 regarding the costs of California's overdependence on natural gas to provide the dispatchable (24-7 available) power that our state's huge economy depends on. If San Onofre Nuclear Generation Station (SONGS) had been repaired after a mismanaged routine service operation instead of being unnecessarily shut down in January, 2012, the current increase in southern California gas prices would have been modest. In 2011, SONGS generated the equivalent of five Hoover Dams of electricity, significantly reducing the region's natural gas demand.

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Los Angeles Times

Soaring California natural gas prices could bring higher electricity bills this summer

Electric transmission lines run along a power corridor connecting to Southern California Edison's Vincent Substation in Palmdale. Southern California Edison had filed for a June 1 rate increase, totaling $595.6 million. The increase, which would be 4.4% for the average customer , is still pending approval by the CPUC.

(Gary Coronado / Los Angeles Times)

BY TERRY CASTLEMAN STAFF WRITER

FEB. 8, 2023 5 AM PT

HTTPS://WWW.LATIMES.COM/CALIFORNIA/STORY/2023-02-08/INADVERTENT-RISK-EXPOSURE-HIGH-NATURAL-GAS-PRICES-ARE-DRIVING-COST-OF-ELECTRICITY-UP

In the wake of skyrocketing gas rates, a utility company executive suggested that hikes in natural gas costs could lead to higher electricity bills this summer.

The news of a potential hike in electricity prices came during a California Public Utilities Commission hearing Tuesday to explore the causes of this winter's dramatic rise in natural gas prices.

"Wholesale natural gas prices have risen to alarming levels this winter," CPUC President Alice Reynolds said to start the four-hour meeting, noting that consumer natural gas bills are up between 2 and 2.5 times what they were a year ago.

Though gas bills for California customers are beginning to drop due to lower costs for natural gas in February, the compounding effects on electric bills may still be coming.

William Walsh, an executive at Southern California Edison, said his company had filed for a June 1 rate increase, totaling $595.6 million. The increase, which would be 4.4% for the average customer, is still pending approval by the CPUC. Edison serves about 15 million customers in Central, coastal and Southern California.

The utility had already increased electricity rates by about 7% on Jan. 1, along with a 3% hike by Pacific Gas and Electric Co. and 16% by San Diego Gas & Electric Co., according to filings with the CPUC.

Marlon Santa Cruz, manager of fuel and purchased power at the Los Angeles Department of Water and Power, told the CPUC that a $5 increase in cost per million BTUs in wholesale natural gas prices can more than double DWP's cost of power production. He noted that gas price hikes are usually short-lived but the recent two-month price jump is "no longer a spike, this is an event."

Experts at the hearing suggested several factors led to the rise in gas prices, such as problems with gas pipelines and an increase in demand during an unusually long cold spell.

Aleecia Gutierrez, director of the California Energy Commission's Energy Assessments Division, pointed to similar weather events in Chicago and Boston this winter during which wholesale gas prices did not spike nearly as much as they did in the West.

She pointed to five "force majeure" events in pipeline infrastructure that reduced natural gas flow into the West, where California imports more than 90% of its natural gas and therefore relies on pipelines.

Rodger R. Schwecke, the chief infrastructure officer of Southern California Gas Co., spoke to higher demand in November and December 2022 due to cold weather. He was the first of several speakers to suggest the need for additional natural gas storage at Aliso Canyon, the troubled facility that in 2015 was the site of the biggest methane leak in U.S. history.

Several representatives for PG&E said futures prices usually create incentives for traders to buy and store natural gas in the spring and sell it for use in the winter. But futures prices were flat last year from May to December, and many independent storage facilities were left unfilled.

The low level of stored natural gas, combined with less gas coming through pipelines, caused a supply constraint, according to experts at the hearing. This combined with increased demand from residents due to cold weather and a 19% year-over-year increase in natural gas demand for electric plants to produce durably higher wholesale prices, according to PG&E representatives.

Most agreed that more stored gas could help stabilize prices in the future, with some members of the CPUC discussing a reserve for natural gas akin to the U.S. Strategic Petroleum Reserve.

The emphasis on storing more natural gas downplays the root cause, according to Fred Heutte of the NW Energy Coalition. The problem, he said, is "overdependence on gas." He said the gas price spike had a $4-billion impact on customers and pushed for a move away from fossil fuels and toward batteries and hydropower storage.

Callers to the hearing voiced frustration with the utilities, which one ratepayer accused of price gouging. Several attendees spoke favorably of Gov. Gavin Newsom's call for the Federal Energy Regulatory Commission to investigate whether "market manipulation, anticompetitive behavior or other anomalous activities" contributed to the higher prices.

Terry Castleman

Terry Castleman is a data reporter on the Fast Break Desk covering breaking news. In 2020, he was named alongside his colleagues as a Pulitzer Prize finalist in explanatory reporting. Previously, he worked at the *New York Times* and volunteered as a first responder for refugees arriving on the shores of Lesvos.

Below are SoCalGas's monthly natural gas procurement prices per therm from November, 2009 through February, 2023. These natural gas prices would be significantly higher if the state forces DCPP to shut down. As California's largest generator (5 Hoover Dams per year while in operation,) DCPP significantly reduces the need for natural gas to generate electricity in California.

SoCalGas NATURAL GAS PRICES

FIND CURRENT GAS PROCUREMENT PRICES AND LEARN ABOUT UPCOMING CHANGES TO THE CORE SALES RATE.

https://www.socalgas.com/for-your-business/energy-market-services/gas-prices

Effective January 1, 2023, the procurement component of the core sales rate will increase 239.563 ¢/therm to 344.892 ¢/therm. This increase resulted from an overall 270.869 ¢/therm increase in commodity price and a decrease of 31.306 ¢/therm in account adjustments. Compared to a year ago, the procurement rate is about 312.7% higher (83.569 ¢/therm) than what it was effective January 2022.

Gas Procurement Prices Monthly Price

Month, Year	Core Procurement Gas Price (Cents Per Therm) [10 Therms = 1 MMBTu]	
February	110.870	[$11.09 / MMBTu]
January, 2023	**344.892**	**[$34.49 / MMBTu]**
December	105.329	[$10.53 / MMBTu]
November	64.959	[$6.50 / MMBTu]
October	65.420	
September	96.994	
August	97.540	

July	75.995
June	103.488
May	74.318
April	58.143
March	55.921
February	60.655
January, 2022	83.569
December	65.129
November	63.799
October	57.580
September	44.425
August	44.599
July	42.622
June	39.460
May	35.684
April	31.373
March	36.982
February	36.766
January, 2021	39.764
December	36.159
November	34.320
October	25.268
September	25.498
August	26.239
July	26.816
June	27.580
May	25.654
April	20.307
March	22.108
February	28.008
January, 2020	34.730
December	38.067
November	27.563
October	30.091
September	26.162

August	27.223
July	28.475
June	24.822
May	23.790
April	29.803
March	41.230
February	34.851
January, 2019	41.589
December	50.314
November	35.980
October	27.872
September	36.500
August	57.159
July	35.830
June	29.770
May	25.750
April	22.450
March	29.482
February	34.818
January, 2018	30.187
December	35.207
November	31.754
October	31.931
September	33.735
August	35.213
July	35.363
June	38.971
May	37.230
April	35.271
March	35.989
February	38.389
January, 2017	41.687
December	35.577
November	32.305
October	35.497

September	35.320
August	35.628
July	34.536
June	25.956
May	25.408
April	22.548
March	22.712
February	26.905
January, 2016	27.193
December	32.322
November	27.684
October	32.136
September	32.949
August	34.256
July	32.833
June	33.042
May	28.577
April	29.738
March	33.244
February	33.656
January, 2015	34.124
December	48.676
November	41.899
October	44.500
September	45.956
August	46.504
July	54.641
June	51.185
May	52.800
April	49.262
March	59.840
February	51.600
January, 2014	47.715
December	40.837
November	41.255

October	37.375
September	38.198
August	42.800
July	43.643
June	47.072
May	45.006
April	42.962
March	36.061
February	39.372
January, 2013	36.809
December	40.358
November	35.831
October	31.542
September	26.100
August	33.479
July	31.606
June	31.733
May	24.397
April	25.102
March	29.725
February	29.670
January, 2012	35.960
December	38.354
November	39.148
October	42.214
September	41.466
August	49.551
July	46.196
June	48.360
May	45.454
April	46.017
March	41.683
February	47.380
January, 2011	40.136
December	43.851

November	34.044
October	39.942
September	35.376
August	46.722
July	47.068
June	41.577
May	42.672
April	44.552
March	42.429
February	59.331
January, 2010	57.867
December	49.786
November	47.143

Here's Michael Caravaggio's analysis of California's elevated December 2022 electricity prices.

Michael Caravaggio · 2nd
Director Thermal Fleet, EPRI

Michael Caravaggio (Updated to December 31, 2022)

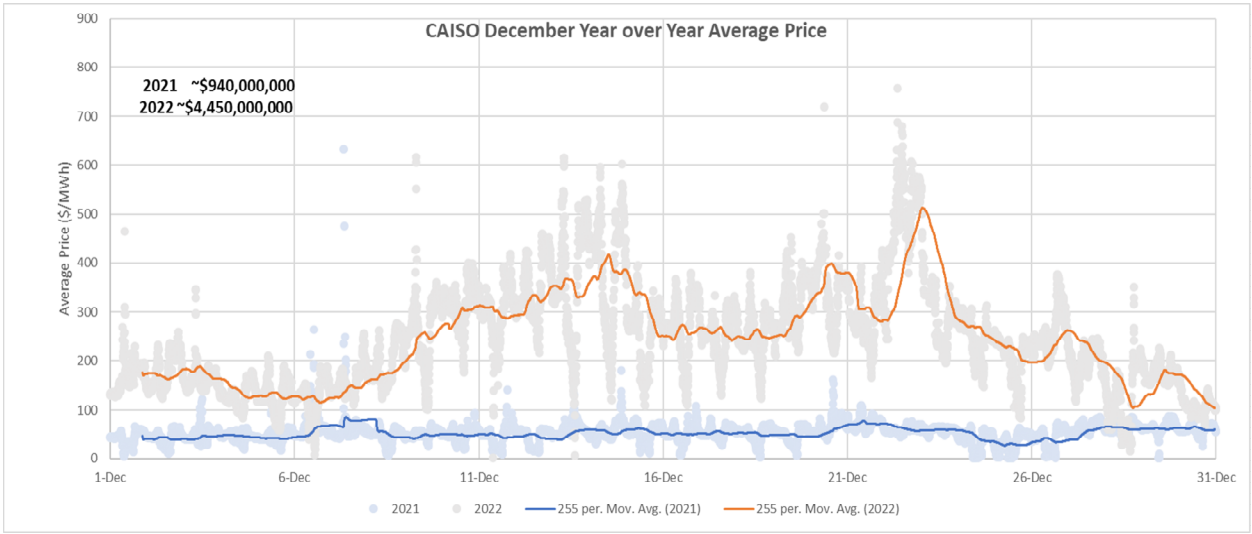
https://www.linkedin.com/feed/update/urn:li:activity:7013628500536422400/

California may have been spared the bomb cyclone impacts - but electricity prices in CAISO this December have sustained very high rates and may be nearly as big a problem in the longer term.

These prices are still much lower than European averages during the energy crisis but nonetheless they are noteworthy.

Year over year it was about $940M (taking average load and average wholesale price) to clear the California Market in 2021. This year it is a little over $4.45 billion USD.

Gas prices set electricity prices in California and the west has elevated natural gas prices compared to the rest of the country.



Here's what Governor Newsom said on September 12, 2022 regarding California's need for DCPP's reliable power:

Eytan Wallace CA Capital correspondent for @KTLA, @KRON4news, @KSEE24, @CBS47, @KGETnews, @fox40, @fox5sandiego | Formerly: @KGETnews, @NBCLA, @USC, @AnnenbergMedia

https://tinyurl.com/Newsom-on-DCPP

3:34 PM • Sep 12, 2022 0:24 seconds. Gov. @GavinNewsom 42,700 Views, 102 retweets, 48 quote tweets, 425 likes

Without the power supply from the Diablo Canyon Nuclear Power Plant during the record heatwave last week, we "full stop" would have had rolling outages during that period.

Eytan: What do you think could have happened last week if we did not have Diablo Canyon?

Governor Newsom: We would have I mean, if we didn't have that 9 % base load its about 9% of the base load of electricity in the state of California, there's no doubt we would have blown past, we would have absolutely triggered into what we call load reduction, otherwise referred to as blackouts, unquestionably, if we did not have Diablo Canyon period, full stop. That's not even in debate or dispute.

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Three recent OpEds and a Letter to the editor also support DCPP's extended operations.

CAPITOL WEEKLY
COVERING CALIFORNIA GOVERNMENT AND POLITICS

Closing Diablo Canyon spurs fears over replacement power

BY ***GENE NELSON*** POSTED 04.05.2022 GENE'S EMAIL: GOVERNMENT@CGNP.ORG

(805) 363 - 4697 GENE'S CELL **HTTPS://TINYURL.COM/DCPP-VERSUS-COAL**

HTTPS://CAPITOLWEEKLY.NET/CLOSING-DIABLO-CANYON-SPURS-FEARS-OVER-REPLACEMENT-POWER/

California's power is expensive and polluting – but doesn't have to be.

The state of California plans to replace Diablo Canyon Power Plant (DCPP) mostly with Wyoming coal-fired generation. The source of the replacement power will remain hidden until 2025, when Californians can't stop the state.

As a nonprofit intervenor before the California Public Utilities Commission (CPUC) since 2016, Californians for Green Nuclear Power (CGNP) has uncovered four obscure clues in CPUC filings that confirm the state's plan. CGNP's thousands of pages of filings provide the details.

> ***While Diablo Canyon is compact, it's annual production is the equivalent of five Hoover Dams.***

The first clue is the engineering requirement that since Diablo Canyon Nuclear Power Plant is a reliable 24/7 generator, any incremental replacement generation must have similar reliability. Otherwise, rolling blackouts occur.

Engineers use the term "dispatchable" (under human control) to describe Diablo Canyon's power. Dispatchable generators that supply power like Diablo Canyon are

powered by natural gas or coal. The ongoing drought means building new dams is impractical. While Diablo Canyon is compact, it's annual production is the equivalent of five Hoover Dams.

Californians demand that California's coal plants be shut down and they object to new plants powered by natural gas.

Widely-promoted solar and wind aren't dispatchable. The sun doesn't always shine and the wind doesn't always blow with sufficient force. Natural gas fills in for solar and wind's substantial intermittencies. Batteries are extremely expensive — and could optimally be reserved for vehicles to improve air quality, instead of displacing natural gas in power plants.

Those constraints imply that California's replacement generation must be located mostly out of state. There are many generators that could produce additional power to replace Diablo Canyon located in or near the nation's biggest coal deposits in Wyoming.

> ***"Unspecified imports" sounds nicer than coal. Unfortunately, this term mostly applies to out-of-state coal power.***

The second clue is the requirement that a new transmission network needs to be built to send the power about 1,000 miles from Wyoming to California.

Such a large network, first announced in 2007, is the Energy Gateway. The network's mastermind, Warren Buffett, stated in his 2021 letter to shareholders the network would cost $18 billion by 2030. Oregon and Washington state have already announced upcoming bans against out-of-state coal power. Thus, by California utility law, most of this transmission cost will be borne by Californians.

Third clue: A California legal euphemism "unspecified imports," which sounds nicer than coal, was created in 2009. Unfortunately, this term mostly applies to out-of-state coal power.

The term appears twice on page 16 in the CPUC's June 24, 2021 procurement decision in R2005003. Between 4,000 and 5,000 megawatts (MW) of generation capacity is stipulated. In order to convert this to more familiar kilowatt-hours (kWh) on your power bill, the capacity factor, or percentage ON time is used. California nuclear power has a capacity factor of 90% and there are 8,766 hours in a year. The product of 5,000 MW times 8,766 hours times 90% is 40 billion kWh.

The fourth clue is the increased air pollution from burning coal.

How can California's leaders evade this problem? The answer requires models they can manipulate. On page 104 of the CPUC's R2005003 Preferred System Portfolio adopted on Feb. 10, 2022 is the sentence, "Criteria pollutants were counted from generation within California only, and not from unspecified imports." This means toxic air pollution from out-of-state coal power is artificially zeroed.

The increased demand for U.S. natural gas to supply Europe after Russia's invasion of Ukraine means increased gas costs for utilities, resulting in pressure to burn more coal. Since nuclear plants like Diablo Canyon don't emit air pollution, they should remain online instead.

With the increased transmission costs, in 2025 Californians could have the worst of both worlds with significantly higher toxic pollution released into the environment — while paying more for this emission-laden power from Wyoming.

Beginning to reverse California's harmful energy policies means continuing operation of safe, reliable and cost-effective zero-emission Diablo Canyon well beyond 2025.

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Editor's Note: Gene Nelson has a Ph.D. in radiation biophysics and served as a science and engineering professor at 3 colleges and a university. He helped found CGNP in 2013, and has been CGNP's Legal Assistant since 2016.

LOMPOC RECORD EDITOR'S PICK

Guest Commentary

Nonprofit backs open, transparent process to determine Diablo Canyon's future | Guest Commentary

https://lompocrecord.com/opinion/columnists/nonprofit-backs-open-transparent-process-to-determine-diablo-canyons-future-guest-commentary/article_a35360be-26e2-524a-ab26-de299de2d685.html

May 12, 2022 Updated May 17, 2022

Nonprofit Californians for Green Nuclear Power, Inc. advocates for an open and transparent process to determine Diablo Canyon's future.

CGNP organized rallies, including the Feb. 16, 2015 rally covered by this newspaper. Since about 2018, on the second and fourth Thursdays, CGNP has operated a booth at the downtown San Luis Obispo farmers market. We have gathered petitions signed by around 1,000 attendees supporting the continued safe operation of Diablo Canyon beyond 2025.

We regularly provide comments supported by written testimony during the public comment period at the San Luis Obispo County board of supervisors meetings. Since January 2017, CGNP has provided thousands of pages of footnoted testimony to regulatory and oversight bodies at the local, state, and federal level that support continued operation.

CGNP has written opinion pieces for numerous publications, including this newspaper, outlining the benefits to California ratepayers, the environment, and California public safety connected with keeping Diablo Canyon running well past 2025.

The plant was designed to run for a century and has been well maintained by Pacific Gas & Electric. It would be very wasteful to turn off California's largest generator after it has been fully paid for by California ratepayers in 2025 - after only four decades of operation.

Californians would not be able to use abundant desalinated water from the plant, as advocated by a recent Stanford-MIT study. All of these open and transparent processes are in contrast to how opponents of nuclear power typically operate.

On the same day that the news story "Doubts dog Gov. Newsom’s idea to extend Diablo Canyon’s life beyond 2025" published, the story "California prepares for energy shortfalls in hot, dry summer" was published. Rolling blackouts are likely this summer, even with Diablo Canyon running. The latter story raises similar concerns as CGNP.

The "joint parties" are dominated by organizations doctrinally-opposed to nuclear power. CGNP learned from an opposition attorney during CPUC hearings in San Francisco that there was a series of secret meetings starting six months before PG&E's surprise announcement on June 21, 2016 of their plans to close Diablo Canyon in 2025. CGNP has documented how over 10 California executive branch agencies have opposed the continued operation of Diablo Canyon.

California's power grid has become much less reliable and more expensive since 2010 as the state has replaced safe, reliable, 24/7 generation such as the San Onofre Nuclear Generating

Station (SONGS) with inherently unreliable solar and wind generation at a cost of tens of billions of dollars.

The problem is that the sun does not always shine nor does the wind blow with sufficient force to turn the wind turbines. The substantial intermittencies (up to 80%) are usually compensated for by wasteful fossil-fired combustion to the detriment of the environment. Batteries are an expensive and dangerous method to compensate for these intermittencies.

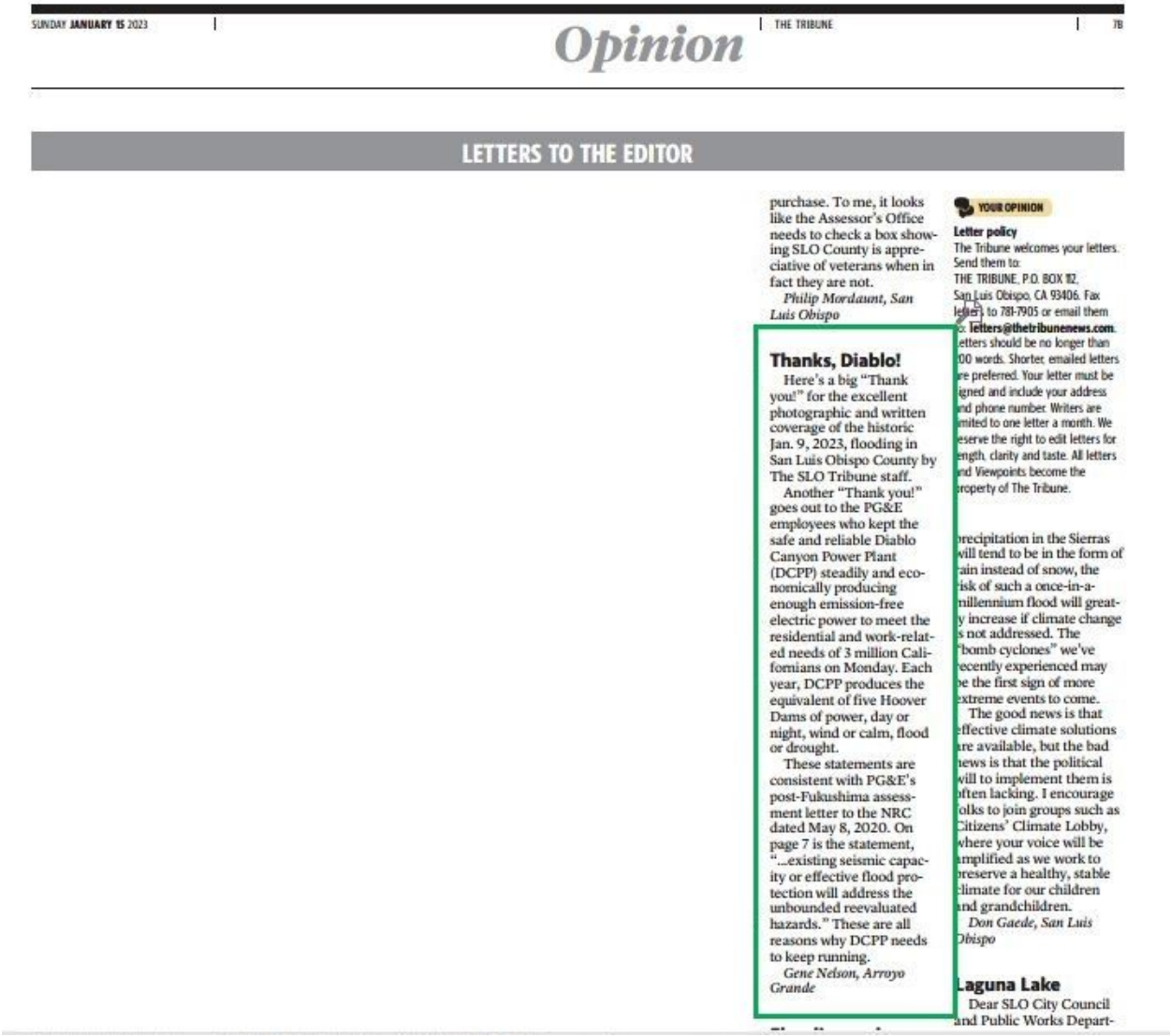
The poorly-kept secret is that Californians get significant amounts of power from emission-laden, out-of-state coal plants such as Intermountain near Delta, Utah. A Berkshire Hathaway Energy subsidiary, PacifiCorp launched the Western Energy Imbalance Market (WEIM) in November 2014.

The WEIM exploits a loophole in California environmental legislation (SB 1368 [Perata]) that forbids long-term supply contracts with out-of-state coal-fired generators. Readers may learn more via the topmost results of the Google query of both phrases "Diablo Canyon" and "Wyoming coal."

The WEIM website shows that this dodge has been very lucrative for power supplier PacifiCorp. The firm has apparently vigorously lobbied behind the scenes via California Advisors, LLC to close Diablo Canyon in 2025. Californians would then have no choice other than to take PacifiCorp's much more expensive and emission-laden power, particularly when the roughly $20 billion cost of an interstate transmission network from Wyoming to California is included in California ratepayer costs.

A superior solution is to keep Diablo Canyon running. This solution is supported by a majority of local residents, organizations concerned about the environment, and several courageous candidates and political leaders.

Here's a recently-published CGNP Letter to the Editor regarding the importance of DCPP that appeared in the Sunday, January 15, 2023 *San Luis Obispo Tribune*.



LETTERS TO THE EDITOR

purchase. To me, it looks like the Assessor's Office needs to check a box showing SLO County is appreciative of veterans when in fact they are not.

Philip Mordaunt, San Luis Obispo

Thanks, Diablo!

Here's a big "Thank you!" for the excellent photographic and written coverage of the historic Jan. 9, 2023, flooding in San Luis Obispo County by The SLO Tribune staff.

Another "Thank you!" goes out to the PG&E employees who kept the safe and reliable Diablo Canyon Power Plant (DCPP) steadily and economically producing enough emission-free electric power to meet the residential and work-related needs of 3 million Californians on Monday. Each year, DCPP produces the equivalent of five Hoover Dams of power, day or night, wind or calm, flood or drought.

These statements are consistent with PG&E's post-Fukushima assessment letter to the NRC dated May 8, 2020. On page 7 is the statement, "...existing seismic capacity or effective flood protection will address the unbounded reevaluated hazards." These are all reasons why DCPP needs to keep running.

Gene Nelson, Arroyo Grande

YOUR OPINION

Letter policy

The Tribune welcomes your letters. Send them to: THE TRIBUNE, P.O. BOX 112, San Luis Obispo, CA 93406. Fax letters to 781-7905 or email them to: **letters@thetribunenews.com**. Letters should be no longer than 200 words. Shorter, emailed letters are preferred. Your letter must be signed and include your address and phone number. Writers are limited to one letter a month. We reserve the right to edit letters for length, clarity and taste. All letters and Viewpoints become the property of The Tribune.

precipitation in the Sierras will tend to be in the form of rain instead of snow, the risk of such a once-in-a-millennium flood will greatly increase if climate change is not addressed. The "bomb cyclones" we've recently experienced may be the first sign of more extreme events to come.

The good news is that effective climate solutions are available, but the bad news is that the political will to implement them is often lacking. I encourage folks to join groups such as Citizens' Climate Lobby, where your voice will be amplified as we work to preserve a healthy, stable climate for our children and grandchildren.

Don Gaede, San Luis Obispo

Laguna Lake

Dear SLO City Council and Public Works Depart-

THE TRIBUNE Newspaper of the Central Coast

VIEWPOINTS

Is California on track to meet clean energy goals without Diablo Canyon? It's doubtful

BY GENE NELSON

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https://www.sanluisobispo.com/opinion/readers-opinion/article253469439.html

https://tinyurl.com/Save-DCPP1

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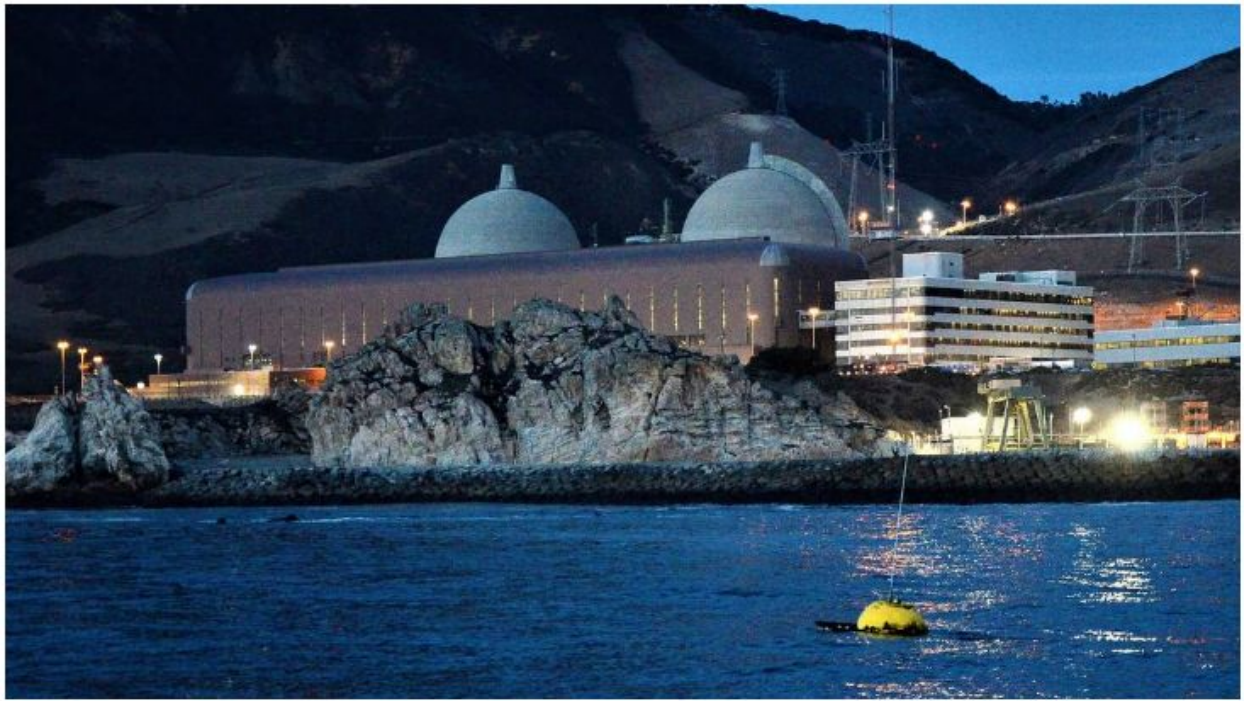

The Diablo Canyon nuclear power plant is scheduled to shut down starting in 2024. JOHN LINDSEY

Economics is given short shrift in The SLO Tribune's editorial, "Ready or not, Diablo Canyon is closing — and California will just have to adjust."

Diablo Canyon is the region's largest private sector employer. If the plant were to be relicensed for another 20 years, it would pump over $20 billion into our region's economy.

Also, keeping Diablo Canyon open will help California meet its ambitious clean energy goals.

The safe plant's rugged foundation, emplaced in bedrock 85 feet above sea level, was built in the location on California's coast least vulnerable to earthquakes and tsunamis.

So, unlike our natural gas supply that is reliant on aging and vulnerable transmission lines, Diablo Canyon will likely be up and running after a major earthquake, providing reliable electricity for recovery.

Furthermore, California's electricity rates are the highest in the continental U.S. with rolling blackouts last summer, and more blackouts probable this year.

This is not the time to shut down an emission-free, reliable energy source.

As an independent, non-profit intervenor, Californians for Green Nuclear Power, Inc. (CGNP) for years advocated before the state for clean nuclear power to support the interests of the environment, ratepayers and public safety. We've been met by a stone wall of denial, obstruction and obfuscation.

Consider the recent procurement order issued by the California Public Utilities Commission (CPUC) that requires utilities to provide an additional 11,500 megawatts of energy by 2026

In the document — and in comments to the news media — the CPUC has claimed that all that new energy must be emission-free.

How will that be possible, given the short time frame?

That's one of the questions Californians need to be asking themselves.

Here's a hint: "Incremental imports could help meet short-term resource needs while resources are planned and constructed to address the 2026 shortfall," a document filed by the California Independent System Operator in 2020 states.

Clearly, there must be an out-of-state electricity supplier.

In fact, the CPUC document even references "unspecified imports" in one section of the procurement order. This is a California legal euphemism mostly applied to out-of-state coal fired generation.

One of the most likely candidates to provide imports is PacifiCorp, a subsidiary of Berkshire Hathaway Energy (BHE), which owns several coal and natural gas plants in the West and is constructing an Energy Gateway transmission project that will link several states. (There is already a transmission line in southern Nevada that links to a Southern California Edison substation, providing access to the California grid.)

Despite a 2006 California law (SB 1368) that sets an emission standard for power provided to California, PacifiCorp obtained an exemption due to its "small footprint" in California.

With 5,234 megawatts of coal-fired power and 3,013 megawatts of natural gas power, PacifiCorp operates in marked contrast to Pacific Gas and Electric, which already has 85% carbon-free power — and no coal.

The Clean Air Task Force's Toll From Coal website tabulates annual deaths from air pollution caused by coal-fired power plants. Based on those calculations, BHE's western U.S. power plants were responsible for 276 deaths in 2019.

Keeping Diablo Canyon running past 2025 will prevent the annual emissions of about 15 million metric tons of carbon dioxide as well as prevent substantial quantities of toxic oxides of nitrogen, sulfur and mercury from being emitted.

Yet the California Public Utilities Commission (CPUC) is acquiescing to Diablo Canyon's closure.

The CPUC is the state agency in charge of overseeing public utility matters that affect every Californian. Yet it occupies a place in our state's legal landscape devoid of accountability, oversight or independent review.

Appellate review of the commission's decisions is typically unavailable. Challenges are denied without explanation. CPUC commissioners, those of the California Energy Commission and the California Independent System Operator (CASIO) Board of Governors are all appointed by Gov. Gavin Newsom.

Absent the possibility of any meaningful review by independent ratepayer organizations, the three groups effectively "rubber stamp" the governor's policy objectives.

In 2015, there was an attempt to appoint a CPUC inspector-general to ensure ethical compliance. Then-Gov. Jerry Brown quashed that initiative.

With the 2005 revisions of the 1935 Public Utility Holding Company Act, deep-pocketed special interests can directly lobby the CPUC to obtain favored treatment.

It's going to take a fight against greedy special interests to keep Diablo Canyon running.

Californians for Green Nuclear Power wants SLO County to follow California environmental laws when they review possible plant closure. We believe Californians can't afford to lose this fight.

Gene Nelson the is legal assistant for Californians for Green Nuclear Power. He has a Ph.D. in radiation biophysics.

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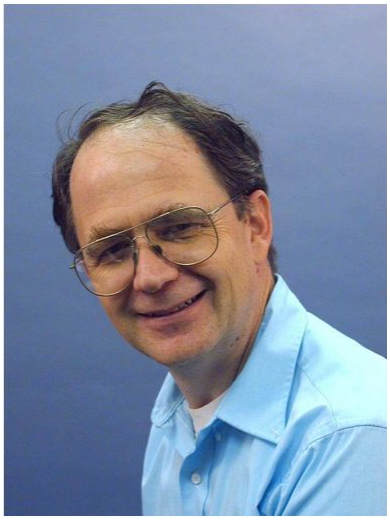

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