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Friday, August 26th
10:00 a.m. – 1021 O Street, Room 1100

INFORMATIONAL HEARING

Diablo Canyon Nuclear Power Plant Extension: Options for Meeting Mid-term Reliability

On August 14-15, 2020, for the first time in nearly 20 years, the California Independent System Operator (CAISO) was forced to institute rotating electricity outages in the midst of a west-wide heat wave. The outages on the 14th and 15th affected 492,000 and 321,000 customers,¹ respectively, of Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E) who lost power for anywhere between 8 to 150 minutes.²

With further heat waves forecast, similar grid conditions projected for subsequent days, and Californians suffering from the loss of electricity, Governor Newsom, state agencies, and the CAISO quickly implemented strategies to manage the immediate shortfall of resources on the grid. A statewide mobilization effort to conserve electricity, shift demand, and maximize existing generation resources was undertaken. Those efforts are largely credited in mitigating subsequent rotating outages from August 16-20, 2020.

Less than a year later, on July 9th, 2021, the Bootleg Fire spread near the Oregon-California border and impacted one of the largest connection points, or “interties,” for bringing electricity into the state. This occurred in the middle of a statewide extreme heatwave,³ where electricity supplies were already stretched. The Bootleg Fire ultimately led to a reduction of almost 4,000 megawatts (MW) of imported energy—nearly 10% of the demand for that day—from coming into California. This was a devastating loss. Reliability was challenged further by natural gas plants, which were kept online precisely for these extreme situations, failing to show-up; nearly two-thirds of their capacity was unavailable the prior day. Remarkably—and largely thanks to measures enacted the previous year—CAISO avoided

¹ “Customers” defined here as residences and business accounts

² Pg. 3, CAISO, CPUC, and CEC; “Preliminary Root Cause Analysis: Mid-August 2020 Heat Storm”; October 6, 2020; <http://www.caiso.com/Documents/Preliminary-Root-Cause-Analysis-Rotating-Outages-August-2020.pdf>

³ Triple digit heat persisted throughout the state: 110 degrees F reported in Palmdale, 113 in Redding, and 130 in Death Valley, for instance.

calling for rotating outages. However, these distressingly close-calls—of which, these are only two of many examples throughout the last two years—led many energy leaders to re-examine our current paradigm for planning and responding to grid reliability events, and go back to the drawing board to consider every possible option for ensuring reliability in the summer of 2022 and beyond.

In April of this year,⁴ Governor Newsom commented on the possibility of extending operations at the Diablo Canyon power plant (DCPP), along with coastal natural gas plants soon facing retirement due to regulations regarding the plants' cooling technology impacting marine life. Currently DCPP's operations are set to end in 2024 and 2025, for its two nuclear-powered units respectively, which the state has been planning for since 2016. Yet the reliability constraints that have squeezed the state these past summers have led some to reconsider its closure. Since the Governor's announcement, much reporting and discussion—including a California Energy Commission-led workshop just two weeks ago⁵—have presented the need, potential, and large hurdles to extending operation at DCPP. The Newsom administration has noted the opportunity for DCPP's operator, PG&E, to access federal Department of Energy (DOE) funding from the Infrastructure Investment and Jobs Act of 2021 to help offset some of the cost of DCPP's extension. DCPP also represents approximately 17% of California's greenhouse-gas (GHG) free electricity, with a capacity of over 2 gigawatts. Moreover, DCPP is fully operational, shielding it from many of the supply chain constraints or grid interconnection challenges of other clean-energy resources that are currently straining to meet their operational deadlines.

While some view this DCPP extension as an elegant solution, others see it as lunacy. Or, as quoted in the background report for the Senate Energy, Utilities and Communications Committee hearing yesterday on this topic, "More than any other single power generation source, nuclear power is the object of extreme loyalty as well as utmost disdain."⁶ Because nuclear power plants rely on fissile (reactive) material that produces intense heat in a process that also produces radiation, and demands well-functioning operators and systems to run efficiently and safely, these plants by their nature invoke serious questions for policymakers that do not often arise elsewhere: are the low-probability, high-consequence risks of a nuclear incident worth the large, steady, baseload power produced? Opponents to the proposal to extend DCPP cite the aged nature of the almost forty-year-old plant, which has not been a stranger to outages itself;⁷ the seismic faults crisscrossing underneath the facility; the

⁴ Roth, S. "California promised to close its last nuclear plant. Now Newsom is reconsidering." *Los Angeles Times*; April 29, 2022.

⁵ "Joint-Agency Workshop – Diablo Canyon Power Plant"; California Energy Commission; Friday, August 12, 2022; remote access only; <https://www.energy.ca.gov/event/workshop/2022-08/joint-agency-workshop-diablo-canyon-power-plant>

⁶ Peter Asmus, *Energy in California*, University of California Press: 2009.

⁷ "Planned and unplanned shutdown at Diablo Canyon halts all electricity generation;" KCBX Central Coast Public Radio; November 10, 2020. <https://www.kcbx.org/energy/2020-11-10/planned-and-unplanned-shutdown-at-diablo-canyon-halts-all-electricity-generation>

vulnerability of relying on a single, large, centralized power source rather than a diverse set of resources; the questionable use of a baseload power resource (which must run at a steady pace and cannot ramp to complement variable renewables by its nature) to solve an intermittency issue; the challenges of unwinding a multi-year and multi-party retirement and decommissioning agreement; and the host of environmental concerns surrounding continued nuclear operations, and in particular a nuclear plant already known to have impacts on marine life.

This hearing presents an opportunity to examine some of these benefits and challenges, at least within the lens of energy policy. It is important to note there are consequential natural resource impacts that arise from a possible DCPD extension; this committee will not have the time nor expertise to delve into those. With the Administration recommending to the Legislature, mere days before the end of the 2021-2022 Legislative Session, to make changes in state law and budget to aid in extending the operations of DCPD, as well as the deadline for PG&E to apply for DOE funding fast approaching on September 6th, 2022, the Legislature is faced with a difficult decision.

As such, some questions to consider:

- *Is the extension of DCPD the only or best solution for the electric reliability issues facing California? Has a comparative analysis been conducted examining cost, benefits, and availability of alternative resources against DCPD?*
- *Have the state's projected reliability issues been sufficiently explained? How reasonable are the assumptions around supply chain constraints persisting into the mid-term (2024-2026)?*
- *What is the minimum required for PG&E to file an application at DOE? Is a full proposal and expedited state review necessary? In the event federal funds are received, what is the opportunity for those funds to benefit ratepayers and taxpayers?*
- *What is the current safety landscape at DCPD? Has maintenance been deferred in anticipation of decommissioning? Has the workforce lost experienced staff, or will it be necessary to rapidly hire to meet the demands of an extension?*
- *How are operational costs and profits allocated in the administration's DCPD proposal? Is it equitable or reasonable? Is there a scenario where a DCPD extension could provide benefit to ratepayers? How might that be structured?*

- *How does a potential extension of DCPD impact future reliability planning in the state? Do we have assurance that the planning issues that lead us to reconsider decommissioning will be resolved before resources are needed in 2030?*
- *How will the continued presence of this baseload resource impact the economics of other resources that were planning for its closure? How do we ensure DCPD operations do not adversely affect future development of offshore wind or other resources at the site?*

Is there a Reliability Problem? Maintaining the electric grid requires a delicate balance of matching supply and demand in real-time. If any one part of the system becomes off-balance, the entire electric system runs the risk of shutting down. In order to avoid close calls, the CAISO is required to have contingency reserves,⁸ which are extra resources that can come online quickly to ensure the grid can respond in case a major element fails. Since 2003, when a widespread power outage shut off power to more than 50 million people across the northeastern United States and parts of Ontario, the federal government has required mandatory reliability standards for U.S. electricity providers.⁹ These standards¹⁰ require grid operators to identify the most severe event that could destabilize their grid and lead to cascading outages throughout the entire west; CAISO must then carry reserves equal to a percent of that potential lost load.¹¹

During parts of August 2020, CAISO had difficulty maintaining their required reserves, necessitating rotating outages. Had CAISO operated with insufficient reserves, they risked causing uncontrolled outages and destabilizing the rest of the western grid. Consequently, on both August 14 and 15, CAISO ordered controlled, rotating outages resulting in load shed of about 500 megawatts (MW) in order to maintain their mandatory reserves.¹²

Rotating outages are the last, worst tool available to grid operators and energy planners to manage supply and demand imbalance. They are the tool everyone seeks to avoid, as outages can have devastating economic and health impacts, compounded by extreme weather events like heatwaves or fires. In California, these larger climate events are occurring alongside ambitious renewable energy integration. Over the next decade, the state was planning to retire both DCPD and a fleet of privately-owned, once-through-cooling natural gas power plants

⁸ Also referred to as operating reserves or ancillary services.

⁹ US-Canada Power System Outage Task Force; *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*; April 2004.

¹⁰ For CAISO, they are the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) standards.

¹¹ For CAISO, this single contingency is the loss of the Diablo Canyon nuclear power plant. WECC rules require 6% contingency reserves for this loss. CAISO also requires electrical entities to maintain an additional 9% in reserves to account for other potential plant outages or higher-than-average peak demand, leading to a total 15% planning reserve margin.

¹² Pg. 28 and pg. 31; *Final Root Cause Analysis* (citation 3)

(totaling thousands of MWs in 2019¹³) and replace these resources with clean energy. Additionally, the state established the policy goal of meeting all retail electricity supply with a mix of Renewables Portfolio Standard (RPS)-eligible and zero-carbon resources by December 31, 2045, for a total of 100 percent clean energy.¹⁴ This supply-side goal is running parallel to changes in demand anticipated with deep decarbonization efforts in the transportation and building sectors. These changes could lead to more prevalent and complex challenges beyond what was experienced in the summers of 2020 and 2021.

Recognizing this need and the insufficient pace at which new resources were being developed, the California Public Utilities Commission (CPUC) issued historic, unprecedented procurement orders in June 2021, ordering utilities to purchase 11,500 MW of new electricity resources to come online between 2023 and 2026.¹⁵ This is in addition to a 2019 procurement order of 3,300 MW by 2023.¹⁶ These orders are meant to be fulfilled with preferred resources, such as distributed energy resources, renewables, and zero-emission sources. The procurement orders represent the largest capacity procurement ordered at a single time by the CPUC. The CPUC reports that 2,650 MW of incremental capacity has come online in the first four months of 2022 alone.¹⁷ However, the COVID pandemic has led to global shutdowns and subsequent supply chain constraints. Additionally, international tariff disputes compounded with the pandemic-induced lag have chilled some renewable energy development.

Our grid planning and operations will need to evolve to meet these challenges. This year the energy agencies presented a multiple-scenario approach to plan for grid events that may better reflect future realities, or may be unnecessarily conservative and costly. As the old adage goes, all models are wrong but some of them are useful. Yet given the compounding events of the Bootleg Fire last summer, many now recognize the implications of multiple grid events happening simultaneously. As shown in the graph below from a CAISO presentation to the Legislature this spring, the energy planners are forecasting an energy resource supply shortfall in 2022 and again in 2025. (The gaps in the graph where the blue diagonal line does not intersect with the yearly bars.) This is shown to be much worse if climate events are considered. Or, as explained at the time, the likelihood of a rotating outage is much, much greater.

¹³ CEC blog “Once-Through Cooling Power Plant Phase Out in Progress”; May 20, 2019.

<http://calenergycommission.blogspot.com/2019/05/once-through-cooling-power-plant-phase.html>

¹⁴ SB 100, De Leon, Chapter 312, Statutes of 2018.

¹⁵ D.21-06-035

¹⁶ 19-11-016

¹⁷ As reported by the CPUC to this committee in April, 2022.

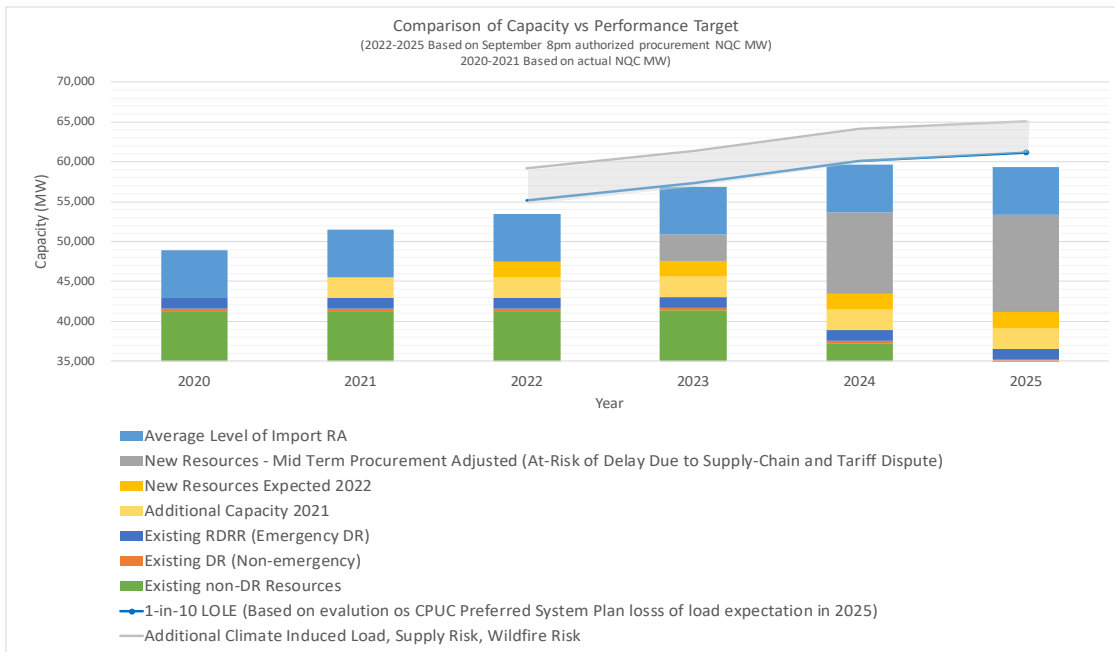


Figure 1- CAISO analysis of September peak day conditions¹⁸

As a result of these updated energy forecasts, the Legislature passed funding for a Strategic Reliability Reserve in June.¹⁹ The legislation tasks the Department of Water Resources with undertaking an intervention it has only done once before, during the Energy Crisis of 2000-2001, of purchasing energy resources, not necessarily clean ones, to help ensure grid reliability in the near-term. The June budget appropriated over \$2 billion to support the Reserve, with \$550 million to support distributed backup and utility-scale assets to support reliability.²⁰ However, according to the state’s energy agencies, this historic action did not fully alleviate the reliability issues, especially in the mid-term (2024-2026) when DCP and coastal natural gas plants are scheduled to come offline.

The Diablo Canyon Nuclear Power Plant. As thoroughly outlined in the Senate Committee on Energy, Utilities, and Communications background paper for their hearing on this subject yesterday, DCP is California’s only remaining operating nuclear power plant. It consists of two units: Unit 1 is 1,073 MWs which began operation in May 1985; Unit 2 is 1,087 MW which began in March 1986. The plant produces approximately 8.5% of California’s in-state electric generation. Currently, DCP is licensed by the federal Nuclear Regulatory Commission to operate until November 2, 2024 (Unit 1) and August 26, 2025 (Unit 2). DCP

¹⁸ Full presentation available on CEC Docket 21-ESR-01, Energy System Reliability, TN # 244871; “Diablo Canyon Power Plant Workshop;” August 12, 2022.

¹⁹ AB 205, Committee on Budget, Chapter 61, Statutes of 2022.

²⁰ “Final Version, Budget Act of 2022 Preliminary Summary”; https://sbud.senate.ca.gov/sites/sbud.senate.ca.gov/files/Final%20Version%20Preliminary%20Summary4.YS_.pdf

reportedly took 18 years and over \$5.5 billion to construct, well above the estimated \$400 million initially projected.

DCPP sits on approximately 900 acres adjacent to the Pacific Ocean between Avila Beach and Montaña de Oro State Park in San Luis Obispo County. The plant employs roughly 1,500 employees who help operate the facility. DCPP itself generates millions in property tax revenue, which mainly benefits local schools.¹ A study, commissioned by PG&E, of the economic benefits of DCPP concluded that operation of DCPP in 2011 contributed, directly and indirectly, over \$900 million to the local economy, including many of the regions high-paying, year-round jobs.² The DCPP is a major contributor to the economy of San Luis Obispo County and northern Santa Barbara County as both a source of tax revenue and employment.

On June 28, 2016, the State Lands Commission voted to approve a lease extension for the DCPP to 2025. A week prior to the vote, PG&E announced a Joint Proposal with labor and environmental organizations that would result in the closure of the plant by 2025 and “increase investment in energy efficiency, renewables and storage beyond current state mandates.” The original parties of the Joint Proposal included the International Brotherhood of Electrical Workers (IBEW) Local 1245, Coalition of California Utility Employees (CCUE), Friends of the Earth, Natural Resources Defense Council (NRDC), Environment California, and Alliance for Nuclear Responsibility.

In August 2016, PG&E filed an application with the CPUC submitting the Joint Proposal to review and request for approval of the replacement power provisions, an employee retention program, and other elements. The application sought over one billion dollars in ratepayer funds to pay for the costs associated with the proposal. In November 2016, PG&E agreed to expand the Joint Proposal and secured the support of the County of San Luis Obispo, the Coalition of Cities (Arroyo Grande, Atascadero, Morro Bay, Paso Robles, Pismo Beach and San Luis Obispo) and the San Luis Coastal Unified School District. The expanded proposal included \$85 million in support for the San Luis Obispo County community (the Community Impact Mitigation Fund, CIMP), compared to the \$50 million in the original proposal.

In the fall of 2017, the CPUC voted to approve the retirement of the DCPP, including approval for some of the elements of the Joint Proposal. Specifically, the CPUC approved \$222.6 million in rate recovery for costs associated with the employee retention (\$211.3 million) and retraining (\$11.3 million). The CPUC also approved \$18.6 million for license renewal activities. However, the CPUC denied elements of the Joint Proposal. In response, SB 1090 (Monning, Chapter 561, Statutes of 2018) was introduced in the Legislature and directed the CPUC to require the use of ratepayer funds for activities the CPUC had previously denied, including: an additional 10% augmentation to the already-approved 15% annual employee retention bonuses (for a total of 25% annual retention bonuses), and the

requirement that replacement power be GHG-free, as well as, approving funds for the CIMP. The CPUC issued a new decision in 2018 following the passage of SB 1090. That legislation and the subsequent CPUC decision has guided the last four years at DCP, as the plant actively prepares for its planned decommissioning.

As described above, changing circumstances have led the Newsom Administration to reconsider closing DCP and instead, in August 2022, propose that the Legislature allow its continued operation for an additional five years (until 2030) for reliability purposes. The challenges and questions invoked by that proposal, as well as the extremely limited time for the Legislature to consider such a consequential policy change and the appropriate safety and financial safeguards to apply to such an extension, are a key purpose of the hearing today.

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