# Ensuring Power Reliability in California: Why the Nuclear Ban Must Go

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**Briefing**
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## I. Overview

Nuclear power has been part of the United States' power mix since the first commercial nuclear power plant was connected to the grid in Shippingport, Pennsylvania, in 1958.[1] The United States now has ninety-four operating commercial reactors at fifty-four power plants.[2] In addition to these operating reactors, forty-one reactors around the country have been decommissioned, some of which were closed for political reasons. Three decommissioned reactors are set to be recommissioned in the coming years as power demand rises.

Nuclear power has contributed to the reliability of the American power grid for more than six decades. The industry has an impressive safety record, and reactors have only gotten safer since the industry's inception. At the same time, nuclear power has fallen victim to fearmongering. Sci-fi imagery, coupled with a precautionary mindset, has created fear in the public's perception of nuclear power. In the past few years, the tide appears to have begun changing. Public perception in the US is starting to shift in favor of new nuclear construction. In 1983, the Bisconti National Nuclear Energy Public Opinion Survey found that 49 percent of Americans were favorable to nuclear energy; by 2023 that number had risen to 76 percent.[3] At the same time, nuclear technology is developing with companies working to build new nuclear reactors—both traditional large reactors and new advanced reactor and small modular reactor (SMR) designs.

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This changing tide is leading to changing policies as well. European countries that previously had nuclear phaseout policies are beginning to reconsider them. States that previously banned nuclear power are now repealing the bans. There has also been action at the federal level, including in 2024 when Congress passed the ADVANCE Act to streamline permitting new reactor designs.[4] The Department of Energy is currently running a pilot program for the development of a small modular reactor, the US Department of Energy Reactor Pilot Program, with eleven projects being developed by ten companies. The goal of the program is to have three reactors reach criticality (the reactors' first self-sustaining nuclear reaction) by July 4, 2026.[5]

The time is ripe to build new nuclear reactors, which would help to meet rising power demand and shore up power grid reliability. Yet California, like many other states, still maintains a nuclear power moratorium. As such, a proven, reliable, safe, competitive, and clean form of power is off the table for the state until the law is changed. An unreasonable prohibition on the development of new nuclear power plants in California has led the Independent Institute to award the California Energy Commission and the Warren–Alquist Act with its twentieth *California Golden Fleece® Award*. California legislators should remove the nuclear moratorium for the good of the state's residents.

## II. Background

### A. History of Nuclear Power in California

California's first commercial nuclear reactor, Unit 1 of the San Onofre Nuclear Generating Station (SONGS), began construction in 1964 and started commercial operation in 1968.[6] That reactor, with a net capacity of 436 MWe (Megawatts electric), was small in comparison to other nuclear reactors, less than half the size of the other reactors that would come to share its site.[7] Currently, the smallest reactors in commercial operation are substantially larger; Prairie Island 1 and 2 in Minnesota have net capacities of 522 MWe and 519 MWe, respectively.[8] SONGS Unit 1 was retired in 1992, began the decommissioning process in 1999, and was mostly decommissioned by 2008 with its reactor pressure vessel and spent fuel relocated elsewhere.[9]

In 1968, construction began on Unit 1 at the Diablo Canyon Power Plant in San Luis Obispo, California.[10] Construction for Unit 2 at Diablo Canyon began three years later.[11] Amid the energy instability of the 1970s, the need for more power spurred further nuclear development in the state.[12] In 1974, construction began on two more reactors at San Onofre. That same year, the single unit at Rancho Seco reached criticality, but the reactor closed permanently in 1989 following a vote by the local community.[13] By the early 1980s, the units at Diablo Canyon and San Onofre were all finishing construction. All four reactors would begin commercial operation during a four-year period. SONGS Unit 1 came online in 1983, followed by Unit 2 in 1984, with the Diablo Canyon units following suit in 1985 and 1986.[14] These reactors were built during the height of the 1970s anti-nuclear movement. Access to Diablo Canyon was blocked by protesters in 1977, with even larger demonstrations in 1979.[15] But even more important to the state's nuclear future was the nuclear moratorium, which came into existence while the reactors at San Onofre and Diablo Canyon were still being built.

### B. The Nuclear Moratorium

California's nuclear power moratorium has persisted for nearly fifty years and serves as a de facto ban on new nuclear power in the state. The ban was enacted as part of a 1976 amendment to the 1974 Warren–Alquist Act, which established the state's Energy Commission.[16] That first-in-the-nation body served to direct the demand side of the power generation market and established building and appliance standards that have

influenced subsequent federal intervention in both areas.[17] The 1976 amendment requires that for any nuclear power plant other than the existing power plants at Diablo Canyon and San Onofre, “no nuclear fission thermal powerplant . . . shall be permitted land use in the state, or where applicable, be certified by the commission” until certain conditions are met.[18] These conditions require that a technology for the disposal of “high-level nuclear waste” be both demonstrated and approved by the US government, and that the commission reports those findings to the legislature and has them approved.[19]

At the time, anti-nuclear sentiments were running high across the country. Much of the anti-nuclear sentiment was spurred on by fear of nuclear weapons proliferation and a conflation of nuclear power with the atomic bomb. Concerns were also raised by environmentalists around the use of water in nuclear power plants, even though the vast majority of water used by light water reactors (which is used in the secondary cooling loop) is not contaminated by radiation and is only used for cooling.[20]

As a result of the legislation, no nuclear power development has occurred in California in two generations. It is impossible to know whether the impetus to build a new nuclear power plant in the state would have occurred without the moratorium in place. Economic factors as well as the anti-nuclear movement made new reactors far less common, but the ban has precluded even the possibility of a new nuclear power plant. The moratorium ignores the benefits that nuclear power can deliver and has closed the state off from the largest source of carbon-free power generation in the United States.[21] A Breakthrough Institute report from 2022 found that California’s nuclear moratorium would cost the state $12 billion in capital investment between 2020 and 2040.[22]

The moratorium used the nuclear waste issue as a cudgel to prohibit all future development. This is despite the safe storage of spent nuclear fuel at sites across the country and the technological feasibility of spent fuel reprocessing, which significantly reduces the waste burden but is not utilized commercially in the United States.[23]

### C. Nuclear Closures

#### *1. Closure of San Onofre*

The San Onofre Nuclear Generating Station shut down permanently in 2013. It was initially shuttered the year before to repair tubing that was deteriorating prematurely in new steam generators.[24] The owner of the plant, Southern California Edison (SCE), along with the manufacturer of the steam generators, Mitsubishi, engaged in a lengthy arbitration process over the warranty on the units. Ultimately, SCE reached a $400 million settlement agreement with Nuclear Electric Insurance Limited for the costs of outages caused by the faulty steam generators. SCE was also eventually awarded $125 million from Mitsubishi, minus legal fees.[25] Various solutions to the tubing problem were sought, but SCE decided to close the plant in June 2013, and the decommissioning began with fuel removal in July.[26]

According to the Energy Information Administration (EIA), this closure contributed to a gap in power prices between Northern California, where Diablo Canyon is located, and Southern California, where San Onofre operated. EIA stated:

> The outages of both units at Southern California Edison’s San Onofre Nuclear Generating Station (SONGS), starting in January 2012, have created a persistent spread in wholesale power prices between Northern and Southern California. Historically, wholesale power prices for Northern and Southern California tracked closely with one another, indicating minimal market differences between the two areas. However, after the shutdown of SONGS

in early 2012, the relatively inexpensive nuclear generation produced by SONGS had to be replaced with power from more expensive sources. Consequently, since April 2012 Southern California power prices have persistently exceeded Northern California prices, with the spread averaging $4.15/MWh, or 12% of the Northern California price.[27]

The loss of this power, which was low-cost and reliable, was a blow to the region in terms of overall energy costs.

***2. Attempted Closure of Diablo Canyon***

In 2016, Pacific Gas and Electric (PG&E) and environmental and labor groups reached an agreement to prematurely close the Diablo Canyon nuclear power plant. Diablo Canyon's two reactors were set to be closed in 2024 and 2025, respectively.[28] Following statewide power outages in 2020, and amid increasing demand projections, California Governor Gavin Newsom signed Senate Bill 846, which required the California Public Utilities Commission to vote on five-year license extensions for the plant. Extensions were granted by the commission in 2023, and Unit 1's license was extended until October 31, 2029, while Unit 2 was extended to October 31, 2030.[29] PG&E has also filed for a twenty-year license renewal from the Nuclear Regulatory Commission (NRC), which would allow it to operate until 2045.[30] While those processes are ongoing, climate groups are continuing to sue for the immediate closure of the plant.[31]

## III. Reliability Issues on the California Grid

### A. Rising Power Demand Fueled by AI Development

Data centers perform a range of functions. They store the photos and documents that we save to "the cloud," keep websites online, and, more recently, enable the development of artificial intelligence.

Power demand in the United States was fairly stagnant for a long time, but owing to rising demand from AI, among other things such as electrification, this is changing. From 2005 to 2020, electricity consumption grew modestly, increasing by an average of 0.1 percent per year over the period.[32] Since 2020, however, electricity consumption has risen at an average rate of 1.7 percent per year, with the commercial and industrial sectors growing even faster.[33] Data centers were a major driver of that growth. According to a Lawrence Berkeley National Laboratory report, data centers accounted for 1.9 percent of total US electricity consumption in 2018.[34] By 2023, data centers represented 4.4 percent of total electricity consumption.[35] Following a long period of stagnant growth, this is a major shift.

Data centers, especially those for artificial intelligence, will drive significant demand for electricity in the coming years. The Lawrence Berkeley National Laboratory report projects that AI data centers could account for 6.7 to 12 percent of overall demand by 2028. That would be a massive increase in demand. But the projection assumes that data center power utilization is 50 percent, meaning that they are only using that amount of power half of the time. In reality, such facilities often operate around the clock, so true power demand growth could be even higher.[36] Another estimate from the Electric Power Research Institute (EPRI) is that AI will consume 5 percent of US power by 2030.[37]

A US Department of Energy report on resource adequacy from July 2025, which relied on numbers from both the Lawrence Berkeley National Lab and EPRI reports, in addition to projections from other sources, states that by 2030, new data center power demand will range from 35 to 108 gigawatts (GW).[38] For context, a gigawatt of consistent output would be the power

demand of 876,000 households, assuming an annual average power consumption of 10,000 kWh.[39] Therefore, on the high end, the DOE's projections mean data center power demand would equal that of about 95 million households (there are 134 million households in the United States).[40] Even the low end of this estimate would represent significant growth for such a short period. The growth will also not be evenly distributed geographically, so some states may see higher relative growth.

Yet, while electricity consumption is ballooning, many power plants are retiring. The types of power plants that are not weather-dependent—such as nuclear, natural gas, and coal plants—have faced significant closures in recent years; 104 GW of reliable power is projected to retire in the US by 2030.[41] Rising demand from AI and electrification, coupled with the retirement of existing reliable plants, is a red flag that significant new power generation will be needed in the near future to satisfy demand.

One of the clearest indications that nuclear power may be economically viable to build in the near future is the long line of technology companies that are signing deals to procure power from both advanced reactors and previously retired nuclear facilities that can be brought back online. Google has an ongoing collaboration with Kairos Power to bring 500 MW of new capacity from its SMR design online by 2035.[42] Google has also signed an agreement with NextEra Energy to bring the Duane Arnold Energy Center, a retired nuclear power plant in Iowa, back online.[43] Meta has signed deals with Vistra, TerraPower, and Oklo to build new nuclear and help keep existing capacity from retiring for a combined 6.6 GW.[44] This is just a sampling of the ongoing interest and investment in new and existing nuclear power from technology companies and is a strong indication that there will be economic opportunities for new nuclear facilities everywhere, but especially in a technology hub like California.

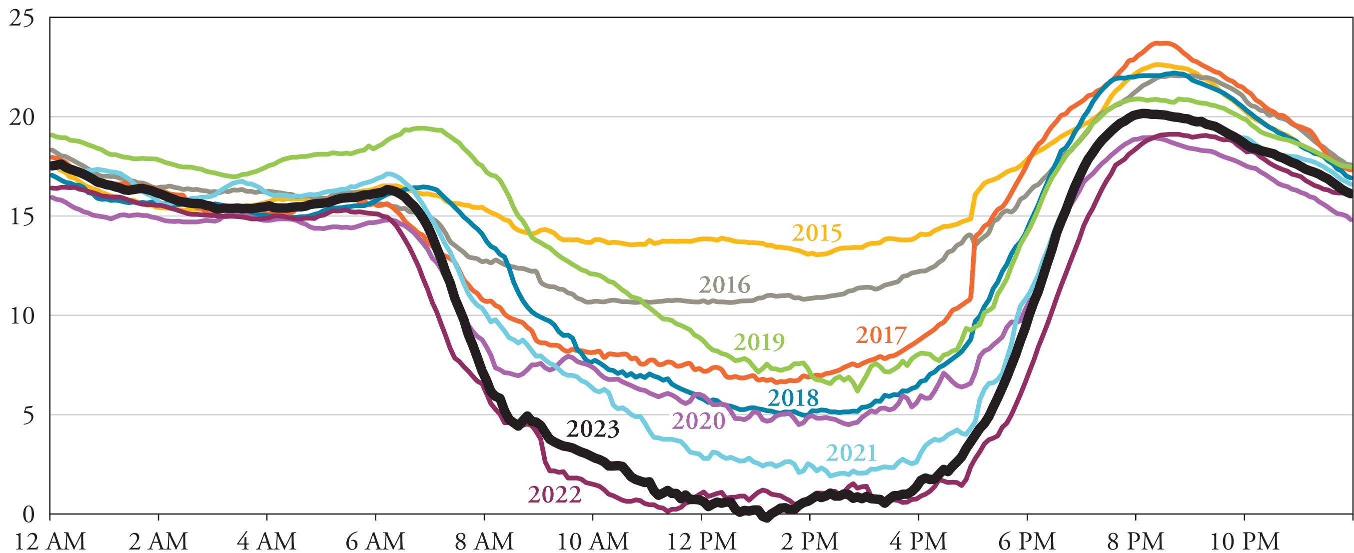
### B. California Electricity Crisis and Attempted Deregulation

In 1996, California passed Assembly Bill 1890, which established new wholesale electricity markets that sought to use a market mechanism to run power auctions. California had previously been organized under a vertically integrated utility model where the utility owns both the generation and distribution assets. AB 1890 moved the state toward a wholesale power market model managed by the California Independent System Operator (CAISO) and California Power Exchange (CalPX), which were established by the bill.[45] This deregulation was paired with policy that did not allow markets to work properly, and that was followed by further government intervention. Essentially, power producers bid their price into auctions to determine which power would be used. The transition proved to be fraught with problems; wholesale power prices rose and retail price controls remained in place.[46] Between 2000 and 2001, conditions came to a head with skyrocketing wholesale prices, intermittent power shortages, and severe financial problems for the state's utilities.[47] Wholesale electricity prices in California rose to an average of $143 per MWh by June 2000, more than twice the monthly price since the beginning of the market in 1998.[48] Pacific Gas & Electric (PG&E) was forced to file for bankruptcy in 2001 (not to be confused with the 2019 wildfire-related bankruptcy of PG&E), and CalPX was dismantled that same year.[49] The federal and state governments stepped in, and with significant spending and intervention, the situation eventually normalized. Today, power in most of California is managed by the California Independent Systems Operator (CAISO).[50] When attempts to deregulate are paired with other government policies that make it impossible for market signals to operate, a system of perverse incentives will occur—in this case, one rife with corruption. The California example is not one to be imitated.

**Figure 1.** The Duck Curve

**California's duck curve is getting deeper**

CAISO lowest net load day each spring (March–May, 2015–2023), gigawatts




## C. Wind and Solar Subsidies and the Unreliability of Green Energy

The subsidization of both wind and solar power has led to their proliferation on the grid nationwide. In California, solar power's penetration has been especially significant, especially given the speed of its proliferation on the grid. California had 13,981 MW of installed solar PV capacity in 2020 and had 22,510 MW of installed capacity by 2024.[51] Solar power is online only during the periods of the day when the sun is shining, leading to a steep ramp-up in solar production in the morning and a steep decline in the evening. The rapid and predictable decline in solar production is met in large part by the consequent ramping up of gas power plants, as well as (to some degree) by battery storage. Utilities must maintain enough power to meet hypothetical peak demand, even if that demand happens outside of the time that intermittent sources are available. This can require duplication of capacity to maintain required reserve margins.

This phenomenon in California and elsewhere is referred to as the duck curve, because the shape of the consumption curve's slope resembles the shape of a duck.[52] As more solar has been added to the grid and it has become more pronounced, some commentators have begun referring to it as a canyon curve instead. This phenomenon leads to stress on the grid, while making it hard for reliable power, nuclear, gas, and coal plants to compete economically because they are forced to idle much of the time, which can push reliable power plants to early retirement and result in a less reliable grid over time.[53]

Subsidies distort the market, and in turn the penetration of intermittent sources is higher than it would otherwise be.

## D. Other Barriers to Power Grid Reliability in California

Electricity is used immediately as it is generated (excluding battery storage). The power grid must reliably match demand and supply on a moment-to-moment basis. Matching this requires a certain degree of predictability for when power plants will be available.

California has the most battery storage of any grid in the country, with nearly 17,000 MW on the grid, but despite that capacity, the vast majority

of the state's power must still be generated at the moment that it is needed.[54]

Power plants that rely on fuel, such as nuclear, gas, and coal, are reliable because they are nearly always available to generate power. Natural gas is often used as a fuel for peaker plants, which ramp up and down to meet fluctuating demand and make up for the shortfalls of intermittent sources such as wind and solar.

Weather-dependent sources of electricity, such as wind and solar, do not operate when the wind is too soft or too strong or the sun is not shining, respectively. The more intermittent sources a grid has, the more delicate this balancing act of just-in-time power provision becomes. At the same time, it becomes much more difficult to build reliable power plants, and existing reliable power plants have been closed prematurely. Now that power demand is rising, the consequences of this combination are being realized. This is especially true in California, given state-specific policies that have shifted its electricity mix.

For example, California has enacted a renewables portfolio standard (RPS). The standard requires that 60 percent of electricity come from "RPS-eligible resources" by 2030, and 100 percent by 2045.[55] Even though no carbon is emitted at the point of generation, in California, nuclear energy is not considered an RPS-eligible resource because the technology relies on finite fuel and produces waste. The standard makes the state overly reliant on wind, solar photovoltaic, solar thermal, some hydroelectric, geothermal, and bioenergy for power. As of 2023, 67 percent of California's power consumption came from zero-carbon sources, but only 42.9 percent was from RPS-certified renewables. The 12.2 percent of power from large hydroelectric facilities and the 11.5 percent from nuclear power do not count toward the RPS standard.[56] Given those restrictions, the RPS standard will continue to push the state toward largely intermittent and potentially expensive sources of power.

### E. The California Environmental Quality Act

Another problem for developing and maintaining energy infrastructure in California is the California Environmental Quality Act (CEQA). This is the state's version of the National Environmental Policy Act (NEPA) and requires a repetitive and expensive review process similar to NEPA. A major difference between CEQA and NEPA is that it is substantive in addition to being procedural. Unlike NEPA, CEQA imposes specific substantive requirements on agencies and even prohibits them from approving projects in certain situations.[57]

CEQA poses a significant barrier to meeting rising power demand in California by making it much more expensive and time-consuming to build new power plants and power infrastructure. CEQA even harms the types of energy projects that clean-energy advocates purport to favor. A Union of Concerned Scientists study found that CEQA and other barriers delayed transmission projects in the state by an average of 6.1 years.[58] The environmental impact report that CEQA requires can cost hundreds of thousands of dollars and may cost far more for large or difficult projects.[59]

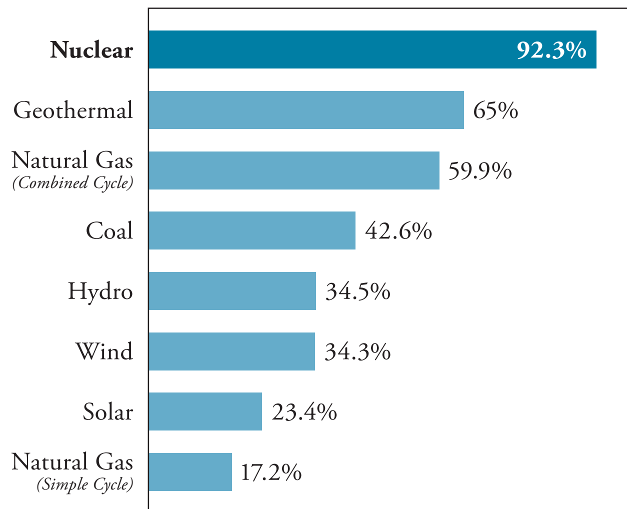
Efforts to amend the law to make it less restrictive for power plants have been unsuccessful thus far, including Assembly Bill 3238, which would have temporarily sped up the approval process for electrical infrastructure projects.[60] The measure failed in 2024, and other attempts to amend CEQA have been similarly rejected.

## IV. Nuclear Power Benefits and Safety

### A. Nuclear Capacity Factor

Nuclear power plants in the United States operate more consistently than any other power source. The average capacity factor of a US reactor was 92.3 percent in 2024, according to data from EIA.[61] Capacity factor measures the portion of

**Figure 2.** Capacity Factor by Energy Source




the time that a power plant is operating optimally and predictably: the average reactor was operating 92.3 percent of the time at nameplate capacity, the maximum output that the manufacturer expects the facility to generate if it operated around the clock. Other power sources have much lower capacity factors. Geothermal power is the closest to nuclear power, with a capacity factor of 65 percent. Combined cycle gas has a capacity factor of 59.9 percent, and simple cycle gas has a capacity factor of 17.2 percent (gas is often ramped up and down to meet demand fluctuations, so this is not indicative of the ability to operate).[62] The difference between these two natural gas–fired systems is that combined cycle systems recycle exhaust heat while simple cycle systems do not recycle, resulting in the former's higher capacity factor.[63] Coal has a capacity factor of 42.6 percent. Wind and solar, which are often the first power taken in wholesale auctions because subsidies drive their prices to artificial lows, have woefully low-capacity factors at 34.3 and 23.4 percent, respectively.[64] Nuclear power's high-capacity factor means that grid operators can rely on it being available nearly all of the time.

## B. Grid Benefits

Because of its high-capacity factor, nuclear power is a stabilizing force for the power grid. A nuclear plant's output is predictable and consistent, thereby helping to meet the baseload demand of the power grid. Because of its consistency, nuclear power is also a great solution for large-load customers with constant demand, such as data centers and remote industrial applications.

## C. Colocation with Data Centers

Because nuclear power is a natural complement to data centers, many technology companies are signing deals with nuclear companies to supply power needs. Many of these agreements are for what is called "behind-the-meter" power. In such an arrangement, a data center is collocated with a power plant before the plant's connection to the broader grid (hence behind the meter). This arrangement somewhat insulates the broader power grid from the new load, especially when companies bring their own power to the table. One example is found in the agreement between Constellation Energy and Microsoft to restart the previously retired Three Mile Island Unit 1, which involves a twenty-year power purchase agreement and will bring more than 800 megawatts of power back online.[65]

## D. Land Use

Nuclear power has the lowest land use per unit of energy generated of any power source. According to a 2022 Our World in Data report, nuclear power requires only 0.3 square meters per MWh of output. This is three times less than the next most efficient power source, natural gas, which uses only one square meter per MWh. Onshore wind requires 8.4 square meters per MWh by project site area. On the other end of the spectrum, small-to-medium hydropower requires, on average, thirty-three square meters per MWh (large hydro requires less, at fourteen square meters per MWh) while coal plants require twenty-one square meters per MWh and solar photovoltaic installed on the ground requires nineteen square meters per MWh.[66] Using less land to generate the same amount of power is environmentally beneficial, as well as useful in contexts with less available land.

## E. Safety and Waste

The nuclear industry has been haunted by the ghost of Chernobyl and the burden of public fear of radiation. The Chernobyl disaster of April 26, 1986, is burned into the minds of the public and, until recently, was a barrier to nuclear power in the US and elsewhere. But Chernobyl was more a failure of Soviet-style bureaucracy than it was of nuclear power in general—a combination of the graphite-moderated and unstable RBMK reactor design that never would have been approved in the United States and a workforce that was compelled to push that reactor far beyond its reasonable limits.[67] A few years after the accident, German American physicist Hans Bethe explained in *The New York Times* what made the Soviet reactor behave that way, and why the same couldn't happen here:

> The design of the Chernobyl reactor results in an unfortunate instability. If, for some reason, the reactor produces excess power, more of the cooling water will turn to steam, fewer neutrons will be absorbed by water and more of them will be absorbed by Uranium-235. This increases the already too high power still further. That is exactly what happened at Chernobyl: The power increased and the reactor became uncontrollable. In Western countries, most nuclear reactors use water for slowing the neutrons and cooling. If some water is lost, the chain reaction stops automatically and the reactor shuts down.[68]

In 2019, HBO released a popular miniseries that reignited the public fear around nuclear power (despite a focus in the show on the Soviet Union's failures, including the tagline "What is the cost of lies?").[69]

The US experience with nuclear accidents has been a very different one. The biggest nuclear incident in the United States, the Three Mile Island accident in 1979, while understandably frightening to people, resulted in no deaths, and no unusual health trends were detected in the vicinity.[70] The other reactor at the site operated until 2019, when it closed for economic reasons—a combination of cheap natural gas prices, slow growth in electricity demand, and the flawed incentive structure of the Pennsylvania–New Jersey–Maryland (PJM) RTO, the area's grid operator.[71] The plant is being recommissioned as part of a deal with Microsoft to power the company's data centers.[72]

Nuclear power in the United States is safe and getting safer. Generation III+ reactors, such as the Westinghouse AP1000, are safer than previous reactor designs. The AP1000 is the most recently deployed American large commercial reactor design, which was the reactor design used for Plant Vogtle Units 3 and 4 in Georgia that came online in 2023 and 2024, respectively.[73] Generation IV reactors, including the small modular reactors in the Department of Energy Pilot Program, which are attempting to reach criticality this summer, are even safer.[74] Many of these Gen IV reactors, as well as the AP1000, have passive safety measures in place that stop chain reactions in the fuel without the need for operator intervention in the event of an incident.[75]

One of the biggest concerns that is raised about nuclear power in the United States is waste. Many of the state-level bans, including California's, are conditioned on waste, and it is also a major issue in the public fear around nuclear power. The nation currently has no permanent geological repository for nuclear waste, and the Yucca Mountain program to establish a permanent geological repository for nuclear waste has been stalled.[76] Despite the lack of a permanent central repository, nuclear waste is safely stored at sites across the country in spent-fuel pools at individual reactor sites and in dry-cask storage.[77] Spent fuel is stored at seventy sites across thirty-five states. The ratio of waste to power generated is also very low—the US as a whole generates only two thousand metric tons of spent nuclear fuel each year; the entirety of all spent fuel ever

produced in the US could fit on a single football field.[78] If every person in the United States got the entirety of their lifetime electricity from nuclear power, the per capita waste would fit in a single twelve-ounce soda can.[79] Spent fuel reprocessing is also an option and is done in other countries, including France.[80] This allows for more of the fissile material in the fuel to be utilized. Up to 96 percent of the material in spent nuclear fuel (SNF) is able to be reprocessed, while the remainder must be disposed of; this process can significantly lower the waste burden by removing fissile material from the ultimate waste.[81]

## V. Lessons from Other Countries and States

### A. International Nuclear Power

France has benefited greatly from nuclear power. More than 70 percent of French power comes from nuclear power.[82] France has fifty-seven nuclear reactors at eighteen power plants, which generate a combined capacity of 144 GWe.[83] That power is reliable, dispatchable (meaning that output can be adjusted to match demand), and often exported to neighboring countries, including Germany. It is worth noting that the French power grid is entirely nationalized, and that government ownership comes with drawbacks, especially as the country attempts to meet some of its net-zero commitment through renewables.[84] The French nuclear industry provides an interesting example because of how it is able to recycle waste, and because France built many of the same reactor designs to achieve economies of scale. Ninety-six percent of France's spent nuclear fuel is able to be reprocessed into new fuel.[85] The nationalized power grid, however, and the bureaucratic decision-making that has accompanied the system, should not be imitated.

Germany provides an example of a failed nuclear power policy. Following the Japanese earthquake and subsequent accident at Fukushima Daiichi in 2011, the German government temporarily shut down its nuclear reactors and instituted a full review of reactor safety. At the time, a quarter of Germany's power came from its seventeen nuclear reactors.[86] Later, in 2011, the Reactor Safety Commission released its report, which found the country's reactors to be safe and also found that, "[a]ccording to current knowledge, initiating events that may lead to such tsunamis are practically excluded for Germany."[87] Essentially, there is almost no risk of tsunamis impacting a nuclear reactor in Germany. But that plain fact did not prevent the ultimate phaseout of nuclear power in Germany.

Alongside the Reactor Safety Commission, there was also an Ethics Commission review. That commission's report opens with, "The Ethics Commission is strongly convinced that the withdrawal from nuclear energy can be completed within one decade using the measures presented here for the energy transition."[88] That phaseout would go on to have incredibly dire consequences for German industry and for power prices.

By April 2023, Germany had permanently shut down its last three remaining nuclear power plants. Those plants were initially scheduled to close at the end of 2022 but were kept online for a few extra months to see the country through the winter.[89] One of the most interesting parts of that report is the section on perception. It highlights one of the most important parts of this issue. Perceived safety and perceived risk are not the same as real safety and real risk, but once the specter of risk exists, it is difficult to undo. The report states, "The risks of nuclear energy have not changed since Fukushima, but the perception of the risks has."[90] The German nuclear phaseout was not about safety; it was about fear and public perception.

Following the closure of its nuclear plants, power prices have risen from 53.33 euros per MW in May 2021 to 77.28 euros per MW by May 2024, representing a 44.9 percent increase.[91] German power imports from its neighbors, especially

nuclear-powered France, have also increased dramatically, and the country is now a net importer.[92]

### B. States That Have Ended Their Nuclear Bans

Kentucky, Montana, West Virginia, and Wisconsin have ended their bans on nuclear power plants in the last decade. Illinois is the most recent state to do so. In 2023, the state partially removed its moratorium for small modular reactors only, but in November, it removed the ban for all reactors.[93] Those states demonstrate that it is possible to abolish prohibitions on new nuclear reactors; they are now open to building new nuclear reactors, which will be useful as power demand rises. This is especially true as the public opinion on nuclear power has shifted in recent years.

## VI. California Power Imports

Power imported from other states and Canada plays a significant role in California's power mix. In 2025, the state imported the second largest amount of power in the country, after Virginia. The imports account for between one-fifth and one-third of the state's annual electricity.[94]

Governor Newsom signed AB 825 into law in September 2025, which takes the first step toward creating a Regional Transmission Organization for western states.[95] The bill enables the California Independent System Operator to participate in regional markets, which had previously prevented the formation of a truly regional and integrated transmission organization.

### A. Nuclear Power Imports

California imported a total of 62,157 GWh of power in 2024. Of that power, nearly 15 percent, 9,234 GWh, came from nuclear power sources.[96] Southern California is responsible for the majority of the state's overall imports with 46,344 GWh, compared to 15,813 GWh in the north. Nearly all of the nuclear imports, all but 208 MWh, went to the southern portion of the state.[97]

### B. Comparison of Nuclear Bans

Currently, eleven states, including California, have some form of nuclear power ban in place. Minnesota has an outright ban on all new nuclear power in the entire state. New York bans nuclear power specifically in the area managed by the Long Island Power Authority, which includes the counties of Nassau, Suffolk, and parts of Queens.[98] Several other states, including Connecticut and Maine, have moratoriums similar to California's, which are conditioned on waste disposal. The only exception to the Connecticut moratorium is for its existing nuclear power plant, which would allow a new reactor to be built at the existing nuclear site.[99]

Some states condition construction of new nuclear power plants on voter approval, legislative approval, or some combination of approval and a plan for waste disposal. Table 1 outlines the various state bans.

### C. States with a Comparative Advantage in Nuclear Power

Because nuclear power requires little land use and the fuel is relatively compact, every state is geographically capable of hosting nuclear reactors. This does not mean, however, that all of them do or will. States with more favorable public opinions toward nuclear power and existing nuclear power plants are likely to have an advantage in developing future plants. Nuclear power plants are staffed by a unique, small pool of talent, so having an existing market for this staff is an advantage.

Along the same lines, nuclear power tends to be most popular in places that are currently operating nuclear power plants. A survey found that 83 percent of those living in communities with nuclear power plants in June 2015 supported nuclear power, and the same survey found that 67

**Table 1.** States with Current Restrictions on New Nuclear Power

| State | Conditions of the ban |
|---|---|
| California | Waste disposal capability[100] |
| Connecticut | Waste disposal capability, with an exception for new units at existing facilities prior to October 1, 2022[101] |
| Hawaii | Legislature approval[102] |
| Maine | Conditioned on voter approval and waste disposal capability[103] |
| Massachusetts | Conditioned on voter approval, legislative approval, as well as requirements for waste disposal and that the nuclear power plant is the optimal means of meeting energy needs[104] |
| Minnesota | Outright ban[105] |
| New Jersey | Waste disposal safety[106] |
| New York | Outright ban in the service area of the Long Island Power Authority; not restricted in the rest of the state[107] |
| Oregon | Requires both a permanent waste repository and voter approval[108] |
| Rhode Island | Requires legislative approval to build a nuclear power plant or oil refinery[109] |
| Vermont | Requires legislative approval to build a nuclear power plant[110] |

percent of the general public supported nuclear power in April 2016.[111] Illinois has both the most nuclear reactors and the largest fraction of its power generated from nuclear power sources, and it recently lifted its nuclear moratorium.[112] Pennsylvania, the second largest generator of nuclear energy, may be a good candidate for new nuclear development given its existing workforce as well as its location in the PJM grid, which is experiencing fast growth in demand.[113] Montana and Utah have each passed legislation to make their states more appealing to nuclear developers. Montana House Bill 623 allows for the creation of nuclear waste storage facilities, and House Bill 676 allows for uranium enrichment and processing in Montana.[114] Utah passed a set of nuclear power amendments to develop and invest in nuclear power.[115] Ultimately, any state that allows new nuclear development could be the optimal location for a new nuclear project, depending on the state's power needs and transmission capacity.

## D. The Politics of Nuclear Power

To varying degrees, both major political parties have become more welcoming toward nuclear power in recent years. Both party presidential platforms favored some use of nuclear power during the 2024 election campaign.

When Joe Biden was the Democratic candidate, the platform read, "Recognizing the urgent need to decarbonize the power sector, our technology-neutral approach is inclusive of all zero-carbon technologies, including hydroelectric power, geothermal, existing and advanced nuclear, and carbon capture and storage."[116] The line was omitted in later iterations of the platform, which contained no mentions of nuclear power.[117]

The Republican platform stated, "Republicans will unleash Energy Production from all sources, including nuclear, to immediately slash Inflation and power American homes, cars, and factories with reliable, abundant, and affordable Energy [*sic*]."[118]

At the federal level, there appears to be bipartisan interest in nuclear power at present. As early as 2018 this interest was seen in the bipartisan passage of the Nuclear Energy Innovation and Modernization Act (NEIMA), which established significant reforms, including Part 53, which created a licensing path for advanced reactors.[119] The bipartisan ADVANCE Act, which was passed as part of the Fire Grants and Safety Act of 2024,

also displays bipartisan interest in advancing nuclear energy.[120]

California features more division on the issue. The official California Democratic 2024 platform advocated to "phase-out all reactors."[121] At the same time, however, party leader Governor Newsom was instrumental in keeping Diablo Canyon operating. In July 2025, Newsom appeared on the *Shawn Ryan Show*, and, when asked about his thoughts on nuclear, he said, "I extended the life of the last remaining nuclear plant in California. Took a lot of s---, so that's where my position [is] on it."[122] When the host followed up by asking if he was pro-nuclear, he responded, "I was the guy who kept the lights on because I extended the life of about 9, almost 9.5 percent of our baseload in California with the last remaining nuclear plant . . . and I think it is absolutely critical moving forward if we're going to help decarbonize and change. It's the only way, only path I see to get us where we're going to need to go."[123] Newsom's responses contrast sharply with the state party's platform.

## VII. Key Policy Recommendations

Significant interest in nuclear power has materialized, both in terms of restarting decommissioned reactors and in building new traditional reactors and SMRs. California and the nation more broadly are experiencing rapid power-demand growth, and that growth is projected to rise for the foreseeable future. Markets are signaling that demand for reliable power is unmet, and nuclear power can be an important part of the solution, especially for baseload needs. Taking those signals seriously, the state of California should immediately make it possible to expand its nuclear capabilities and import more nuclear power by implementing key policy reforms.

### A. Remove the Nuclear Power Ban

It is critical that California end the state's nuclear moratorium. If the moratorium persists, no new nuclear facilities can be sited anywhere in the state, with the exceptions of the Diablo Canyon and San Onofre facility sites.

In January 2025, a new bill, AB 305, was introduced in the California Assembly to exempt small modular reactors of up to 300 MW per unit from the moratorium. That would be a good first step toward allowing nuclear power in the state and would still allow many nuclear designs to be built. Although passing the legislation would be an improvement on the status quo, the bill does not go far enough in removing unnecessary barriers to the construction of larger reactors.

The legislation also phases out gas generation. It states that "on or before January 1, 2028, the commission shall adopt a plan to increase the procurement of electricity generated from nuclear facilities and to phase out the procurement of electricity generated from natural gas facilities."[124] Doing so would likely cancel out the power generation benefits of deploying SMRs in the state while further undermining the reliability of the state's grid, which already has considerable intermittent generation (which relies heavily on gas to back it up). It would also remove competition from the state's energy market, driving prices up further. Ideally, the moratorium should be abolished entirely.

### B. Stop Attempts to Prematurely Close Natural Gas Plants to Meet Climate Goals

Despite (or because of) California's renewables portfolio standard's requirements, the state has already needed to postpone natural gas plant closures to maintain reliability. The intermittency of wind and solar power requires a power source that can ramp up and down quickly to match fluctuations in demand, and natural gas is generally the best fit for that role. In 2023, three natural gas plants that had originally been slated to close in 2020 were extended again through 2026, while a fourth was extended through 2029 to meet demand when the grid is under stress.[125] At a time when demand is rising and reliability is already in question, the premature closure of

reliable gas-fired power plants is unwise. It would also be wise to remove the state's renewables portfolio standard to allow power demand to continue to be met by a range of sources.

### C. Ease Regulatory Burdens on Energy and Transmission Development

In addition to lifting the ban on new nuclear power, easing the burdens for developing nuclear and other energy projects is an essential part of the equation. Overregulation makes it incredibly difficult to build new power plants in general, and for nuclear energy in particular. The same applies to adding new transmission lines, especially to connect California with other western states. Other reforms are also needed at the federal level, especially regarding permitting.

For California especially, easing the burden of building new power plants would require a paradigm shift. The state currently views new power plants with animosity, even as demand is growing rapidly. Meeting that challenge will require reforming CEQA to allow power plants to be built more readily and at lower up-front cost. In the best case, California could repeal CEQA entirely, as fewer than half of the states have a NEPA-like policy in place.[126]

Internationally, especially in China, nuclear reactors are built much more quickly. The current timeline for a new reactor in China is seven years from start to finish, and there are twenty-seven reactors under construction.[127] This is for reactor designs that are similar to designs in the United States, where it takes far longer and costs far more. For example, Plant Vogtle Units 3 and 4 began construction in 2009 and were completed in 2023 and 2024.[128] That is fourteen and fifteen years, respectively. This disparity is entirely a self-inflicted policy choice.

### D. State Siting Policies

In addition to other restrictions imposed by the state, including CEQA, California should amend its unreasonably strict policy for the siting of new oil and gas operations. Senate Bill 1137, passed in 2024, requires these operations to be located more than 3,200 feet from any homes, schools, or hospitals. That distance is more than half a mile and puts a significant portion of the state out of consideration for the siting of new facilities.[129] Given that the policy is already on the books for oil and gas, were new nuclear power to be allowed in the state, it is likely that a similar policy would be applied to new nuclear facilities. This would impose less of a burden on a large power plant but may create issues for the siting of more diffuse resources such as SMRs, which may be deployed directly at the site where power is needed. Were the moratorium to be lifted, avoiding a similar siting policy for nuclear power plants would be an important goal. Nuclear siting should be based on specific metrics backed by science-based risk, not arbitrary distances that fail to account for the size and safety of a specific facility.

### E. Federal Policies That Impact the California Grid

The California grid likewise is influenced by federal policymaking, and action should be taken to remove subsidies that harm reliability and to reform permitting that slows project timelines. California policy has driven the penetration of wind and especially solar power on the state's power grid, but that growth has been subsidized by the federal investment tax credit and production tax credit, which pay wind, solar, and other renewable energy developers for their investments in new facilities and for each unit of power produced, respectively. The subsidies have existed for decades, but they were expanded under the 2022 Inflation Reduction Act (IRA).[130] More recently, these subsidies have been phased out by the 2025 budget reconciliation bill, the One Big Beautiful Bill Act. These phaseouts will not take place until 2028, which leaves plenty of time for them to continue to affect the power mix.[131] The IRA also contained a litany

of other subsidies that affect people's electricity consumption choices.

Permitting is another federal policy that has major implications for power plants. Between NEPA, the Clean Air Act, the Clean Water Act, and the Endangered Species Act, federal permits are among the most time-consuming and expensive elements of developing any new power plant.

NEPA is an area of permitting that has seen improvement recently. In 2025, the US Supreme Court case *Seven County Infrastructure Coalition v. Eagle County* clarified the scope of NEPA and made clear that the law is purely procedural in nature:

> NEPA is a purely procedural statute that, as relevant here, simply requires an agency to prepare an EIS [environmental impact statement]—in essence, a report. Importantly, NEPA does not require the agency to weigh environmental consequences in any particular way.
>
> Rather, an agency may weigh environmental consequences as the agency reasonably sees fit under its governing statute and any relevant substantive environmental laws.
>
> Simply stated, NEPA is a procedural cross-check, not a substantive roadblock. The goal of the law is to inform agency decision making, not to paralyze it.[132]

Because of the court's ruling, the impact of NEPA on the permitting process should be reduced. It is also essential to reform the other laws that impact energy development in a broad-based and technologically neutral manner.

### F. Federal Rules That Make Nuclear Development More Difficult

As nuclear technology has improved, the regulatory regime has not kept pace. Nuclear regulation should be updated to allow the technology to reach its potential. All of the general permitting requirements are still required for nuclear plants. But on top of those requirements, nuclear power faces the additional layer of the Nuclear Regulatory Commission, which has its own permitting process. Some attempts, including the ADVANCE Act, have been made to streamline the process somewhat, but more work needs to be done. One important action that would improve nuclear regulation would be to remove the Linear No Threshold (LNT) model (which treats minute amounts of radiation exposure the same as serious radiation exposure) and replace it with a scientific model that approaches radiation safety in a risk-informed manner. Another useful action would be to remove the As Low as Reasonably Achievable (ALARA) standard. That standard makes it incredibly difficult to build a nuclear power plant affordably by constantly raising the bar for radiation safety far beyond what has any real-world impact.[133]

In a May 2025 executive order, President Donald Trump ordered that the NRC "[a]dopt science-based radiation limits" by reconsidering its use of LNT and ALARA standards.[134]

Additionally, Secretary Chris Wright announced the end of the Department of Energy's use of ALARA in January 2026.[135] This change, coupled with the executive order, should encourage the NRC to reconsider its use of those standards. Amending those standards would make the construction and permitting process for new nuclear plants more efficient and cost-constrained without weakening safety.

## VIII. Conclusion

California and every other state that imposes moratoriums on new nuclear power should remove those harmful policies. A reliable and abundant US energy supply in the future must include nuclear power to meet the electricity needs of the American people while maintaining affordability. Reliable electricity is vital if the US economy is to lead the world in innovation and prosperity.

California's nuclear moratorium is an outdated policy that must go. To affordably meet rising power demand, maintain and improve power grid reliability, and keep California a hub of innovation, California legislators should end the nuclear ban and address other regulatory barriers to abundant and affordable power for all Californians.

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The opinions expressed in this paper are purely the author's own and do not necessarily represent those of CEI.

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