

ISSUE BRIEF

TRANSITIONING AWAY FROM UNECONOMICAL NUCLEAR POWER PLANTS

PROTECTING CONSUMERS, COMMUNITIES, WORKERS, AND THE ENVIRONMENT

Nuclear plants across the country are facing closure because they are not economically viable in competitive (and often fundamentally flawed) wholesale electricity markets. Many states are concerned about climate and other environmental impacts if nuclear power is replaced with fossil fuels, and also about the loss of jobs and the local tax base that nuclear plants provide. Some states have already developed plans for an orderly transition away from nuclear power, and others are weighing options, including direct financial support to nuclear facilities to delay closure. This issue brief outlines key environmental, economic, and fairness considerations for states seeking to manage their transition away from nuclear plants.

Experience in four states grappling with the potential closure of nuclear plants—California, New York, Illinois, and Connecticut—makes clear that any financial support should be predicated on a showing of financial distress and should be narrowly tailored to market conditions. Policymakers should also tie such support to a time-limited transition plan to address a state’s specific concerns, for example by simultaneously adopting state policies that will drive investment in the emissions-free energy efficiency and renewable energy needed to replace the plant; by requiring the plant owner to retain, retrain, and/or compensate its workforce; and by supporting an alternative economic development plan for communities that rely on nuclear plants for a substantial portion of their tax revenues.

BEST PRACTICES FOR NUCLEAR TRANSITIONS

As America’s nuclear plants age, reach the end of licenses or license extensions, or become increasingly uneconomical in today’s wholesale electricity markets, growing numbers of reactors are likely to be retired. A well-planned, systematic transition is critical to: ensuring that clean, renewable and more cost-effective alternatives replace the plants; that carbon emissions do not increase; and to avoiding detrimental impacts to workers and to host communities that rely on nuclear facilities for their tax base. Short-term, narrowly tailored financial support for existing nuclear facilities that demonstrate severe financial distress may make sense in some cases, provided it is tied to robust efforts to ensure an orderly transition.



California, New York, Illinois, and Connecticut have taken steps to avoid the abrupt closure of nuclear plants; New York and Illinois provide direct financial support for the plants and Connecticut has authorized such support. The states developed these policies for a variety of reasons, including avoiding backsliding on efforts to meet state greenhouse gas reduction goals, protecting jobs, and preserving an important source of tax revenue for local communities. Their experience reveals the following best practices for transitioning away from nuclear power:

- **Showing of severe financial distress.** Financial support for a nuclear facility may be warranted if the owner can

demonstrate that it will close the plant absent such support; reduced profitability is not sufficient. In New York and Illinois, plant owners filed notice of closure and opened their books to state regulators. In Connecticut, the plant owner made no such disclosure; as a result, the state agency conducted its own analysis based on publicly available information, determined the plant was profitable, and refused to authorize financial support.¹

- **Narrowly tailored support.** The financial support needed to extend operation of a plant depends on wholesale electricity market prices, as well as any carbon price, and should be adjusted accordingly in order to avoid a windfall to shareholders at the expense of consumers. New York has a mechanism to adjust the value of nuclear subsidies biannually to reflect wholesale market and carbon price fluctuations; Illinois, which does not currently cap carbon emissions, adjusts its nuclear subsidy to reflect wholesale market changes, ties the value of the subsidy to the Environmental Protection Agency's Social Cost of Carbon, and caps the overall cost of the subsidies.²
- **Time limits.** The purpose of subsidizing existing nuclear plants is to create the time needed to plan for an orderly transition to clean energy that takes into account the workers and surrounding community (both discussed below); there is no public policy justification for indefinite support. In New York the transition period extends to 2030; in Illinois the payments are structured as 10-year contracts.
- **Scaling energy efficiency and renewable energy.** From an environmental perspective, any justification for subsidizing existing nuclear plants is to provide the time needed to scale up clean energy (e.g. energy efficiency and renewable energy) at the magnitude and pace necessary to avoid backsliding on the reduction of carbon emissions and other pollutants and their associated public health impacts. If zero-emission nuclear facilities abruptly retire, the near- to medium-term outcome is often increased generation and emissions from nearby coal, oil, and natural gas plants.
- **Maintaining the integrity of efficiency and renewable policies.** States should not allow funds intended to drive investment in energy efficiency or renewables to be siphoned for nuclear subsidies, and nuclear generation should not "count" toward a state's renewable energy targets. This would undermine the goal of scaling up those very resources. In California, the retirement and replacement proposal (currently pending state approval) calls for additional investment in efficiency, wind, solar and other zero-carbon replacement resources. New York's utility commission adopted a "zero-emission credit" mechanism to support existing nuclear plants in conjunction with a legally binding program to scale up

renewable resources to meet 50 percent of the state's electricity demand by 2030 (nearly doubling its current renewable energy supply); nuclear generation will not count toward that target. Illinois's legislation provided more than twice the value of its nuclear support to kickstarting efficiency and renewables. In contrast, Connecticut authorized a subsidy for nuclear power as a stand-alone measure and separately made devastating cuts to its clean energy policies, siphoning clean energy funds to balance the state budget.³

- **Worker transition.** Nuclear plants typically employ several hundred to more than 1,000 people. Some employees can transition to the work of decommissioning when a plant closes, a process that can take up to 60 years. Plant owners can also transfer workers to other facilities within their companies, as Entergy is considering doing for up to 180 employees at its Palisades nuclear plant.⁴ The California proposal includes provisions for worker retention, retraining and compensation; the New York and Illinois policies do not, although the Illinois legislation does provide \$30 million for broader job-training programs and New York has an existing clean energy job-training program.⁵
- **Community transition.** Many communities with nuclear power plants rely on them for a substantial portion of their tax base. A scheduled transition provides time to develop plans to attract new businesses to the area to replace lost tax revenue. States can also provide direct support for a glide path to new economic development, as Entergy is doing in southwest Michigan,⁶ and as Massachusetts did for the towns of Somerset and Holyoke in connection with the closure of local coal plants.⁷ The California proposal includes provisions for community compensation; the New York and Illinois policies do not, although New York has a statute to provide temporary transitional tax base relief to communities that face the retirement of power plants, independent of technology type. When nuclear facilities retire, those communities may apply for such relief.⁸

STATE APPROACHES TO NUCLEAR TRANSITIONS

California

In June 2016, Pacific Gas & Electric, along with labor and environmental organizations, announced the *Diablo Canyon Joint Proposal*,⁹ an historic commitment to the orderly phase-out of California's last nuclear power plant by 2025 and replacement of its electric generating capacity with lower-cost, emissions-free options including energy efficiency, and wind and solar power. Under the terms of the proposal, currently pending approval by the California Public Utility Commission, the plant will continue to operate for nine years. Had the two reactors been relicensed, they could have operated an additional 29 to 49 years.

A NOTE ON INDIAN POINT

The troubled and aging Indian Point Energy Center, a 2,000 MW two-unit facility, is not included in New York's ZEC program. The state has negotiated an agreement to shut down the facility, based in part on its close proximity to New York City—making emergency evacuation all but impossible—and the decades-long series of safety and operational problems that have plagued the plant.

Under the agreement, Indian Point's remaining Unit 2 reactor will close in 2020 and Unit 3 in 2021. The agreement does not specify a plan for replacement power, but Governor Andrew Cuomo has made a commitment that the closure will not cause an appreciable increase in carbon emissions.¹³ If New York implements a sufficiently strong energy efficiency portfolio on par with its ambitious requirement to scale up renewable energy to 50 percent by 2030, and follows through on the state's efforts to bolster the transmission grid, the governor can deliver on this commitment.¹⁴ In addition, New York is part of the nine-state Regional Greenhouse Gas Initiative, which caps carbon emissions in the power sector. The recently strengthened program requires regional emissions to decline by 3 percent annually from 2021 to 2030, on the basis of modeling that assumes the retirement of Indian Point in accordance with the agreement.

Due to its enormous size and lack of flexibility in operation, Diablo Canyon increasingly is an obstacle to adding clean generation and displacing natural gas, which also adds to greenhouse gas emissions. Removing Diablo Canyon will open space for new, less costly renewable resources, and increased generation from renewables already on the system. In addition, Diablo Canyon is located near earthquake fault lines; by shortening the life of the plant, the proposal substantially reduces the risk of catastrophic earthquake damage to an operating nuclear facility.

Diablo Canyon is a competitive resource and the Joint Proposal does not include any financial subsidy for the facility. Rather, the proposal sets out an orderly transition around the future closure of the plant in order to avoid more costly upgrades that would be required with relicensing. PG&E has estimated that costs to refurbish and operate the plant would more than double to above 10 cents per kilowatt-hour (kWh) after 2025, and that a portfolio of energy efficiency, renewable energy, and other zero-carbon measures would cost substantially less. NRDC has estimated the savings at more than \$1 billion, which exceeds the cost of the community and labor compensation that are also integral to the Joint Proposal.

New York

In August 2016, the New York Public Service Commission adopted the Clean Energy Standard (CES),¹⁰ which includes a zero-emission credit (ZEC)—the first carbon emissions credit created exclusively for nuclear power. This was done to avoid the premature closure of three upstate facilities: James A. FitzPatrick Nuclear Power Plant, Ginna Nuclear Power Plant, and Nine Mile Point Nuclear Generating Station.

These plants had already been relicensed; the current licenses expire in 2034, 2029 and 2029, respectively,¹¹ providing sufficient time to develop a cost-effective plan to replace them with energy efficiency and renewable energy.

However, the New York Public Service Commission determined that the plants were at risk of abruptly retiring because they were uneconomical under current market conditions. Agency staff reviewed financial data and tax filings for the plants, which made clear that they had been in financial distress over a number of years.¹² For the near- and medium-term, closures would have led to increased generation from polluting sources like oil and natural gas because it takes time to scale up and integrate sufficient renewable resources and energy efficiency into the electric grid.

New York is in the process of implementing its CES, which requires utilities and other electricity providers to deliver 50 percent of their electricity from renewable energy sources by 2030. The ZEC program, which requires electricity providers to purchase credits from

the upstate nuclear power plants until 2030, is structured as a component of the CES, but is entirely separate and distinct from the renewables program. The Public Service Commission will undertake a public biennial review of the ZEC program to make any necessary adjustments. Not a single megawatt hour of electricity generated from nuclear facilities will count toward the renewables target.

Illinois

In December 2016, the Illinois General Assembly passed the Future Energy Jobs Act.¹⁵ The legislation includes direct financial support for the Clinton Nuclear Generating Station and Quad Cities Nuclear Generating Station in the form of zero-emission credits, but that support is narrowly tailored. It was issued in the form of a 10-year contract, and was contingent on a showing by Exelon, the plants' owner, that the facilities were no longer economically viable. Exelon had previously filed notice with the Illinois Public Utility Commission of its intent to shutter the facility. Analysis also showed that absent this legislative package, increased generation from coal and natural gas facilities would have been required to meet the electricity demand served by the nuclear plants.

Illinois was a clean energy leader, having built the second-largest number of wind turbines in the nation in 2012, but it has not built another since then due to structural issues with its Renewable Portfolio Standard that prevented the procurement of renewables through long-term contracts.

Similarly, a recent evaluation of the state’s Energy Efficiency Portfolio Standard found Illinois was failing to achieve its original policy goals by a wide margin, in large part due to a cost cap that limited utilities’ spending, even if additional investments would have been cost-effective.

The 2016 legislation remedied these flaws in the state’s clean energy policies and will further scale up clean energy through provisions that direct 70 percent of the value of new incentives to investment in energy efficiency and renewable energy.¹⁶

Connecticut

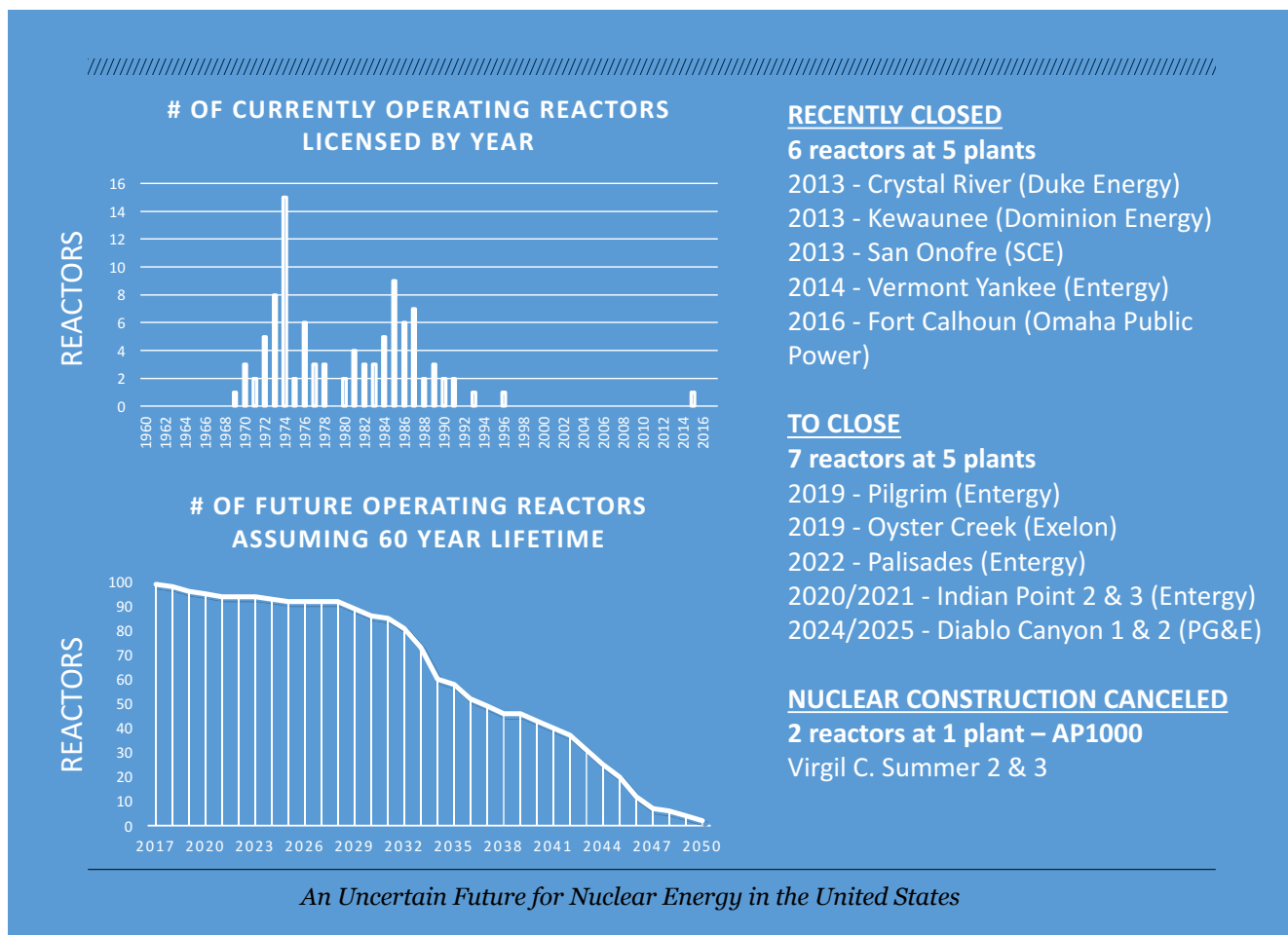
In October, 2017, Connecticut enacted SB1501, “An Act Concerning Zero Carbon Procurement,”¹⁷ directing agencies to consider above-market power agreements for Dominion Energy Inc.’s Millstone plant, the state’s sole nuclear facility. The law permits, but does not require, such agreements.

If it is deemed in the public interest after completion of a market study already underway, the Department of Energy and Environmental Protection (DEEP) and the Public Utilities Regulatory Authority could allow Millstone to compete in a solicitation for zero-carbon generating resources, which would likely command higher prices than the wholesale market. The solicitation is limited to up to 12 million megawatt-hours of energy annually, in the aggregate; any proposal selected would result in a purchase agreement with one of the state’s utilities.

Dominion contended that without the higher zero-carbon market prices it would prematurely retire the two reactors at the plant, but it has refused to provide the state with proprietary documents supporting its claim of a need for financial relief.

The DEEP commissioner and the Public Utilities Regulatory Authority completed an analysis of the economic viability of the plant shortly following passage of the bill, concluded that Millstone is expected to be highly profitable through 2035, the date one of its licenses expires, and rejected its request for financial support.¹⁸

Recent and Imminent Nuclear Plant Closures



NUCLEAR POWER BASICS

Nuclear power represents 19.7 percent of all U.S. electricity production.¹⁹ The nuclear plant fleet comprises 99 units at 61 facilities across 30 states.²⁰ Most of the units were designed and constructed in the 1960s and 1970s and almost all reach the end of 60-year operating licenses in the 2030s and 2040s. Many of these reactors are at risk of closing well before their license end dates because they are no longer economical and cannot compete in the marketplace, often because of the low price of natural gas and renewable energy and in some cases due to the need to replace expensive major components.

Nuclear power's beneficial low-carbon attributes are important to consider in a warming world but we must take seriously the significant safety, global security, environmental, and economic risks that this technology imposes on society. This reality demands stringent regulation of the complete nuclear fuel cycle, beginning with the mining and milling of uranium and ending with the final disposal of radioactive wastes. The 2011 Fukushima nuclear disaster in Japan, the worst since Chernobyl, illustrates some of these risks. Until these risks are properly mitigated, expanding nuclear power should not be a leading strategy for diversifying America's energy portfolio and reducing carbon pollution. More practical, economical, and environmentally sustainable approaches to reducing U.S. and global carbon emissions are available, including the widest possible implementation of energy efficiency throughout the economy, and the adoption of policies to accelerate the commercialization of clean, flexible, renewable energy technologies.

ENDNOTES

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