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A Dialogue on Issues from the ALEC Center for Innovation and Technology

A Policy Renaissance: Emerging Trends in State Nuclear Policy

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INTRODUCTION

A "nuclear renaissance" in state policy is underway.[1] In 2007, states considered a total of 27 bills pertaining in some way to nuclear energy. By 2011, this number leaped to 204. Since then, it has consistently held steady around 200 bills each year.[2] The Nuclear Regulatory Commission (NRC) holds general regulatory primacy over nuclear reactors, but it shares authority with the states when it comes to nuclear power plants.[3] State policy, therefore, has significant effects on nuclear energy resources in the United States.[4] To fully understand the state role in nuclear policymaking requires an exploration of underlying causes of this "policy renaissance" and an analysis of emerging state policy trends.

KEY POINTS

- The Energy Policy Act of 2005 and early closure of several nuclear power plants appear to be primary drivers of renewed state interest in nuclear policy over the last decade.
- Thirty states and counting now have laws or regulations promoting, assisting or directly subsidizing nuclear power.
- Recent state nuclear policy discussions focus on policy interventions to preserve existing nuclear power plants.

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Research reveals several developments have combined encouraging states to take a fresh look at nuclear energy policy. The primary systemic factors are the Energy Policy Act of 2005[5] and the recent spate of early nuclear power plant retirements, which appear to be driven by economic challenges arising in part from electricity restructuring and the natural gas boom.[6] State policy on nuclear power is divided but rapidly evolving under the influence of these systemic factors. This paper will explore these systemic factors, followed by an overview major nuclear policy trends in the states.

The State Policy Renaissance: Systemic Factors

SYSTEMIC FACTORS OVERVIEW

Two macro causes underpin the recent re-emergence of state policy interest in nuclear power. The first factor encouraging the proliferation of new state nuclear policy is the federal Energy Policy Act of 2005, which created incentives for new nuclear power plant construction. Several states, particularly southeastern states with regulated electricity markets, enacted favorable policies to allow their states to capitalize on the federal policies favorable to new nuclear construction.

"The Nuclear Regulatory Commission (NRC) holds general regulatory primacy over nuclear reactors, but it shares authority with the states when it comes to nuclear power plants."

The second factor is early nuclear power plant retirements. Nuclear power currently struggles to be economically viable in the era of cheap natural gas, leading operators to close plants before the end of their useful life because they are operating the plants at a loss.[7] Within this decade, operators have decommissioned or scheduled for shutdown 18 nuclear power plants.[8]

FACTOR ONE: ENERGY POLICY ACT OF 2005

The Energy Policy Act of 2005 incentivized new nuclear power plant construction.[9] These federal incentives immediately preceded most state action to offer state incentives for new plant construction. Specific incentives included Department of Energy loan guarantees, production tax credits, streamlining of regulations and authorization for a risk insurance pool to address delays in construction, including construction delays associated with extended NRC licensing.[10] The production tax credit applies to new plants that come online before December 31, 2020. The tax credit provides 1.8 cents per kilowatt-hour for the first 6,000 megawatts of generation through the first eight years of the plant's operation.[11] Unless Congress extends this tax credit, currently only one new plant may qualify for this incentive, the Southern Company Vogtle Reactors 3 & 4 Plant.[12] The tax credit extension passed the House of Representatives in June 2017 and the White House has announced President Trump will sign the legislation if it gets to his desk.[13]

FACTOR TWO: EARLY NUCLEAR POWER PLANT DECOMMISSIONING

Five U.S. nuclear power plants have retired within the last five years,[14] leaving the U.S. with 61 operating power plants and 99 operating nuclear energy reactors.[15] Analysts estimate between 19 and 29 additional reactors are at risk for premature decommissioning in the near future.[16] Long term electricity costs, reliability and environmental protection arguments are why states with high electricity demand like California, New York and Illinois find themselves grappling with whether or not, and how, to preserve their existing nuclear power plants. Jobs are another consideration, with the average nuclear power plant employing between 400 to 700 workers.[17] Some investment analysts predict the extinction of the industry within 30 years, absent policy intervention.[18]

This significant reduction of U.S. nuclear power plant fleet presents a challenge for energy security and supply stability, another matter of concern for state policymakers. The modern economy requires a stable, affordable electricity supply, and diversity of energy sources promotes energy security.[19] The U.S. has one of the highest demands for electricity in the world, second only to China in net electricity generation on an annual basis.[20] Nuclear power plants, although they represent only one percent of total power plants, provide 20 percent of U.S. annualized electricity generation[21] and roughly 60 percent of zero-emissions power generation.[22]

OTHER FACTORS AFFECTING ECONOMIC COMPETITIVENESS OF NUCLEAR POWER AND EARLY DECOMMISSIONING

Concerns about early plant decommissioning cannot be separated from the nuclear industry's pressing economic viability challenges. Recent trends in state nuclear policy must therefore be considered in light of economic pressures created by electricity restructuring,[23] the natural gas boom and renewables source preferences.

ELECTRICITY RESTRUCTURING

Historically centralized power organizations helped provide electricity to consumers at the lowest price.[24] One entity—a state or regionally regulated monopoly—would own generation, transmission and distribution services for provision of electricity to customers in an assigned territory. The entity was a private investor owned utility, member owned cooperative, nonprofit or even the public, as with the Tennessee Valley Authority. In what are called regulated markets today, this largely remains the case.[25] In these regulated markets, states set retail rates that provide vertically integrated utilities with a return on their investment in electricity generation and transmission infrastructure.[26]

By the late 1990s, some jurisdictions broke away from this traditional, vertically integrated, regulated monopoly model and began allowing electricity to be sold in competitive markets. This phenomenon became known as "electricity restructuring."[27] In restructured markets,[28] generation and transmission are separated from distribution.[29] Generators produce power, transmission companies transmit power and distribution companies are consumer facing, selling electricity to residential and commercial customers. Because distribution is separated from generation and transmission, wholesale market prices for electricity drive retail rates rather than regulated rates of return in restructured states.

"The modern economy requires a stable, affordable electricity supply, and diversity of energy sources promotes energy security."

In a regulated state, a utility building a nuclear power plant can operate the plant knowing its capital costs will be included in its rates.[30] In a deregulated state, electricity prices fluctuate with the market and power plant operators are not guaranteed to recover capital costs in the retail rates.[31] Unsurprisingly, the vast majority of at-risk nuclear power plants are located restructured markets and all new nuclear power plant construction is taking place in regulated markets.[32]

"Nuclear competitiveness struggles in part due to the nature of favorable federal tax credit policies for wind and solar."

HYDRAULIC FRACTURING AND THE NATURAL GAS BOOM

Cost-effective hydraulic fracturing and inexpensive natural gas is creating economic pressures on other energy sources of baseload electricity like nuclear and coal. These traditional sources struggle to compete with lower cost natural gas fired electricity. In addition being abundant and cheap, natural gas also has a unique, mutually beneficial relationship with renewables that coal and nuclear do not.[33] Managing supply and demand in the electricity sector requires precision; the present grid needs supply to meet demand in order to properly function, i.e. power plants need to generate power the moment the power is needed in order to avoid blackouts, brownouts and other adverse situations.[34] Renewables come online intermittently, and natural gas generation has the most flexibility to be quickly scaled to accommodate surges of renewable power to the grid.[35] Most U.S. coal and nuclear plants were not designed to have this "ramping" in mind. Therefore, coal and nuclear power plants face additional pressures in jurisdictions with mandates requiring the use of renewable electricity.

Renewable generation is intermittent and occurs, for example, when the sun is shining or the wind is blowing. The intermittency of renewables means integration of renewables requires the grid to adapt baseload supply around renewable generation.[36] A natural gas plant is less expensive than a coal-fired plant to turn on and off or quickly ramp up to accommodate an influx or wind or solar power.[37] Nuclear plants have a particular disadvantage in managing intermittency because they cannot turn on and off, or even quickly adjust output like natural gas plants. As a further practical matter, where new baseload power is required, it is easier and faster to build a natural gas fired power plant than a nuclear power plant. A utility can permit and construct a new natural gas plant in less time than an existing nuclear plant, on average,[38] can complete a required operating license extension process with the NRC.[39]

RENEWABLE SUBSIDIES AND MANDATES

Renewable energy portfolio standards and tax credits for renewables that exclude other zero emissions power distort the electricity market in such a way that it is difficult or impossible for nuclear to compete with wind and solar as a source of zero emissions power.[40] Twenty-nine states currently have renewable or clean energy portfolio standards or goals.[41]

Nuclear competitiveness struggles in part due to the nature of favorable federal tax credit policies for wind and solar.[42] These renewables subsidies are a primary reason why the nuclear industry now seeks its own additional incentives to create a more level playing field. As Brookings Institution energy security expert David Victor observes, "Because new renewables get subsidies, advocates for other energy sources—such as hydropower, biomass and now nuclear—are also seeking and obtaining subsidies. It is extremely difficult to design and maintain effective power markets that operate with layers of distorting and counter-distorting subsidies."[43] Due to the oversupply challenges presented by the glut

of new renewable power that challenges baseload power, even Germany, with its aggressive clean energy transition plan Energiewende (Energy Transition), is eliminating some of its renewables subsidies.[44]

In markets where these incentives dramatically favor wind and solar, negative electricity pricing scenarios arise when these intermittent sources are at peak production.[45] Negative electricity prices happen when producers pay buyers to take their electricity. This occurs in grid congestion scenarios where it makes more economic sense for the producer to pay others to take their electricity than to actually shut down production. Due to federal tax credits, renewable electricity generators can often still make a profit when paying buyers to take their power. While negative electricity pricing is not a common occurrence, the inability of nuclear power plants to shut down generation to accommodate increased supply of intermittent sources causes nuclear power plants to be more vulnerable in these cases. This further exacerbates nuclear power's ability to economically compete in a distorted market.[46]

AGE OF THE EXISTING NUCLEAR FLEET

The age of plants in the existing nuclear fleet is also a factor in nuclear cost competitiveness. Most nuclear power plants are 40 to 60 years old. Relicensing at the 40 and 60 year marks necessitates new capital investments in NRC required plant upgrades, further boosting the cost of nuclear power and reducing its competitiveness in the era of cheap natural gas prices.[47] New safety regulations following the Fukushima Daiichi meltdown increased regulatory compliance costs enough to contribute to the premature decommissioning of several nuclear energy reactors.[48]

State Policy Trends

State policy on nuclear power is divided, but rapidly evolving under the influence of the foregoing systemic factors. The trend of the last decade is for states to enact policies that assist the nuclear power industry. Thirty states and counting now have laws or regulations promoting, assisting or directly subsidizing nuclear power.[49] States can legally enact policies beyond plant construction and permitting that affects the nuclear energy industry. Examples of such state policies include renewable portfolio standards, energy industry tax incentives, electricity restructuring[50] and state responsibility to implement federal environmental rules directly affecting nuclear power plants, such as the Obama Administration's Clean Power Plan (CPP).[51] States have the discretion to ban or restrict nuclear power plants within their borders.[52] States also have the ability to enact policies providing incentives for nuclear energy, such as credits for zero-emissions electricity production and favorable financing tools for the construction of new plants.[53] Fourteen states, however, still maintain older laws banning or imposing a moratorium on new nuclear power plants within their jurisdictions.

> *"It is extremely difficult to design and maintain effective power markets that operate with layers of distorting and counter-distorting subsidies."*

State Policy Trends for Existing Nuclear Energy

ZERO EMISSIONS CREDITS

New York[54] and Illinois[55] have enacted Zero Emissions Credit (ZEC) policies to subsidize nuclear power plants in their states. Ohio[56] considered similar legislation early in its 2017 session, but the bill has yet to move despite several hearings and First Energy's promise to close the plants if near term action is not taken.[57] Pennsylvania legislators formed a Nuclear Energy Caucus to grapple

with the issue in early 2017, although no legislation has been introduced. Exelon has announced it will close the Three Mile Island plant near Harrisburg in the absence of a Pennsylvania nuclear subsidy.[58]

The explicit intent of these policies is to keep economically struggling nuclear power plants operational.[59] The ZEC programs typically function by providing production "certificates" or "credits" to nuclear power plants based on the number of zero emissions kilowatt hours the plants produce.[60] Distribution companies are then required to purchase these zero emissions credits, or certificates, from the nuclear power plant generation companies.[61]

"The explicit intent of these policies is to keep economically struggling nuclear power plants operational."

The additional costs of these payments from distribution utilities to nuclear power generators are then borne by ratepayers, who see the expense reflected in electricity rates. To limit the consumer cost of the ZEC programs, states usually design ZEC programs to adjust the base price of the credits depending on the gap between the retail cost of electricity and the additional cost needed to make the nuclear power plant economically viable.[62]

ZEC programs are controversial because they are essentially a subsidy for nuclear power generation paid for by distribution utilities and consumers.[63] Adding more subsidies to an already distorted energy marketplace is a concern to free market advocates. Ideally, the government should not force energy consumers and taxpayers to subsidize the energy industry, whether traditional fossil or renewable sources.[64] Supporters of these ZEC programs, however, argue ZECs are not subsidies, but rather a market correction, "internalizing to the market the external value of nuclear's zero carbon emission generation."[65]

Proponents of ZEC programs point to long term stability of electric rates, preservation of guaranteed available baseload power access, environmental benefits,[66] subsidies for competing energy sources and preservation of nuclear industry jobs as reasons why ZECs are necessary to keep existing nuclear power plants in operation.[67] Some proponents of ZECs also argue fairness requires investors be made whole for capital investments in "legacy" nuclear power plants that were built prior to restructuring and therefore under agreements that guaranteed investors capital cost recovery. Opponents argue this "legacy plant" fairness issue was sufficiently addressed during restructuring.

ZEC policies also invite federalism challenges. Opponents argue they exceed state authority because ZECs disrupt regional wholesale power markets over which the Federal Energy Regulatory Commission (FERC) has exclusive jurisdiction.[68] This issue is currently being litigated.

CLASSIFICATION OF NUCLEAR AS CLEAN OR RENEWABLE[69]

Indiana[70] currently classifies nuclear power as renewable or clean energy for the purposes of its renewable portfolio standard. Arizona,[71] New Jersey[72] and Washington[73] have recently considered adding nuclear to their portfolio standards clean energy definitions. Ohio's[74] Advanced Portfolio Standard allows forms of advanced nuclear to count toward its renewable portfolio standard. Critics of classifying traditional zero emissions like nuclear and hydropower in clean energy standards argue renewable standards are meant to encourage emerging

technology as much as reduce emissions. Other critics of energy source preference mandates, including ALEC model policy, cite concerns about the expense of these mandates and the market distortions they create.[75]

CARBON PRICING[76]

Policies that price carbon, including carbon taxes and cap-and-trade programs, may assist economically struggling nuclear power plants by increasing the price of electricity generated by nuclear fossil fuel competitors. But carbon taxes and other forms of carbon pricing[77] could only assist nuclear power if they substantially price carbon emissions. The Regional Greenhouse Gas Initiative (RGGI)[78] cap-and-trade program, for example, does not currently price carbon sufficiently to allow at-risk nuclear plants located in ISO New England's region to be cost competitive.[79]

Massachusetts,[80] New York[81], Oregon[82], Rhode Island,[83] Vermont[84] and Washington[85] have considered legislation or ballot measures to enact a carbon tax. Again, whether or not a carbon price makes nuclear competitive depends on the actual enacted carbon price point. Any new carbon pricing programs, if they reflect existing enacted carbon price points, will be inadequate to help at-risk nuclear power become economically competitive unless nuclear support is expressly considered in the policy design. Finally, given most states will meet their 2030 Clean Power Plan emissions reductions targets with no additional action, it also seems unlikely Clean Power Plan motivated carbon pricing will be sufficient to assist nuclear power even in the now unlikely event the regulation survives.[86]

CORPORATE POWER PURCHASE AGREEMENTS

Corporate power purchase agreements (PPAs), or long term contracts between specific generators and a specific corporate ratepayer, may help nuclear power plants by providing the nuclear power plants with access to third-party buyers for their generation capacity. Corporations sometimes desire these agreements to meet corporate clean energy goals or stabilize electricity costs. A state utility regulator must typically authorize or permit such agreements.[87] The availability of corporate PPAs is not always sufficient to make nuclear power plants profitable, as corporate buyers may not be willing to pay premium electricity rates for nuclear power. The decision to close Michigan's Palisades plant, located in a hybrid market, came after the operator could not negotiate a cost-effective corporate PPA renewal with a large corporate ratepayer.[88] Further, as the prices of wind and solar continue their rapid decline, "green" PPAs are losing their general attractiveness to sustainability motivated corporate buyers.[89]

Connecticut considered, but did not enact, policies to allow for nuclear-power specific PPAs in an effort to save the state's Millstone Nuclear Power Station.[90] The policy would allow Connecticut's sole nuclear plant to enter long term contracts to sell up to 50 percent of its power. Connecticut reconsidered this legislation in 2017 as Senate Bill 778.[91] The bill passed the Senate, but failed to pass the House.[92]

PUBLIC ACQUISITION OPTION

New York[93] considered, but did not enact, legislation to give the state the option of becoming a "caretaker" of nuclear power plants at-risk for early decommissioning. This type of policy would authorize the state to purchase nuclear power plants operating at a loss in order to avoid loss of baseload generation capacity due to early retirement of the nuclear plant. In such a case, the nuclear power plant would be owned by the public.

"Critics of classifying traditional zero emissions like nuclear and hydropower in clean energy standards argue renewable standards are meant to encourage emerging technology as much as reduce emissions."

"Using the CWIP option can result in lower nuclear power prices over time, primarily because it lowers investment risk, which in turn results in better financing terms and reduced plant capital costs."

State Policy Trends for New Nuclear Energy

ADVANCED COST RECOVERY OR CONSTRUCTION WORK IN PROGRESS

Following the generous federal incentives for new nuclear power plants that became law in 2005, regulated states began enacting advanced cost recovery policies that encourage new nuclear power plant construction. These laws are also referred to as "Construction Work in Progress (CWIP)" provisions. CWIP laws permit utilities to begin to charging ratepayers for development and construction costs in electricity rates during the construction phase of a nuclear power plant. Using the CWIP option can result in lower nuclear power prices over time, primarily because it lowers investment risk, which in turn results in better financing terms and reduced plant capital costs.[94]

CWIP contrasts with the historic "used and useful" principle, which, with some exceptions, requires a power plant to be operational before a utility can begin to recover costs associated with the plant.[95] Georgia,[96] Louisiana,[97] Kansas,[98] Florida[99] and South Carolina[100] now have nuclear specific advanced cost recovery policies. North Carolina[101] and Mississippi[102] have advanced cost recovery policies that include nuclear. CWIP is criticized because it can become quite costly for ratepayers, for example, CWIP charges for a nuclear power plant under construction currently comprise 18.64 percent of the average residential customer bill for customers of South Carolina Electric & Gas.[103]

Virginia[104] allows advanced cost recovery for research and construction phases of nuclear power plants. Florida also permits utilities to recover costs associated with the siting, design, licensing and construction of both new nuclear power plants and expansion of existing nuclear power plants.[105]

TAX INCENTIVES

Utah offers tax credit incentives for certain renewable energy projects, and includes nuclear power in its definition of renewable energy for these purposes.[106] Texas updated its property tax laws to allow local governments to offer property tax abatements to new nuclear power plants.[107] Kansas also passed a bill to create a property tax exemption for new nuclear power plants.[108]

CONSTRUCTION BAN OR MORATORIUM REPEAL

Alaska repealed its nuclear power plant construction moratorium in 2010.[109] Wisconsin repealed its moratorium on new nuclear power plant construction in 2016.[110] A diverse coalition of industry and environmental advocates sought repeal of the moratoriums in both states. In Wisconsin, the legislation also recognizes nuclear power as environmentally friendly by amending other programs to reflect the unique zero-emissions, baseload generation qualities of nuclear power.[111] Kentucky[112] repealed its moratorium in 2017.[113]

CONSTRUCTION BANS AND MORATORIA

States enacted limits on the construction of new nuclear power plants in the 1970s and 1980s following accidents at Chernobyl and Three Mile Island. State laws limiting new nuclear power construction include outright bans and moratoriums dependent on waste storage requirements.

BANS ON NEW CONSTRUCTION

Minnesota and New York have bans on construction of new nuclear power plants. In Minnesota, all new nuclear plant construction is banned.[114] In New York, the new construction and operation ban applies only to the Long Island Power authority's geographic region.[115]

NEW CONSTRUCTION MORATORIUM – WASTE STORAGE REQUIREMENTS[116]

In what might be called "Yucca Mountain" laws, California,[117] Connecticut,[118] Illinois,[119] Maine,[120] Oregon[121] and West Virginia[122] have construction moratoriums dependent on availability of adequate nuclear power plant waste storage facilities.[123] These moratoriums will no longer be a limitation on new construction if Yucca Mountain or another federal high level waste storage facility is opened.

New Jersey has an executive order that requires a finding of the Commissioner of Environmental Protection that safe waste storage or reprocessing is available before a new nuclear power plant can be built in the states.[124]

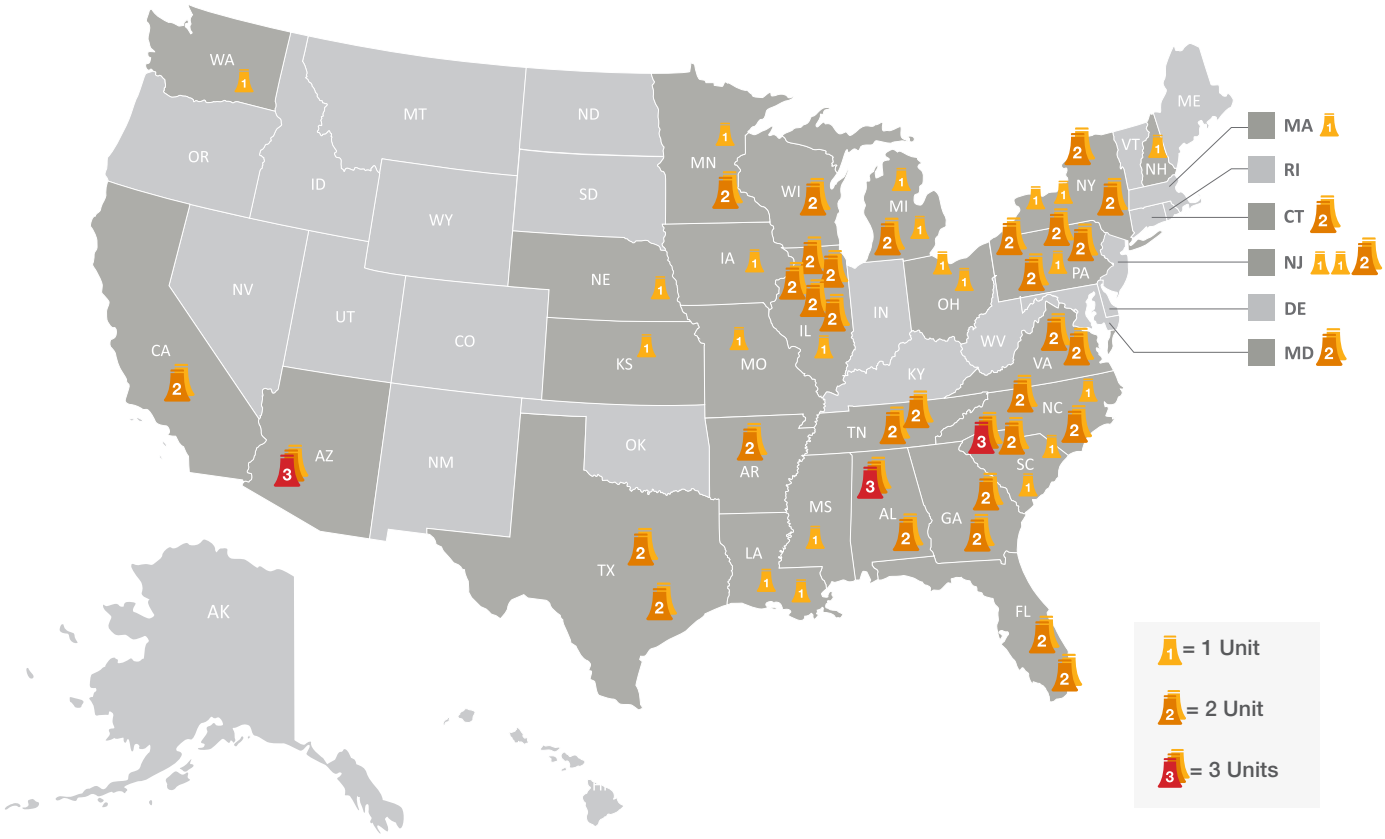
LEGISLATIVE APPROVAL

Hawaii,[125] Illinois,[126] Massachusetts,[127] Rhode Island[128] and Vermont[129] require a vote of the state legislature to authorize the construction of a new nuclear power plant.

VOTER APPROVAL

Maine,[130] Massachusetts,[131] Montana[132] and Oregon[133] require a vote of the people, through public referendum, to authorize the construction of a new nuclear power plant.

U.S. OPERATING COMMERCIAL NUCLEAR POWER REACTORS



As of May 2017

Source: United States Nuclear Regulatory Commision U.S. NRC

Other State Actions and Policy Considerations

RESOLUTIONS

New Mexico, the birthplace of the atomic era, has passed resolutions encouraging the federal government to make additional investments in nuclear waste storage in the state and to encourage the state to examine possible benefits of a small modular reactor in the state.[134] A February 2014 fire at the Department of Energy's Waste Isolation Pilot Project (WIPP) military nuclear waste storage facility near Carlsbad, NM created concerns about WIPP's long term future. This, in turn, partly prompted the state's legislative response of support for nuclear.[135] The government subsequently re-opened WIPP and the facility began accepting military nuclear waste again in January 2017.[136]

"Public opinion regarding the safety of nuclear power plants is an important consideration when policymakers look at nuclear energy policy issues"

Tennessee passed a resolution urging the Nuclear Regulatory Commission to promptly license a new nuclear power plant project in the state.[137]

The Illinois House of Representatives adopted a resolution recognizing the importance of the state's nuclear power plants and urging the federal government to take actions to protect nuclear plants, such as considering environmental and reliability factors in electricity market rules.[138]

Indiana also passed a resolution praising nuclear energy and encouraging the study of the environmental and economic benefits of nuclear energy.[139]

CLEAN POWER PLAN

The Obama Administration's Clean Power Plan[140] rule to reduce US carbon emissions is currently stayed, or on hold, pending the outcome of litigation concerning its ultimate legality.[141] President Trump has also issued an executive order instructing the United States Environmental Protection Agency to unwind the rule – an action that will also likely be subject to extended litigation.[142] As a result, states have yet to implement Clean Power Plan (CPP) compliance provisions.[143] The Clean Power Plan, were it to stay in force, recognizes nuclear as an important source of emissions free power.[144] The final rule allows states to count both new nuclear and expansion of existing plants towards compliance with the rule's carbon emissions reductions requirements.[145] Prior to the Supreme Court's stay of the rule, operators of nuclear power plants at risk for early decommissioning argued state action to protect their plants was necessary, in part, to help states meet their greenhouse gas emissions targets under the CPP.[146]

PUBLIC OPINION

Public opinion regarding the safety of nuclear power plants is an important consideration when policymakers look at nuclear energy policy issues. Data from Pew and Gallup show the public continues to have safety concerns about nuclear power, which include the risks posed by both reactor meltdowns and the storage of radioactive waste generated by nuclear power plants.[147] Just as Chernobyl began to fade from public memory, the Fukushima reactor meltdown in 2011 renewed

these fears across the globe about the safety of nuclear power.[148] Germany, for example, chose to decommission all of its nuclear power plants in the wake of Fukushima even though the nation has significant carbon emissions reduction goals.[149]

Public concerns about the safety of storing radioactive nuclear waste from power plants make the storage issue contentious enough the United States still does not have a policy for permanent storage of nuclear power plant waste, despite first passing legislation to create a waste storage plan in 1982.[150] Until the waste storage matter is resolved, new nuclear power plant construction will be deterred if not by economics, by the sheer number of states with construction moratoriums dependent on a federal waste storage resolution.

Public opinion is not, however, wholly unfavorable for nuclear power. Industry commissioned polling shows the public supports nuclear power, particularly when environmental considerations are raised.[151] Conservative Republicans, notably, are the demographic most supportive of nuclear power.[152] And although millennials are less likely than older cohorts to support nuclear power, millennials motivated by a desire to innovate in energy are studying nuclear engineering and making discoveries resulting in advanced reactor technology start-ups.[153] In a turnabout from the 1960s and 1970s, today's environmental activists are also working to save existing nuclear power plants due to carbon emissions reduction motives.[154]

CONCLUSION

This survey of the state policy landscape suggests moving forward, state nuclear policy discussions will focus on policy interventions to preserve existing nuclear power plants instead of policies that promote new construction. Given the relevance of energy subsidies, mandates and federally regulated wholesale power markets to nuclear power, these policy conversations will hopefully encourage states and the federal government to take a fresh look at unraveling the "Gordian knot" of existing market distorting policies. As economist Devin Hartman notes, "Removing government engineering of the fuel mix is essential, and could largely benefit nuclear as a byproduct (e.g., reducing mandates and phasing out deployment subsidies for competing technologies)."[155] In the absence of such a free market approach that removes all energy subsidies and mandates, state policymakers will continue to find themselves pressed by energy industries seeking to level the playing field through the enactment of ever more additional source preference policies. These important issues warrant continued research, as the policy dialogue shows no signs of slowing.

"State nuclear policy discussions will focus on policy interventions to preserve existing nuclear power plants instead of policies that promote new construction."

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