Nos. 17-2433 and 17-2445

IN THE UNITED STATES COURT OF APPEALS
FOR THE SEVENTH CIRCUIT

VILLAGE OF OLD MILL CREEK, et al.,
Plaintiffs-Appellants,

v.

ANTHONY STAR, in his official capacity as
Director of the Illinois Power Agency, et al.,
Defendant-Appellee,

and

EXELON GENERATION COMPANY, LLC,
Intervening Defendant-Appellee.

ELECTRIC POWER SUPPLY ASSOCIATION, et al.,
Plaintiffs-Appellants,

v.

ANTHONY STAR, in his official capacity as
Director of the Illinois Power Agency, et al.,
Defendants-Appellees,

and

EXELON GENERATION COMPANY, LLC,
Intervening Defendant-Appellee.

On Appeals from the United States District Court for the Northern District of Illinois, Nos. 1:17-cv-01163 & 1:17-cv-01164, Hon. Manish S. Shah, District Judge

BRIEF OF THE NUCLEAR ENERGY INSTITUTE AS *AMICUS CURIAE* IN SUPPORT OF DEFENDANTS-APPELLEES

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November 3, 2017

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APPEARANCE & CIRCUIT RULE 26.1 DISCLOSURE STATEMENT

Appellate Court No: 17-2433 and 17-2445

Short Caption: Village of Old Mill Creek, et al v. Star, et al.; Electric Power Supply Associat, et al. v. Star

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Attorney's Signature: s/ Jonathan Rund Date: November 3, 2017

Attorney's Printed Name: Jonathan Rund

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INTRODUCTION AND STATEMENT OF INTEREST OF *AMICUS CURIAE*

The Nuclear Energy Institute, Inc. (NEI) submits this brief in support of Defendants-Appellees, Anthony Star, in his official capacity as Director of the Illinois Power Agency, and Exelon Generation Company, LLC.[1] NEI is the Washington, D.C.-based policy organization of the nuclear technologies industry. NEI's mission is to foster the beneficial uses of nuclear technology and to communicate accurate information about the importance of nuclear energy and technology. NEI is responsible for developing industry positions and advocating on legal, regulatory, and policy matters affecting the nuclear energy industry. NEI has more than 300 members, including all the companies licensed to operate commercial nuclear power plants in the United States, as well as nuclear plant designers, major architectural and engineering firms, entities that process nuclear fuel, and other organizations involved in the nuclear industry.

NEI is uniquely positioned to provide insight into the industry-wide and global impacts of the Illinois zero emissions credit (ZEC) legislation, as well as the role nuclear power plays in preventing air pollution. NEI has been directly involved in efforts to compensate nuclear power for its environmental benefits across the country, including with Illinois and other states considering similar legislation. NEI, as the representative of the nuclear industry, is also uniquely positioned to respond to assertions made by other industry groups that have submitted amicus briefs in this proceeding.[2]

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[1] All parties have consented to the filing of this brief. No party's counsel authored this brief in whole or in part; no party or party's counsel contributed money intended to fund the brief's preparation or submission; and no person other than NEI, their members, and counsel contributed money intended to fund the brief's preparation or submission.

[2] Unless otherwise noted, all docket references are to the lead case, No. 17-2433 (7th Cir.), and No. 1:17-cv-01163 (N.D. Ill.).

SUMMARY OF ARGUMENT

Nuclear generation provides approximately 60 percent of the nation's emission-free electricity. In Illinois, for example, nuclear power provides more than half of the state's electricity and 90 percent of the state's carbon-free electricity. Illinois and other states are increasingly recognizing the critical role nuclear power plays in greenhouse gas reductions, and are updating their climate policies to incorporate nuclear power. ZEC programs represent one means by which states can support nuclear power's beneficial climate attributes. These programs are extensions of widely-accepted state renewable energy credit (REC) programs. As with RECs, states have implemented ZEC and other environmental programs, such as tax incentives, by exercising the authority reserved to them under the Federal Power Act, as amended (16 U.S.C. § 791(a) *et seq.*).

The "cooperative federalism" framework that defines the entire process of generating and ultimately delivering electricity allows states to support environmentally-preferred generation. Under this framework, the federal government regulates wholesale markets to optimize prices, within the constraints of complementary state environmental policies and programs. States in turn may institute programs, like the Illinois ZEC program, to satisfy their environmental policy goals even if those programs affect market prices and participation.

This Court should affirm the District Court's determination that Illinois's ZEC program does not infringe on the Federal Energy Regulatory Commission's (FERC) jurisdiction over wholesale markets. To find otherwise not only infringes on states' rights, it risks the premature, permanent retirement of thousands of megawatts of irreplaceable zero-emissions capacity, significantly increasing greenhouse gas and other emissions. Nothing in the Federal Power Act requires a state to suffer such a major setback to its climate policy goals.

ARGUMENT

I. INITIATIVES SUCH AS ILLINOIS'S ZEC PROGRAM REPRESENT THE FUTURE OF STATE CLIMATE POLICIES.

States are increasingly turning to nuclear power to support their environmental policies, recognizing that nuclear power is by far the largest source of zero-emissions power generation in the country. Unlike traditional fossil-fueled power sources, which provide roughly 65 percent of the nation's power generation,[3] nuclear power does not produce carbon emissions, or other harmful air pollutants (such as sulfur oxides, nitrogen oxides, and mercury) that pose a risk to the environment and public health. Many have also acknowledged that it is unrealistic to expect renewable generation to replace the thousands of megawatt-hours of baseload power that nuclear energy provides. This is particularly true in states such as Illinois, where nuclear power accounts for the vast majority of its clean energy. Nuclear power thus must be preserved if realistic action addressing climate change is to succeed.

States are exploring multiple means to support nuclear generation and its positive environmental attributes. One route is through ZEC programs, which essentially apply state REC program concepts to nuclear generation. ZECs, like RECs, are commodities sold separately and independently from energy and capacity. To quantify the environmental harms avoided through the use of zero-emissions generation, ZECs rely on the Social Cost of Carbon, an economic tool used to quantify the societal costs of carbon emissions (and conversely the benefits of reducing emissions).

[3] *Electricity Explained: Electricity in the United States; Generation, Capacity, and Sales*, U.S. Energy Info. Admin., https://www.eia.gov/energyexplained/index.cfm?page=electricity_in_the_united_states#tab2 (last updated May 10, 2017).

A. Nuclear Power is the Largest Source of Zero-Emissions Generation in Illinois and the United States.

Nuclear power generates 60 percent of the nation's zero-carbon electricity, making it by far the largest source of clean energy in the country.[4] A typical 1,000 megawatt nuclear reactor prevents the emissions of 4.1 to 6.7 million tons of carbon per year.[5] Nationwide, the use of nuclear energy in 2016 *alone* prevented the emission of 553 million metric tons of carbon, which equals the amount released in a year by 117 million passenger cars.[6] The same year, the nation's nuclear power plants generated well over twice the amount of zero-carbon electricity than that produced by solar, wind, biomass, and geothermal power sources combined.[7]

Nuclear power is unique among generation sources. It is a "baseload" generator, which essentially means it operates reliably around-the-clock, providing a minimum amount of electricity at all times. The U.S. Department of Energy (DOE) has stated that "today's electricity

[4] *Environment: Emissions Prevented*, NEI, https://www.nei.org/Knowledge-Center/Nuclear-Statistics/Environment-Emissions-Prevented (last visited Nov. 1, 2017).

[5] Metin Celebi et al., The Brattle Group, *Nuclear Retirement Effects on CO_2 Emissions: Preserving a Critical Clean Resource* 1 (Dec. 2016), http://brattle.com/system/news/pdfs/000/001/158/original/Brattle_Nuclear-Carbon_Whitepaper_-_Dec2016.pdf.

[6] *Fact Sheet, Illinois and Nuclear Energy*, NEI, https://www.nei.org/CorporateSite/media/filefolder/Backgrounders/Fact-Sheets/State%20Fact%20Sheets/Illinois-State-Fact-Sheet.pdf?ext=.pdf (last visited Nov. 1, 2017).

[7] *Frequently Asked Questions: What is U.S. Electricity Generation by Energy Source?*, U.S. Energy Info. Admin., https://www.eia.gov/tools/faqs/faq.php?id=427&t=3 (last updated Apr. 18, 2017) (Nuclear power produced 19.7% of all electric energy in 2016, while solar, wind, biomass, and geothermal power combined produced 8.4%.).

system is highly dependent on baseload generation."[8] Critically, nuclear power is the *only* source of zero-emissions baseload generation.[9]

In comparison, renewable generation sources such as wind and solar cannot serve as baseload generators, because they cannot operate when the wind does not blow or the sun does not shine. In 2016, while nuclear power plants operated with a capacity factor of 92.5% (*i.e.*, they produced 92.5% of their potential maximum power over the year), solar plants operated with capacity factors around 25%, and wind power plants at less than 35%.[10] This means that, on average, three to four megawatts' worth of wind and solar capacity has to be constructed to generate the same amount of net electricity as one megawatt of nuclear power capacity. And in periods of low solar and wind potential, a carbon-emitting generation source such as coal has to be on standby to make up the difference. Add to all this that nuclear power also has arguably the lowest overall life-cycle carbon emissions of *any* generation source.[11] At a

[8] U.S. Dept. of Energy, *Quadrennial Energy Review – Transforming the Nation's Electricity System* 1-20 (Jan. 2017), https://energy.gov/sites/prod/files/2017/02/f34/Quadrennial%20Energy%20Review--Second%20Installment%20%28Full%20Report%29.pdf.

[9] According to DOE, baseload generation sources consist of "coal, nuclear, and natural gas combined-cycle plants." *Id.* at 1-21.

[10] U.S. Energy Info. Admin, *Electric Power Monthly, with Data or August 2017*, at tbl. 6.7.B (Oct. 2017), https://www.eia.gov/electricity/monthly/current_month/epm.pdf. Nuclear power plants also operated at a much higher capacity factor than even coal and natural gas combined cycle plants, which in 2016 operated with capacity factors just above 50 percent. *Id.* at tbl. 6.7.A.

[11] *See* Int'l Atomic Energy Agency, *Nuclear Power and Sustainable Development*, at 50-51 (2016), http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1754web-26894285.pdf. Life-cycle assessments consider impacts related to operation, and the generation source's "construction and decommissioning as well as the fuel cycle"—*i.e.*, from "cradle to grave." *See id.* at 5, 38.

time when the world's attention is focused on mitigating the serious effects of climate change,[12] the baseload emissions-free power produced by nuclear energy is the reason why leading climate change scientists have repeatedly stated, including in open letters to the Illinois government, that states should "do everything in [their] power" to keep nuclear power plants open.[13]

In addition to nuclear power's carbon-free attributes, no other form of generation—even renewable generation—so fully accounts for its broader environmental impacts. Nuclear power avoids not only carbon emissions, but emissions of sulfur oxides, nitrogen oxides, mercury, and other dangerous pollutants associated with fossil fuel generation.[14] Nuclear power is also the only power generation source that financially accounts for its environmental impacts up front, unlike all other generation sources. It also operates under one of the most stringent regulatory regimes in the world, which regulates every part of the nuclear life cycle, from construction and

[12] The Paris Agreement on Climate Change, which 168 countries signed and the United States is a member of until at least 2020, states on its first page that the parties recognize "the need for an effective and progressive response to the urgent threat of climate change." Paris Agreement pmbl., *adopted* Dec. 12, 2015, https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf; *see also Paris Agreement – Status of Ratification*, U.N. Framework Convention on Climate Change, http://unfccc.int/paris_agreement/items/9444.php (last visited Nov. 1, 2017); Brad Plumer, *The U.S. Won't Actually Leave the Paris Climate Deal Anytime Soon*, N.Y. Times (June 7, 2017), https://www.nytimes.com/2017/06/07/climate/trump-paris-climate-timeline.html.

[13] *Illinois First Letter*, Envtl. Progress (Apr. 4, 2016), http://environmentalprogress.org/illinois-first-letter; *Illinois Second Letter*, Envtl. Progress (May 10, 2016), http://environmentalprogress.org/illinois-second-letter.

[14] *See* Philip J. Landrigan et al., *The* Lancet *Commission on Pollution and Health*, The Lancet, at 1, 12 (Oct. 19, 2017), http://www.thelancet.com/commissions/pollution-and-health (estimating millions of deaths are caused by air pollution a year). Moreover, "nuclear power avoids air emissions of over one million tons of sulfur dioxide and 650,000 tons of nitrogen oxides each year, as well as significant particulate emissions." The Brattle Group, *supra* note 5, at 2-3.

operation[15] to decommissioning[16] and final disposition of spent fuel.[17]

B. It is Sound Public Policy to Extend Existing State Support for Renewable Energy to Nuclear Energy.

It is not surprising then that Illinois has turned to nuclear power to meet its increasingly stringent climate goals. Nuclear power supplies roughly 92 percent of the state's zero-emissions electricity.[18] Going forward, the state's eleven reactors are expected to offset up to an astounding 86 million metric tons of carbon dioxde per year,[19] equal to the carbon output of over 21 coal-fired power plants.[20] The preservation of nuclear units also presents among the cheapest ways for the state to meet its carbon reduction goals.[21] To put things in perspective, the 86

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[15] *Fact Sheet on Nuclear Power Plant Licensing Process*, U.S. Nuclear Regulatory Comm'n, https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/licensing-process-fs.html (last updated Aug. 5, 2015).

[16] *Backgrounder on Decommissioning Nuclear Power Plants*, U.S. Nuclear Regulatory Comm'n, https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/decommissioning.html (last updated May 14, 2015).

[17] *Backgrounder on Storage of Spent Nuclear Fuel*, U.S. Nuclear Regulatory Comm'n, https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/storage-spent-fuel.html (last updated Nov. 3, 2016); *Backgrounder on Licensing Yucca Mountain*, U.S. Nuclear Regulatory Comm'n, https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/yucca-license-review.html (last updated Sept. 3, 2015).

[18] Illinois Commerce Comm'n et al., *Potential Nuclear Power Plant Closings in Illinois: Impacts and Market-Based Solutions* 117 (2015), http://www.ilga.gov/reports/special/Report_Potential%20Nuclear%20Power%20Plant%20Closings%20in%20IL.pdf.

[19] *Id.* at 117-120.

[20] *See Greenhouse Gas Equivalencies Calculator – Calculations and References*, U.S. Envtl. Prot. Agency, https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references#coalplant (last visited Nov. 1, 2017) (using the emissions data from an average U.S. coal plant).

[21] The Brattle Group, *supra* note 5, at 15-16 & n.10 (estimating that retaining nuclear plants in merchant markets may cost $12-20 dollar/ton of carbon avoided, which is cheaper than adding new renewable generation at $37/ton of carbon avoided.). While other options, such as energy efficiency, may be closer in cost, it is far from clear whether such options can provide the sizeable amount of baseload power required to replace at-risk nuclear reactors. *See id.* at 16 n.10, 20.

million metric tons of carbon avoided by nuclear power in Illinois is equivalent to the electricity generated by nearly 22,000 wind turbines operating for a year.[22] To replace all eleven reactors in Illinois with wind power just in electricity generated, ignoring reliability and intermittency concerns, would require between 3,000 and 4,000 square miles of wind turbines.[23] For reference, the entire land area of Rhode Island is 1,045 square miles.[24]

In S.B. 2814,[25] the Illinois General Assembly therefore sensibly concluded that while past efforts to promote renewable energy have been successful in reducing air pollution, the state had to "expand its commitment to zero emission energy generation" by considering the environmental attributes of those energy sources "outside the scope of the existing renewable portfolio standard, including, but not limited to, nuclear power." S.B. 2814 § 1.5(3) (at page 3). The General Assembly also cited approvingly to a comprehensive report on "Potential Nuclear Power Plant Closings in Illinois," which explained that the *climate change-related harms alone* from the retirement of just one nuclear reactor could reach $400 million per year.[26] The report also indicated that the increased carbon emissions related to the loss of a single nuclear reactor

[22] *Greenhouse Gas Equivalencies Calculator*, U.S. Envtl. Prot. Agency, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator (last updated Sept. 2017) (entering 86 million metric tons under "If You Have Emissions Data").

[23] Illinois's eleven nuclear reactors have a capacity of approximately 11,500 megawatts. NEI, *supra* note 6. To generate the equivalent of 1,000 megawatts of nuclear power through wind energy requires between 260 and 360 square miles. *Land Requirements for Carbon-Free Technologies*, NEI (June 2015), https://www.nei.org/CorporateSite/media/filefolder/Policy/Papers/Land_Use_Carbon_Free_Technologies.pdf?ext=.pdf.

[24] *Fun Facts & Trivia*, RI.gov, https://www.ri.gov/facts/trivia.php (last visited Nov. 1, 2017).

[25] Pub. Act 099-0906, S.B. 2814, 99th Gen. Assemb. (Ill. 2016).

[26] Illinois Commerce Comm'n et al., *supra* note 18 (emphasis added). This leaves out additional impacts from other air pollutants. Illinois estimates that the majority of capacity that would replace a retired nuclear plant would be in the form of coal energy. *Id.* at 119.

would almost equal the zero-carbon electricity generated by *all other renewable resources in the state*.[27] That is why Illinois implemented the ZEC program, which supports clean power by paying generators for each megawatt-hour of electricity produced based on the Social Cost of Carbon—that is, the value of carbon pollution avoided.[28]

Leading environmentalists, climate scientists, and scholars—including James Hansen, the former Director of NASA's Goddard Institute for Space Studies and considered to be the father of climate change science[29]—vocally advocated for Illinois to take action to save its zero-emissions sources. In two open letters to Illinois leaders and legislators, the scientists asked Illinois to "do everything in your power to keep all of Illinois's nuclear power plants running for their full lifetimes."[30] In their first letter, dated April 4, 2016, they explained:

> It would take many years for the Illinois wind and solar sectors, which together comprise six percent of the state's current generation, to grow enough to replace nuclear's output. And because solar and wind cannot provide the reliable power of nuclear, much of the nuclear energy would have to be made up for with coal or natural gas.[31]

In a follow-on letter, the same scientists reminded state leaders that "Illinois sits on a knife's edge. If it loses one-quarter of its clean energy, it could become one of the worst

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[27] *Id.* at 117.

[28] As many states do with RECs, Illinois set up a competitive procurement process to award ZECs to selected facilities. *E.g.*, N.J. Stat. Ann. §48:3-87.1; Md. Code Ann., Pub. Util. §7-704.1. Any nuclear plant interconnected with Midcontinent Independent System Operator, Inc. (MISO), and PJM Interconnection, L.L.C. (PJM) may apply. There are approximately 35 merchant and 13 rate-regulated nuclear reactors operating in the MISO and PJM markets near Illinois. *Nuclear Plants in Regulated/Deregulated States*¸ NEI, https://www.nei.org/Knowledge-Center/Nuclear-Statistics/US-Nuclear-Power-Plants/Nuclear-Plants-in-Regulated-Deregulated-States (updated July 2015).

[29] John Abraham, *What's Climate Scientist James Hansen's Legacy?*, The Guardian (Apr. 29, 2013), https://www.theguardian.com/environment/climate-consensus-97-per-cent/2013/apr/29/climate-scientist-james-hansen-legacy.

[30] *Illinois First Letter*, *supra* note 13.

[31] *Id.*

performing states in the nation in terms of climate and the environment over the next decade."[32] They emphasized the need for immediate action, stating that if Illinois fails to act within the same legislative session, "carbon emissions will increase the equivalent of adding nearly 2 million cars to the road."[33] These climate leaders rightly demanded action that would help the plant as soon as possible, "without prejudice or preference toward any technology."[34]

Illinois is not alone in moving to incorporate nuclear power into state climate policies. The challenged ZEC program is part of a broader movement among states to better incorporate nuclear power into the fight against climate change. Like Illinois, New York has decided to compensate nuclear power for its contributions to the state's greenhouse gas reduction goals through a ZEC mechanism similar to Illinois's program. The U.S. District Court for the Southern District of New York recently upheld the New York program against a similar challenge, and for similar reasons as the present decision on appeal. *See Coal. for Competitive Elec. v. Zibelman*, __ F. Supp. 3d __, 2017 WL 3172866, at *2-3 (S.D.N.Y. July 25, 2017), *appeal docketed*, No. 17-2654 (2d Cir. Aug. 25, 2017). Illinois and New York are not alone: other states are beginning to recognize the benefit of compensating nuclear power for its environmental benefits. For example, Connecticut's governor recently signed legislation that would compensate the state's nuclear power plant for its zero-carbon emissions.[35]

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[32] *Illinois Second Letter*, *supra* note 13.

[33] *Id.*

[34] *Id.*

[35] S.B. 1501, Gen. Assemb., Special Sess. (Conn. 2017). *See also* H.B. 381, 132d Gen. Assemb., Reg. Sess. (Ohio 2017); H.B. 178, 132d Gen. Assemb., Reg. Sess. (Ohio 2017) and S.B. 128, 132d Gen. Assemb., Reg. Sess. (Ohio 2017) (Ohio bills seeking to implement a statewide ZEC-type program); S. 3061, 217th Leg. (N.J. 2017) (a New Jersey bill to require the state Board of Public Utilities to evaluate creating a ZEC program in the state); Daniel Shea & Kristy Hartman, *State Mechanisms Supporting*

Given the increasing recognition of nuclear power as a key component of any future climate strategy, this Court is in a position to significantly boost—or chill—meaningful state efforts to address climate change. States have started to acknowledge that meeting climate goals necessitates the preservation, if not the expansion, of nuclear power. This is why, in passing the Illinois ZEC program, the Illinois General Assembly emphasized that "[p]reserving existing zero emission energy generation . . . is vital to placing the State on a glide path to achieving its environmental goals." S.B. 2814 § 1.5(4) (at page 3). The New York Public Service Commission likewise stated that "it is simply unrealistic to assume" that energy efficiency or the addition of renewable energy could "offset the 27.6 million MWh of zero-emissions nuclear power that would need to be replaced per year" if New York's at-risk nuclear plants shut down.[36] It calculated that replacing these plants with renewable energy "would require 9,000 MW of onshore wind or 22,000 MW of solar deployment," a feat "virtually impossible" to meet in the short term.[37] At the same time, New York citizens would have to pay more, as the REC prices needed to sustain these other projects would likely be "higher than ZEC prices."[38] A decision by

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Existing Nuclear Generation, Nat'l Conference of State Legislatures, http://www.ncsl.org/Portals/1/HTML_LargeReports/Nuclear_Report_Update.htm (last visited Nov. 1, 2017) (Pennsylvania forming a bipartisan "Nuclear Energy Caucus" that is expected to propose a bill this year to support in-state nuclear generation).

[36] Order Adopting a Clean Energy Standard 126-127, Case Nos. 15-E-0302 & 16-E-0270 (N.Y. Pub. Serv. Comm'n Aug. 1, 2016), *available at* http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={1A8C4DCA-E2CC-449C-AA0D-7F9C3125F8A5}.

[37] *Id.* at 127. As discussed *supra* Section I.A (at 5), each power generation source has specific capacity factors. While nuclear power has a capacity factor above 90%, wind and solar power have much lower capacity factors. This means that more megawatts of wind and solar capacity have to be built to generate the equivalent number of megawatt-hours of electricity as a nuclear plant.

[38] *Id.*

this Court undermining the Illinois ZEC program risks handicapping states in their efforts to preserve their largest sources of zero-carbon generation.

If states are sent back to the drawing board, the opportunity to preserve so much baseload zero-carbon generation may be lost. More than 11,000 megawatts of nuclear capacity have or plan to shut down prematurely, with additional facilities at risk.[39] Unlike coal and gas units, which can be mothballed and repowered, once nuclear units retire they cannot come back. Scaling back output at a nuclear plant does not scale-back costs. Staffing and other operations and maintenance costs, which are driven by regulatory requirements, can only be significantly trimmed when a reactor operator makes certain key certifications to the NRC—and those same certifications are tied to the licensee's ability to operate the plant. *See* 10 C.F.R. § 50.82(a). Once these certifications are made, the plant may no longer be operated. The NRC has no regulatory process in place for restoring this operating authority once it is terminated, and no reactor licensee has ever sought to restore its operating authority after this point. With mothballing not an option, and faced instead with permanent shutdowns, states instead are taking action through ZEC and other programs to keep these zero-emission sources operating.

The situation in other states highlights the threat that state climate programs face from premature nuclear retirements, and exemplifies Illinois's and New York's concerns that renewables alone are not enough for states to meet meaningful climate change goals. California seeks to reduce its greenhouse gas emissions 40 percent from 1990 levels by 2030.[40] After

[39] U.S. Dept. of Energy, Staff Report to the Secretary on Electricity Markets and Reliability 31, tbl. 3-2 (Aug. 2017), *available at* https://energy.gov/sites/prod/files/2017/08/f36/Staff%20Report%20on%20Electricity%20Markets%20and%20Reliability_0.pdf.

[40] *The Governor's Climate Change Pillars: 2030 Greenhouse Gas Reduction Goals*, California Air Res. Bd., http://www.arb.ca.gov/cc/pillars/pillars.htm (last updated Sept. 20, 2016).

decades of significant state support for renewable energy, all the wind and solar power plants in California generated roughly 33,000 gigawatt-hours of electricity in 2016.[41] Yet this is less than the 37,000 gigawatt-hours of electricity produced by the state's two nuclear plants at the start of the decade.[42] With one of these plants already shut down and the other slated to shut down in 2025, California may find itself in 2025 producing nearly the same amount of zero-carbon electricity as it did in the prior decade despite decades of support for renewables.[43]

Massachusetts also exemplifies how the loss of a single plant can complicate state and regional greenhouse gas reduction goals. By 2020, the state wants to reduce greenhouse gas emissions up to 25 percent below 1990 levels (Mass. Gen. Laws ch. 21N § 4).[44] Despite heavy investment in renewable energy, a single unit nuclear power plant, the Pilgrim nuclear plant, produces approximately 17 percent of the state's electricity, and over 80 percent of the state's emissions-free electricity.[45] The closure of this plant in 2019, along with the closure of the

[41] *Total System Electric Generation*, California Energy Comm'n, http://www.energy.ca.gov/almanac/electricity_data/total_system_power.html (last visited Nov. 1, 2017).

[42] *California Electrical Energy Generation*, California Energy Comm'n, http://www.energy.ca.gov/almanac/electricity_data/electricity_generation.html (last visited Nov. 1, 2017) (2011 data).

[43] Letter from Peter T. Dietrich, Senior Vice President & Chief Nuclear Officer, S. Cal. Edison, to U.S. Nuclear Regulatory Comm'n (June 12, 2013), https://www.nrc.gov/info-finder/decommissioning/power-reactor/songs/decomm-plans/permanent-cessation-letter.pdf.; David Sneed, *PG&E Agrees to Close Diablo Canyon in 2025*, Trib. (June 21, 2016), http://www.sanluisobispo.com/news/local/article84993992.html.

[44] *Progress Toward Massachusetts Clean Energy & Climate Goals*, Mass.gov, http://www.mass.gov/eea/agencies/massdep/climate-energy/ghg-progress.html (last visited Nov. 1, 2017).

[45] *Fact Sheet, Massachusetts and Nuclear Energy*, NEI, https://www.nei.org/CorporateSite/media/filefolder/Backgrounders/Fact-Sheets/State%20Fact%20Sheets/Massachusetts-State-Fact-Sheet.pdf?ext=.pdf (last visited Nov. 1, 2017).

Vermont Yankee nuclear power plant in 2014,[46] will seriously complicate Massachusetts's and the region's decarbonization goals. The governor of Massachusetts has stated that "the closure of Pilgrim will be a significant loss of carbon-free electricity generation and will offset progress Massachusetts has made in achieving the 2020 greenhouse gas emission reduction goals, making it more challenging to hit these targets."[47]

Looking abroad, the experience in Germany with its nuclear phase-out is another example. In 2006, nuclear power produced approximately a quarter of the country's electricity.[48] However, as Germany has moved to phase out nuclear power and shut down reactors, nuclear power now provides about half what it did before.[49] This decline is roughly equivalent to all the electricity produced by wind in that country last year.[50] The country's nuclear plant shutdowns offset the new solar and wind generation that came online over the same period. Germany, like several U.S. states, will face a tough time meeting its climate goals because it is eliminating its

[46] *Vermont Yankee Closing Will Challenge Region's Emissions Goals*, NEI (Nov. 19, 2014), https://www.nei.org/News-Media/News/News-Archives/Vermont-Yankee-Closing-Will-Challenge-Region-s-Emi (also explaining that the loss of nuclear generation in the region will be made up with natural gas).

[47] Press Release, Mass.gov, *Governor Baker Statement on Closing of Pilgrim Nuclear Power Station* (Oct. 13, 2015), http://www.mass.gov/governor/press-office/press-releases/fy2016/governor-baker-statement-on-closing-of-pilgrim-station.html. Although Governor Baker discusses options for renewables to help replace loss of Pilgrim, the state has yet to identify the source of replacement power.

[48] *Power Reactor Info. Sys. (PRIS): Germany*, Int'l Atomic Energy Agency, https://www.iaea.org/pris/CountryStatistics/CountryDetails.aspx?current=DE (last updated Oct. 31, 2017) (click "Trend" button). Since 2006, Germany has had generally flat generation growth, producing approximately 640,000 gigawatt-hours of electricity per year. *Total Gross Electricity Generation*, Eurostat (Aug. 11, 2016), http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=ten00087&language=en.

[49] *PRIS: Germany*, *supra* note 48 (click "Trend" button).

[50] *Production: Gross Electricity Production in Germany from 2014 to 2016*, Destatis (Aug. 11, 2017), https://www.destatis.de/EN/FactsFigures/EconomicSectors/Energy/Production/Tables/GrossElectricityProduction.html.

largest single source of zero-emissions energy from the generation mix. In fact, despite aggressive efforts to expand renewable energy sources, Germany saw its carbon emissions *increase* in both 2015 and 2016.[51]

C. The Social Cost of Carbon is Being Adopted by a Number of States and Incorporated into their Climate Change Policies.

As the District Court correctly recognized, the Illinois ZEC program is an extension of widely accepted REC programs. Op. 32, ECF No. 78 ("RECs are similar to ZECs, and the parties do not suggest that RECs are preempted."). The choice by Illinois to turn to the Social Cost of Carbon does not legally distinguish the ZEC program from REC programs, as appellants suggest. Appellants Br. 51-52, ECF No. 38; *see also* AWEA Br. 3, 7-9, ECF No. 71. The Social Cost of Carbon metric builds on REC programs by using more advanced economic tools to support state climate policies in a cost-effective manner.

Developed in 2010 by a federal government interagency working group, the Social Cost of Carbon "is meant to be a comprehensive estimate of climate change damages."[52] The working group was organized in response to a 2008 court of appeals decision, which remanded a federal transportation rulemaking because the agency had failed to try to quantify the benefits of reducing carbon emissions. *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172 (9th Cir. 2008). The court explained that while there may significant uncertainty

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[51] *See Greenhouse Gas Emissions in ESD Sectors*, Eurostat, http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=0&language=en&pcode=t2020_35&tableSelection=1 (last updated Aug. 11, 2016); Guy Chazan, *German Greenhouse Gas Emissions Rise as 2020 Target Looms*, Fin. Times (Mar. 16, 2017), https://www.ft.com/content/7f2f199a-0a5f-11e7-97d1-5e720a26771b.

[52] U.S. Envtl. Protection Agency, *EPA Fact Sheet, Social Cost of Carbon* 1 (Dec. 2016), *available at* https://archive.epa.gov/epa/sites/production/files/2016-12/documents/social_cost_of_carbon_fact_sheet.pdf.

or range in the cost of climate change, "the value of carbon emissions reduction is certainly not zero." *Id.* at 1200.

To determine this value, the Council of Economic Advisers and the Office of Management and Budget convened a working group to perform a social cost "modeling exercise" of the impact of carbon emissions on the environment, and then to develop estimates of the damages.[53] The members of the working group included a number of scientific and economic experts from throughout the federal government, including, among others, the Council on Environmental Quality, the U.S. Environmental Protection Agency, the National Economic Council, and the U.S. Departments of Commerce, Energy, and Treasury.[54] Both Illinois and New York have used this tool developed by the working group for their ZEC programs.[55]

The Social Cost of Carbon has a strong history in front of the courts. This Circuit was one of the first to embrace the tool, upholding its use to justify energy efficiency standards promulgated by DOE in 2016. *Zero Zone, Inc. v. U.S. Dep't of Energy*, 832 F.3d 654, 677-678 (7th Cir. 2016). Since then, the Social Cost of Carbon has become an established metric for evaluating the costs of climate change, and is being increasingly used by states. Indeed, as a sign of its increasing stature, a Montana district court found a National Environmental Policy Act analysis deficient *because* it failed to use the Social Cost of Carbon to quantify costs of

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[53] *Id.* at 1–2.

[54] Interagency Working Grp. on Social Cost of Carbon, U.S. Gov't, *Technical Support Document: - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866*, at 1 (Feb. 2010), *available at* https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf. Although the new administration has not yet embraced the Social Cost of Carbon as an analytical tool, that does not challenge the strong, independent scientific foundation that undergirds the Social Cost of Carbon framework.

[55] S.B. 2814 at 136; Order Adopting a Clean Energy Standard, app. E at 11-12, Case Nos. 15-E-0302 & 16-E-0270 (N.Y. Pub. Serv. Comm'n Aug. 1, 2016), *available at* http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={B3777382-228F-4268-A674-6B5B93B8614B}.

greenhouse gas emissions. *See Montana Envtl. Info. Ctr. v. U.S. Office of Surface Mining*, __ F. Supp. 3d __, 2017 WL 3480262, at *13-15 (D. Mont. Aug. 14, 2017) ("Defendants cannot persuasively justify the Enforcement Office's failure to consider the cost of greenhouse gas emissions from coal combustion," using the Social Cost of Carbon).

Interest in the Social Cost of Carbon is growing. Earlier this year, the Colorado and Minnesota Public Utilities Commissions required utilities to use the Social Cost of Carbon for resource planning.[56] And legislation passed in California in September of 2016 requires the California Air Resources Board to consider a Social Cost of Carbon-type metric for its latest set of greenhouse gas reduction measures.[57]

In sum, Illinois's ZEC program is a commitment to clean energy because it targets the largest source of clean energy in the state and country: nuclear power. The state's ZEC program is an extension of popular REC programs, and solidly links itself to Illinois's climate goals by relying on the Social Cost of Carbon. The wrong decision here would unnecessarily rob not only Illinois, but many other states of their best tools in the fight against climate change, just as these zero-carbon sources are most at risk.

[56] Phase I Decision (Decision No. C-17-0316) at 25-31, *In re Application of Pub. Serv. Co. of Colo. for Approval of its 2016 Elec. Res. Plan*, Proceeding No. 16A-0396E (Colo. Pub. Utils. Comm'n Mar. 23, 2017), http://coseia.org/wp2016/wp-content/uploads/2017/05/ERP-Decision-C17-0316_16A-0396E-1.pdf; Mike Hughlett, *'Social Cost' of Carbon Dioxide Emissions from Power Plants Increased*, Star Trib. (July 27, 2017), http://www.startribune.com/minnesota-regulators-increase-social-cost-of-co2-emissions-but-not-as-much-as-asked/437066353/; Christian Roselund, *Minnesota Ups the Value of Its Social Cost of Carbon*, PV Mag. (July 31, 2017), https://pv-magazine-usa.com/2017/07/31/minnesota-ups-the-value-of-its-social-cost-of-carbon/.

[57] A.B. 197, 2015-2016 Assemb. (Cal. 2016).

II. STATES CAN ENCOURAGE ENVIRONMENTAL GOALS THROUGH ZEC PROGRAMS.

The wholesale market is a segment of the process by which electricity is generated and ultimately delivered—which along the way includes the retail and wholesale energy markets, along with all other aspects of generation and delivery that bring electricity to the end customer. The "cooperative federalism" framework that defines our electric grid encourages, if not requires, states and federal government to complement each other in this endeavor. The federal share of this arrangement covers one specific segment—interstate wholesale sales. Using their authority over generation and environmental matters, states routinely establish policies within their own domain that may impact the wholesale markets, from environmental permitting to RECs. ZECs, like RECs, nonetheless are separate and distinct from the wholesale markets because they are commodities traded independently from energy and capacity.

A. Both the Federal Government and the States Have a Role in the Energy Markets.

Under the principle of "cooperative federalism" in which the broader energy markets operate, both states and the federal government have roles to play in the provision of electricity. *Zibelman*, 2017 WL 3172866, at *7; *see also Hughes v. Talen Energy Mktg., LLC*, 136 S. Ct. 1288, 1300 (2016) (Sotomayor, J., concurring) ("In short, the Federal Power Act, like all collaborative federalism statutes, envisions a federal-state relationship marked by interdependence."). This interdependence is marked by two different but equally important roles in the broader energy market: FERC has exclusive jurisdiction over wholesale sales of electric energy in the interstate market; and states may regulate "any other sale" of electricity, which includes retail electricity sales, and sales in commodities other than electric energy. 16 U.S.C. §§ 824(b), 824e(a). These two roles complement each other and each is clearly defined.

Both the federal government and the states may regulate within the "domain" Congress assigned to them. *See FERC v. Elec. Power Supply Ass'n (EPSA)*, 136 S. Ct. 760, 774 (2016), *as revised* (Jan. 28, 2016). State programs compensating nuclear generators for their unique environmental attributes are essentially addressing externalities from electricity generation, by which we mean air and carbon pollution. By pricing externalities, state programs complement—but are not tied to—the wholesale markets by accounting for the social costs of generating electricity. FERC has recognized that "a state may separately provide additional compensation for environmental externalities, outside the confines of, and, in addition to the [FERC-regulated interstate wholesale] rate." *Cal. Pub. Utils. Comm'n*, 133 FERC ¶ 61,059, at P 31 (2010).

B. ZECs, Like RECs, Are Commodities Exchanged Separately and Independently from Energy and Capacity.

That state actions affect wholesale prices is nothing new. "It is a fact of economic life that the wholesale and retail markets in electricity, as in every other known product, are not hermetically sealed from each other." *EPSA*, 136 S. Ct. at 776. There are almost countless ways state actions can impact interstate wholesale markets. State environmental limits can reduce the relative contribution of coal plants in our supply portfolio. The siting of power plants and transmission facilities routinely take into account, and often give way to, prevailing environmental policy considerations. States can create environmental commodities, such as ZECs and RECs, which are exchanged separately from wholesale sales. And the mechanisms need not be so subtle—states can also simply "order utilities to purchase [clean] generation." *Entergy Nuclear Vt. Yankee, LLC v. Shumlin*, 733 F.3d 393, 417 (2d Cir. 2013) (citing *S. Cal. Edison Co.*, 71 FERC ¶ 61,269, at *8 (1995)) (internal quotation marks omitted).

ZEC programs and REC programs take extra pains to separate themselves from the wholesale markets, by creating environmental "commodities" that are exchanged *separately and*

independently from the wholesale markets. FERC has expressly approved this approach for RECs. *Cal. Pub. Utils. Comm'n*, 133 FERC ¶ 61,059, at P 31 n.62 ("RECs are separate commodities from the capacity and energy . . . . If a state chooses to create these separate commodities, they are not compensation for capacity and energy."); *Am. Ref-Fuel Co.*, 105 FERC ¶ 61,004, at P 23 (2003) ("States, in creating RECs, have the power to determine who owns the REC in the initial instance, and how they may be sold or traded."), *reh'g denied*, 107 FERC ¶ 61,016 (2004), *review denied sub nom. Xcel Energy Servs. Inc. v. FERC*, 407 F.3d 1242 (D.C. Cir. 2005). Illinois's ZEC program is no different. As explained by the District Court, S.B. 2814 creates a new "commodity," ZECs, targeted towards an environmental attribute, which is then traded between zero-emissions plants and retail utilities. Op. 7-8, ECF No. 78. The ZEC program creates a market based on emissions-avoided during generation, not the sale of electricity, and is therefore not a market for capacity and energy. *Cal. Pub. Utils. Comm'n*, 133 FERC ¶ 61,059, at P 31 n.62.

Appellants' efforts to distinguish ZECs from RECs based on the Social Cost of Carbon do not chip away at this foundation. Appellants claim that ZECs are different from RECs in "how the prices are determined." Appellants Br. 51-52, ECF No. 38; *see also* AWEA Br. 3, 7-9, ECF No. 71 ("In contrast to typical REC programs, the ZEC program is not market-based."). And they are correct that ZECs are based on a metric—the Social Cost of Carbon—that was not present when RECs were created. Op. 8, ECF No. 78.

Before the Social Cost of Carbon was developed, state REC programs used a wide variety of carbon costs estimations to support their REC programs. *Ctr. For Biological Diversity*, 538 F.3d at 1199 (discussing the large variety of carbon cost estimations used). States had to take alternative approaches to get to the same rough goal as the now established Social

Cost of Carbon metric. As the metric has become more accepted, as expected, states, such as California, Colorado, Minnesota, and New York, are increasingly turning to the Social Cost of Carbon to account for the effects of greenhouse-gas emissions in state initiatives. *Supra* Section I.C (at 17).

Likewise, the existence of a ZEC price adjustment clause—a consumer protection measure—fails to differentiate ZECs from RECs. The Illinois ZEC program is capped at the Social Cost of Carbon, which means that the program is designed to ensure the value of the credit never exceeds the value of the environmental attributes the program is seeking to compensate. It is typical for REC programs to also contain caps to keep REC prices from getting too high, through "alternative compliance payments." For example, New Jersey's REC program sets a cap on solar REC prices through alternative compliance payments so energy costs remain affordable. *See* N.J. Stat. Ann. § 48:3-87; N.J. Admin. Code § 14:8–2.10. And New Jersey is not alone: according to one report Connecticut, Delaware, the District of Columbia, Maryland, New Jersey, Pennsylvania, Massachusetts, Maine, New Hampshire, and Rhode Island all have alternative compliance payments or similar programs.[58] The Social Cost of Carbon simply provides a different value as a cap for the Illinois ZEC program, one which is more closely linked to the value of the avoided carbon emissions.

It also is irrelevant that the ZEC price adjustment clause *references* a regional wholesale futures price index. Appellants Br. 21, ECF No. 38. The District Court correctly stated that *referencing* the futures index is not akin to *interfering* in the wholesale markets. Op. 31, ECF No. 78; *see also Zibelman*, 2017 WL 3172866, at *9 (*Hughes* "nowhere stated, implied or even

[58] Edward A. Holt, Ed Holt & Assocs., Inc., *CESA State RPS Policy Report: Increasing Coordination and Uniformity Among State Renewable Portfolio Standards* 18-19 (2008), https://cesa.org/assets/Uploads/Resources-pre-8-16/CESA-Holt-RPS-policy-report-dec2008.pdf.

considered that a State program's incorporation of the wholesale market price would provide a basis for preemption."). Referencing the futures index to help in a price adjustment is no different than referencing any other value, as the intent is merely to adjust the ZEC credit, not to interfere with the wholesale market. Oddly enough, Appellants do not take issue with Illinois's own REC program, which references future energy prices in setting price caps for Illinois's REC program. *See* 20 Ill. Comp. Stat. 3855/1-75(c)(1)(D) (allowing regulators to consider "expected current and future regional energy prices" in setting cost caps so that Illinois RECs remain "cost effective").[59]

Indeed, setting a precedent that prohibits mere references to futures prices for *independent state activities* risks expanding the scope of federal jurisdiction to the same "near-infinite breadth" the Supreme Court in *EPSA* sought to reign in. *EPSA*, 136 S. Ct. at 764. That is why the method of pricing is irrelevant to determining interference with the wholesale markets. No matter how they are priced or how large their influence, both ZECs and RECs remain unbundled commodities traded outside of the wholesale markets, independently of electricity and capacity, and thus do not interfere with wholesale markets. Op. 32, ECF No. 78; *Cal. Pub. Utils. Comm'n*, 133 FERC ¶ 61,059, at P 31.

In all other semblances too, ZECs are like RECs. AWEA mischaracterizes both ZECs and RECs by stating that the latter are "without regard to economic need" to encourage broad participation, while only nuclear plants that would otherwise shut down are able to access ZECs. AWEA Br. 11, ECF No. 71. But REC programs likewise support otherwise unprofitable renewable generation sources by attempting to compensate for something that the wholesale

[59] Exelon's district court reply brief (ECF No. 61, at 13-15) provides additional examples of limitations to or features of state REC programs that are similar to the Illinois ZEC program.

markets do not address. *See e.g.*, 20 Ill. Comp. Stat. 3855/1-75(c)(1)(J) (Under Illinois's own REC programs, the Illinois Power Agency cannot purchase RECs from generators that are "recover[ing]" their "costs," because that would fail to "promote the competitive development of renewable energy."); *see also* Ivan Gold & Nidhi Thakar, *A Survey of State Renewable Portfolio Standards: Square Pegs for Round Climate Change Holes?*, 35 Wm. & Mary Envtl. L. & Pol'y Rev. 183, 189 (2010) (State RPS and associated REC "programs generally relied on legislative findings that [they] were needed to subsidize renewable energy resources" among other goals.). Moreover, economic need is irrelevant for the legal analysis here. The Illinois ZEC program, like state REC programs, is targeted towards technologies not being adequately compensated for their environmental attributes, which is what the ZEC program intends to cure.

CONCLUSION

For the foregoing reasons, and those in the appellees' briefs, the District Court decision should be affirmed.

Respectfully Submitted,

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/s/ Jonathan M. Rund

Jonathan M. Rund

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I certify that on November 3, 2017, I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the Seventh Circuit by using the CM/ECF system. I certify that all participants in the case are registered CM/ECF users and that service will be accomplished by the CM/ECF system.

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