Nos. 18-868 & 18-879

IN THE
Supreme Court of the United States

ELECTRIC POWER SUPPLY ASSOCIATION, ET AL.,
Petitioners,

v.

ANTHONY STAR, IN HIS OFFICIAL CAPACITY AS DIRECTOR OF THE ILLINOIS POWER AGENCY, ET AL.,

AND

JOHN B. RHODES, IN HIS OFFICIAL CAPACITY AS CHAIR OF THE NEW YORK PUBLIC SERVICE COMMISSION, ET AL.,
Respondents.

On Petitions for a Writ of Certiorari to the United States Courts of Appeals for the Seventh and Second Circuits

BRIEF OF ENERGY ECONOMISTS AS *AMICI CURIAE* IN SUPPORT OF PETITIONERS

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INTEREST OF *AMICI CURIAE*[1]

Amici curiae are leading economists and experts in the field of markets for electric power.[2] *Amici* also serve as professors and teachers of economics; write on economic issues; advise clients on the economic impact of legislation, regulations, and other policies; or previously were employed by an independent system operator.

Amici leave to others the articulation of the legal standards governing the Federal Power Act's allocation of authority between the States and the federal government to regulate electricity markets. *Amici* believe, however, that those standards and their application should be informed by a sound understanding of the economics of wholesale energy markets.

Although *amici* do not always agree on economic issues presented by energy-market regulations and have not attempted to formulate a standard to resolve these cases, *amici* share the concern that the reasoning of the Second and Seventh Circuits in the decisions below is not consistent with sound economic principles and that the energy subsidies those deci-

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[1] Pursuant to Supreme Court Rule 37.6, counsel for *amici* represent that they authored this brief in its entirety and that none of the parties or their counsel made a monetary contribution intended to fund the preparation or submission of this brief. Tenaska, Inc. contributed money to fund this brief. Pursuant to Rule 37.2(a), counsel for *amici* also represent that all parties were provided notice of *amici*'s intention to file this brief at least 10 days before its due date and that the parties have consented to the filing of this brief.

[2] A summary of the qualifications and affiliations of *amici* is provided as an appendix to this brief. *Amici* file this brief as individuals and not on behalf of the institution with which they are affiliated. None of *amici* is being compensated in connection with this brief.

sions upheld will have deleterious effects on the federally regulated wholesale energy and capacity markets. *Amici* have dedicated substantial professional effort to promoting the efficient operation of wholesale electric markets, sharing a belief that efficient, competitive markets promote the efficient supply of electric power for the benefit of the public. Given the substantial impact of the subsidies at issue – and the risk that the decisions will encourage other States to adopt similar subsidies – the courts of appeals' rulings should not stand without review by this Court.

This brief applies economic reasoning to address two issues. *First*, *amici* explain, contrary to the reasoning of the courts of appeals, that the subsidies at issue in the decisions under review are tethered to the wholesale energy markets in a way that is economically equivalent to the subsidy that this Court found to be preempted in *Hughes v. Talen Energy Marketing, LLC*, 136 S. Ct. 1288 (2016). *Second*, *amici* explain that these subsidies will have a substantial impact on the incentives faced by potential developers of generation resources, with a deleterious impact on efficient energy markets and the development of alternative resources such as new clean energy – a factor underscoring the importance of review.

STATEMENT

1. In a series of orders, the Federal Energy Regulatory Commission ("FERC") restructured the wholesale delivery of electric power throughout the nation to promote competition. *See*, *e.g.*, *Regional Transmission Organizations*, 89 FERC ¶ 61,285, 1999 WL 33505505, at *2 (1999). Broadly speaking, there are two types of wholesale electricity auction markets run by "independent system operators" ("ISOs") and subject to FERC regulation. Perhaps the more familiar are the markets for electrical energy for next-day and same-day delivery needed to serve present demand. These auctions require generators to submit the prices at which they are willing to produce power for the served market[3] and electric distribution utilities or other retail sellers – known as "load-serving entities" or LSEs – to submit bids to consume. The ISOs then "stack" the generators' bids from lowest to highest price, select the amount of energy required to meet demand, and set the price for energy at the marginal cost of incremental demand. This "market clearing" price is "the price an efficient market would produce" and is paid to all generators. *FERC v. Electric Power Supply Ass'n*, 136 S. Ct. 760, 769 (2016) ("*EPSA*").

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[3] These prices can be $0 per megawatt-hour ("MWh"), or even negative, reflecting a willingness to pay to have their power accepted into the grid to avoid being asked to reduce production. Generators can also accept whatever price the auction yields, known as "self-scheduling." Generators that "self-schedule" or make negative bids typically are highly inflexible in terms of output, like nuclear plants, have high opportunity costs for changing output, or would lose a subsidy if they did not produce energy.

In addition to wholesale energy markets, the ISOs also conduct periodic "capacity" auctions. Capacity auctions are intended to ensure that sufficient generation capacity is available to meet forecasted future needs. For example (and simplifying somewhat), PJM, the ISO serving several mid-Atlantic and mid-western States, holds a yearly auction in which generators bid to guarantee capacity to be available three years in the future. As in the energy auctions, the bids are accepted in order from lowest to highest until projected demand is satisfied. The "clearing price" is then paid to all successful bidders and reflects the marginal cost of supply. *See generally Hughes v. Talen Energy Mktg., LLC*, 136 S. Ct. 1288, 1293 (2016). The payments that generators receive through the capacity auctions are in addition to the amounts they receive through daily energy auctions.

2. In 2009, the State of Maryland created a subsidy program to encourage the construction of a new gas-fired power plant in Maryland. *See Hughes*, 136 S. Ct. at 1294. After soliciting proposals and selecting a company (CPV) to construct the new plant, Maryland required electric utilities to enter into 20-year contracts – called "contracts for differences" – with CPV. *See id.* at 1294-95.

The contracts for differences addressed payments for capacity. They provided that, as long as the generator successfully sold its capacity into the PJM capacity auction, the generator would receive the price in the contract, with the LSEs paying (or receiving) the difference between the contract and auction prices. *See id.* at 1295. Because the new generator, CPV, "[wa]s guaranteed a certain rate" if its capacity cleared the auction, "the contract's terms encourage[d] CPV to bid its capacity into the auction at the lowest possible price." *Id.*

This Court found that Maryland's "contract for differences" was an impermissible intrusion into FERC's exclusive authority over the wholesale electricity market. It reasoned that "Maryland's program set[] an interstate wholesale rate" for capacity because the subsidy, though in form "requir[ing] CPV to participate in the PJM capacity auction," in fact "guarantee[d] CPV a rate distinct from the clearing price for its interstate sales of capacity to PJM." *Id.* at 1297.

The Court found that the fact that "Maryland was attempting to encourage construction of new in-state generation" – a matter ordinarily within the States' regulatory purview – did not "save its program." *Id.* at 1298. States "may not seek to achieve ends, however legitimate, through regulatory means that intrude on FERC's authority over interstate wholesale rates." *Id.* And the Court emphasized that "States interfere with FERC's authority by disregarding interstate wholesale rates FERC has deemed just and reasonable, even when States exercise their traditional authority over . . . in-state generation." *Id.* at 1299.

The Court stated that its holding was "limited" and that it was not addressing subsidies "untethered to a generator's wholesale market participation," which would "not condition payment of funds on capacity clearing the auction." *Id.*

3. In 2016, Illinois created a subsidy program for two nuclear power plants whose owners represented that the plants would cease operation without government intervention. *Star* Pet. App. 17a-19a & n.9. These two nuclear power plants receive a "zero emission credit" ("ZEC") for each MWh of electricity generated. *Id.* at 18a. LSEs must pay for all of the

ZECs. *Id.* at 19a, 74a. The costs are then passed on to electricity consumers in the form of higher retail electricity prices.

The price of each ZEC is tied to the wholesale market price for electricity through a complicated pricing formula. The ZEC was initially set at $16.50/MWh – based on an adjustment from the "Social Cost of Carbon" according to the U.S. Interagency Working Group on Social Cost of Carbon. *Id.* at 19a & n.11. The ZEC payments are adjusted, however, depending on the wholesale market price of electricity. In brief, the Illinois program established a "baseline market price index" of $31.50, based on the average of PJM's daily, day-ahead auction prices and capacity prices set in auctions conducted by PJM and the Midcontinent Independent System Operator ("MISO"), the other ISO serving Illinois. Each year, a "market price index" is calculated, based on the results of the previous year's wholesale energy and capacity auctions. If the market-price index exceeds the baseline, the ZEC subsidy is reduced by the excess.

Once the dust settles, the program effects a price guarantee similar to the guarantee established by the Maryland contract for differences. The two nuclear power plants receive a minimum price of $47.90 per MWh generated as long as the auction price remains above $31.40/MWh. If the index rate falls below $31.40, the program guarantees $16.50 of additional revenue for every MWh generated. *Id.* at 19a-20a & n.13.

4. Also in 2016, New York created a ZEC subsidy program for three nuclear power plants in western

New York. *Rhodes* Pet. App. 7a-8a.[4] Like the Illinois credit system, the nuclear power plants receive ZECs for every MWh of electricity generated, and LSEs (and ultimately consumers) must buy the ZECs, regardless of existing power purchase contracts. *Id.* at 8a, 10a.

As in Illinois, the ZEC price in New York is purportedly based on an adjustment from the "social cost of carbon" and set for the program's first two years at $17.48 per MWh generated (subject to a possible cap) "in addition to the price the facility receives for the sale of the electricity and capacity in the [New York Independent System Operator ('NYISO')] market." *Id.* at 9a.

The New York ZEC subsidy may be reduced if "the New York energy market experiences 'additional renewable energy penetration.'" *Id.* In addition, prices are tied to wholesale market prices in a manner similar to the market-price-index adjustment in Illinois. Every two years, the New York Public Service Commission will calculate a "reference price" based on the forecast sum of energy and capacity prices during the period. To the extent that reference price exceeds a benchmark price (based on historical wholesale prices), the ZEC price is reduced accordingly.

5. Plaintiffs challenged the ZEC programs, including on the basis that they were preempted by the Federal Power Act. District courts in Illinois and New York rejected those challenges, and the Seventh Circuit and the Second Circuit affirmed.

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[4] Although there are eligibility criteria for the New York ZECs, they were designed to ensure that these three facilities, and not others, would qualify.

a. The Seventh Circuit (in a strikingly brief opinion) found that this subsidy program did not regulate the prices of capacity or energy auctions because (the court incorrectly concluded) the Illinois ZEC program was "'untethered to a generator's wholesale market participation.'" *Star* Pet. App. 5a-6a (quoting *Hughes*, 136 S. Ct. at 1299). The court stated that, "[t]o receive a credit, a firm must *generate* power, but how it sells that power is up to it. It can sell the power in an interstate auction but need not do so. It may choose to sell power through bilateral contracts with users (such as industrial plants) or local distribution companies that transmit the power to residences." *Id.* at 6a. In so concluding, the court ignored the allegation (which no one disputes) that, because of the manner in which they operate, nuclear generators invariably deliver the power they generate into the interstate grid and therefore must participate in the ISO energy auctions as price takers – that is, "at the lowest possible price." *Hughes*, 136 S. Ct. at 1295.[5]

The Seventh Circuit also reasoned that the subsidy "can influence the auction price only indirectly, by keeping active a generation facility that otherwise might close and by raising the costs that carbon-releasing producers incur to do business." *Star* Pet. App. 6a. This holding betrayed a basic misunderstanding of the ZEC program. The court thought that carbon-releasing producers pay for ZECs, but they do not; LSEs pay and pass the costs along to

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[5] Furthermore, the generators may be subject to obligations that require them to offer their capacity in relevant capacity auctions and, if successful, to participate in energy auctions. *See*, *e.g.*, Monitoring Analytics, LLC, http://www.monitoringanalytics.com/reports/Market_Messages/Messages/RPM_Must_Offer_Obligation_20181231.pdf.

consumers. More important, the subsidy in *Hughes* affected wholesale auction prices in the same supposedly "indirect" way – that is, by ensuring that a favored generator, guaranteed a price different from the price set at auction, would bid its capacity into the auction at a lower price than representative of its actual costs.

b. The Second Circuit likewise found that "the ZEC program regulates production" rather than wholesale prices, and therefore "skirt[ed]" this Court's decision in *Hughes*. *Rhodes* Pet. App. 16a, 25a. The court stated that the subsidy "avoids setting wholesale prices and instead regulates the environmental attributes of energy generation and in the process considers forecasts of wholesale pricing." *Id.* at 17a. Moreover, the court concluded that the ZEC program does not "compel generators to make wholesale sales" because "a generator's decision to sell power into the wholesale markets is a business decision." *Id.* at 18a. Thus, like the Seventh Circuit, the Second Circuit ignored the fact that, in the real world, the nuclear plants receiving the subsidy *always* sell the power they generate into the wholesale market.

The Second Circuit also reasoned that, unlike the contract for differences at issue in *Hughes*, the ZEC program in New York did not guarantee generators any particular price: instead, the ZEC program is fixed for two-year periods and, because the subsidy is capped, exposes generators to "market risk in the event that energy prices fall." *Id.* at 16a. The court thus disregarded the fact that the ZEC was calculated based on predicted wholesale market prices and adjusted to provide three favored generators wholesale prices different from those set in the FERC-regulated auctions.

SUMMARY OF ARGUMENT

I. The distinctions the Second and Seventh Circuits drew between the ZEC programs and the subsidy found preempted in *Hughes* are insubstantial. Both courts wrongly assumed that a subsidy on *generation* is meaningfully different from a subsidy on the *sale* of power at wholesale. There is no such distinction in fact. Moreover, like the preempted subsidy in *Hughes*, the ZEC programs replace FERC-regulated, just-and-reasonable prices for capacity and/or energy. The Second Circuit incorrectly compared the ZEC programs to a state requirement to maintain production, but the subsidies here create different prices for different market participants, undermining the fundamental mechanism of competitive markets.

II. The ZEC programs have kept five generators in the markets for capacity and energy that otherwise would have left, distorting supply. These distortions will encourage generators that are more efficient than the favored generators to leave the market, and will likewise discourage entry by more efficient generators. Blocking entry and encouraging early exit may impede the ostensible goal of the programs – to promote low-emissions power.

ARGUMENT

I. The ZECs at Issue Have Economic Effects on Wholesale Prices Indistinguishable from the Subsidy at Issue in *Hughes*

The courts of appeals sought to distinguish the ZEC subsidies adopted by Illinois and New York from the contract-for-differences subsidy adopted in Maryland. From an economic point of view, however, those distinctions are without substance. As with the Maryland program, the ZECs pay favored gener-

ators a subsidy based on their wholesale market participation, thereby guaranteeing them a price that is different from the price set in the auction. Although there are differences in the details of the price-setting mechanisms employed by the subsidy programs, those differences are largely irrelevant to their basic design and purpose.

First, both courts distinguished *Hughes* based on findings that the ZEC programs do not require participation in interstate energy markets. *See Star* Pet. App. 6a ("a firm must *generate* power, but how it sells that power is up to it"); *Rhodes* Pet. App. 18a ("a generator's decision to sell power into the wholesale markets is a business decision"). But in the real world – as a matter of both physics and tariff requirements – nuclear generators such as the ZEC recipients in Illinois and New York *must* inject the power they generate into the electric grid. And injection of energy into the electric grid constitutes a sale into the relevant ISO's energy market. Even if the amount injected may fulfill elements of a bilateral agreement, the pricing of the wholesale market based on such injections remains unchanged. Thus, from an economic perspective, the ZEC subsidies are contingent not only on the generation of power, but also on its sale into wholesale markets.

In these circumstances, a subsidy that is conditioned on the *generation* of power (as this one admittedly is) is also conditioned on the *sale* of that power into a federally regulated wholesale market. There are no two ways about it. Thus, the distinction from the subsidy found preempted in *Hughes* that both decisions below made is not meaningful from the perspective of economics.

Second, the manner in which the ZEC subsidies interfere with FERC-regulated wholesale market price-setting is likewise equivalent to the subsidy at issue in *Hughes*. The Second Circuit was of the view that, because "the fixed ZEC price is capped based on . . . the social cost of carbon," generators are exposed to market risk in the event energy prices fall. *Rhodes* Pet. App. 16a. But CPV was likewise subject to market risk: the contract for differences affected CPV's payments for *capacity*, but the amount that CPV would receive for the *energy* or electric power it generated remained uncertain and subject to market fluctuations. ZEC recipients are guaranteed a price for the power they sell into the wholesale market that is higher than the auction price (except in the event average wholesale prices rise to a level far higher than the rates that prevail today). To be sure, the amount ZEC recipients ultimately receive for the power they generate is not entirely insulated from market variations. Nevertheless, the whole point of the ZEC program is to pay the recipients more for the power they deliver in the wholesale market than the prices other generators receive.

The Second Circuit was also wrong to equate the ZEC program with the regulatory scheme at issue in this Court's decision in *Northwest Central Pipeline Corp. v. State Corp. Commission of Kansas*, 489 U.S. 493 (1989). In that case, Kansas provided that a natural gas lease would terminate if the lessee failed to extract enough gas to prevent an imbalance in a natural gas field. *Id.* at 503. The effect of that regulation was to require producers to extract more natural gas than they would have otherwise, which, by increasing supply, affected interstate rates. *Id.* at 512. This Court found the Kansas scheme to be a

permissible regulation on the production of gas, not an impermissible regulation of interstate rates.

Unlike the subsidies at issue here, however, the producers subject to the use-it-or-lose-it requirement confronted the same market price as other producers and therefore had the same economic decision to make: whether to stay in the market for production of natural gas given the market price. In contrast, the subsidies here create *different* prices for the subsidy recipients and all other generators. These targeted subsidies, unlike the regulatory scheme in *Northwest Central*, attack the fundamental purpose of the wholesale electricity markets, which is to provide price signals to market participants and potential market participants.

To be sure, as discussed below, many of the policy concerns implicated by the ZEC programs reflect that the *result* of the program is to preserve uneconomic generation resources, discouraging development of competing and more efficient alternative resources. And this Court has indicated that preserving even uneconomic in-state generation resources is within the power of the States. *See Hughes*, 136 S. Ct. at 1298. At the same time, the Court has held that a State cannot pursue even permissible ends by employing "regulatory means that intrude on FERC's authority over interstate wholesale rates." *Id.* By guaranteeing ZEC recipients a rate for the wholesale power sold in FERC-regulated markets that is different from the rate set at auction, the ZEC programs have the same economic characteristics as the program found to be preempted in *Hughes*.

II. These Petitions Present an Important Issue Because of the Substantial, Deleterious Impact These Subsidies Will Have on Sound, Efficient Energy Markets

Because the nuclear plants receiving ZECs would otherwise shut down, the subsidies will increase the supply of energy and capacity relative to the levels without the subsidies and therefore will reduce the market-clearing prices of energy and capacity. These programs are massive, promising billions of dollars in subsidies and preserving 6,290 MW of uneconomic generating capacity.[6] Furthermore, the decisions offer other States a roadmap to evade federal preemption. Such a development in the regulatory landscape should not be permitted without this Court's review.

Moreover, the ZEC programs cannot be justified by purported environmental benefits. Current and expected market prices serve as the primary signal to potential and existing market participants, affecting their willingness to enter or stay in the market. Lower prices will dampen or prevent the entry of new resources directly and undermine trust in competitive markets' ability to reward efficient new investment. For example, the ZEC program subsidies could force retirement of more efficient low-emissions generators, block the entry of more efficient zero-emissions generators, or displace other, lower-cost zero-emissions resources.

The ZEC program subsidies thus may not only discourage more efficient alternative resources but

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[6] Information for the Quad Cities, Clinton, Fitzpatrick, Ginna, and Nine Mile power plants sourced from Exelon Corp., http://www.exeloncorp.com/locations/power-plants/.

also impede the transition to a zero-emissions future. Without careful study, there can be no assurance that the ZEC programs will promote reduction in carbon emissions, especially when only five nuclear generators have been approved to receive them and the subsidies may force out or block the entry of more efficient, lower-cost zero-emissions generators. The economic reality is that the ZEC programs may create barriers to the rapid, efficient, market-driven deployment of lower-cost, clean-energy systems.

A. The ZEC Programs Will Distort Prices in the Wholesale Energy and Capacity Markets

Paying a subsidy for each MWh generated and sold by the ZEC-eligible nuclear power plants in Illinois and New York influences pricing in the energy and capacity markets operated by MISO, PJM, and NYISO – three of the largest and most significant ISOs in North America – in two ways.

First, the ZEC-eligible nuclear power plants were represented as planning on shutting down and exiting the markets for capacity and energy. *See Star* Pet. App. 17a; *Rhodes* Pet. App. 42a n.5, 108a. (If they were not planning to shut down, the ZEC subsidy would be a pure windfall.) The subsidies will keep these ZEC-eligible nuclear power plants in the market. *See Star* Pet. App. 18a; *Rhodes* Pet. App. 95a. This artificially increases supply relative to the level that would result in the absence of the subsidy. Through this greater supply and the dynamics of supply and demand, the ZEC program subsidies therefore suppress the market-clearing price for energy in the wholesale market. FERC-sanctioned auctions are designed to produce just-and-reasonable rates. *See Hughes*, 136 S. Ct. at 1291-92. This just-

and-reasonable result, however, can happen only if price signals provide accurate information leading excess or uneconomic generation to exit the market in response to prices that are too low to justify their continued operation.

Second, continued operation of these ZEC-eligible plants also results in an excess supply of capacity eligible to bid into the MISO, PJM, and NYISO capacity markets. The greater supply relative to demand for capacity has the potential to artificially depress prices in the capacity markets relative to the operation of the market in the absence of the ZEC programs. *See NRG Power Mktg., LLC v. FERC*, 862 F.3d 108, 111 (D.C. Cir. 2017) (explaining that "below-cost bidding in capacity auctions" – which "state subsidies" make possible – "may reduce the supply of electricity in the long run").[7]

B. The Price Distortions Will Influence Decisions To Exit and Enter the Market for Wholesale Power Generation

Distorting equilibrium pricing has consequences: the ZEC programs will interfere with efficient market entry and exit decisions. The clearing price has functions outside of simply setting the amount paid and received by buyers and sellers. The auction system "identif[ies] need for new generation." *Hughes*,

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[7] A January 2011 report by the PJM Independent Market Monitor concluded that "adding 1,000 MW of capacity in New Jersey, paying it through an out of market subsidy, and requiring it to offer at zero shows that the result would be a reduction in capacity market revenues to PJM suppliers of more than one billion dollars per year." Monitoring Analytics, LLC, *Impact of New Jersey Assembly Bill 3442 on the PJM Capacity Market* 1 (Jan. 6, 2011), https://www.monitoringanalytics.com/filings/2011/NJ_Assembly_3442_Impact_on_PJM_Capacity_Market.pdf.

136 S. Ct. at 1293. "A high clearing price in the capacity auction encourages new generators to enter the market, increasing supply and thereby lowering the clearing price . . . ; a low clearing price discourages new entry and encourages retirement of existing high-cost generators." *Id.* If a generator's marginal cost is above the expected market-clearing price, the owner should take that as a signal to exit the market; if a prospective generator believes its marginal cost will be below the expected market-clearing price, the investor-developer should take that as a signal to enter.

The pricing signals of the markets for wholesale electric power are no accident. For many years, Congress and FERC have sought to foster competition in wholesale electric markets. The cornerstone of that policy has been access to all generators on nondiscriminatory terms. As FERC has explained, nondiscriminatory auction pricing "has the benefit of encouraging all sellers to place bids that reflect their actual marginal opportunity costs." *Commonwealth Edison Co.*, 113 FERC ¶ 61,278, at 62,121 (2005). By contrast, "paying different amounts to different generators based on the level of compensation needed to keep the generator in operation would create a unit-specific cost-based system and undermine the advantages of a market for capacity." *Devon Power LLC*, 110 FERC ¶ 61,315, at 62,227 (2005).

Prior to the creation of the ZEC programs, market signals indicated that the five nuclear power plants receiving ZECs were not economical and should retire. The plan to close those plants was not the result of a market failure. On the contrary, it reflected the reality of competition among generators to meet energy demand and reliability needs in the wholesale

power market. In particular, lower gas prices have reduced costs broadly in electricity markets – which pressures *all* sellers and benefits consumers.[8] But had these five nuclear power plants retired, the resulting reduction in supply would have tended to raise near-term energy prices, encouraging new generators to enter the market if they could be profitable at the new prices.

In contrast, the ZEC programs keep the five nuclear power plants in the market, maintaining excess capacity and insulating these noncompetitive resources from market pressures faced by other participants. The lower market equilibrium price created by the ZEC subsidies acts as a barrier to entry for new resources, including (perversely) more efficient, renewable resources and the flexible generation needed to support them. The artificially lower market-clearing price discourages investment in new generators that would be more efficient than the nuclear plants. With the ZEC programs, more efficient new generators are signaled to stay out of the market because they cannot recoup their operating costs. Similarly, existing, more efficient generators that would be profitable at the competitive market price may not be profitable at the artificially lower market price created by the ZEC programs and be forced from the market. The power of market incentives to drive innovation is muted.

In the view of *amici*, the ZEC programs select specific winners – and inevitably create losers among the remaining generators. Selecting winners and losers

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[8] *See* U.S. Dep't of Energy, *Staff Report to the Secretary on Electricity Markets and Reliability* 35-39 (Aug. 2017) ("DOE Staff Report"), https://www.energy.gov/downloads/download-staff-report-secretary-electricity-markets-and-reliability.

constitutes discrimination that is fundamentally incompatible with any efficient wholesale market design. In a recent FERC technical conference, a number of economists expressed concern that state-government intervention in wholesale markets – including, in particular, the creation of ZEC programs to keep nuclear plants in operation – is putting the operation of competitive wholesale markets at risk.[9] Such discrimination damages wholesale markets where they are perhaps most vulnerable by undermining the ability of wholesale markets to send accurate signals regarding investment and retirement decisions. Day-ahead and same-day energy markets have done an effective job, at least at times of moderate demand, of matching wholesale prices to marginal costs. Dealing with high-demand and scarcity situations is a focal point of current reforms. Furthermore, it has been apparent – in part because of well-intended regulatory interventions – that short-term market prices do not allow generators to recover their fixed costs; capacity markets are intended to help to address that problem and provide appropriate incentives for needed resources to remain in or to enter the market.[10] By keeping uneconomic capacity in the market, ZEC programs undermine capacity markets and severely distort investment decisions.

C. The ZEC Programs May Undermine Efforts To Transition to Alternative Energy Resources

The States' selection of winners and losers in the electricity generation market was ostensibly to

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[9] *See* DOE Staff Report 116-17.

[10] *See id.* at 108-11.

reduce carbon emissions. *Star* Pet. App. 18a; *Rhodes* Pet. App. 8a. However, as a result of the distortions to pricing signals, there can be no assurance that the ZEC programs will have that intended effect.

Economic analysis helps to explain why subsidies like the ZEC programs may delay, rather than promote, achievable, beneficial, and cost-effective carbon-emissions reductions. The subsidies here are based loosely on the "social cost of carbon," and, at first blush, that might seem to make some sense. But it does not. For one thing, there is no assurance that the generating resources that the nuclear generators will displace are carbon-emitting: on the contrary, the distorted market may discourage entry of clean energy sources and thereby perpetuate carbon emissions. It also may discourage conservation, and indeed encourage greater consumption, due to lower wholesale prices, resulting in greater amounts of generation from less "clean" resources.

More fundamentally, the "social cost of carbon" is an economic externality – a cost of carbon-emitting electricity generation that is not properly incorporated into the price that consumers of electricity pay. The proper way to account for this cost is to incorporate it into the price of electricity, raising the price of carbon-emitting resources. (This can be done through a carbon tax or a cap-and-trade system, for example.) The ZEC programs do not even approximate such a principled market intervention; instead, they provide a selective subsidy to five low-carbon resources out of all suppliers.

The "theory of the second best" states that achieving an efficient price (such as by fully internalizing an externality) for one good or service in a market with multiple inefficient prices for goods and services

without also setting efficient prices for those other goods and services cannot be relied on to remove the overall efficiency of the market.[11] Rather, correcting only a single inefficient pricing problem may make the overall market *less* efficient.

Further, if one necessary condition to produce an optimal or "first best" allocation of resources is absent, it is not necessarily true that the rest of the necessary conditions, if they exist, will lead to a beneficial "second best" allocation. The result instead may involve multiple distortions from the optimal conditions, and the true "second best" allocation may look very different from the "first best" allocation.

In more familiar terms, if one is baking cookies, and the best possible cookie contains both chocolate chips *and* coconut, it is not necessarily true that the second-best cookie contains either chocolate chips *or* coconut. The second-best cookie may be a ginger-snap, something completely different from the first-best cookie.[12]

The theory of the second best is not a reason to eschew incremental progress, but it does counsel careful consideration of the collateral impact of such partial achievements. The theory is at play here. Rather than implement the first-best solution of a price on carbon-emitting resources, Illinois and New York chose a selective subsidy to five low-carbon resources. This cannot be counted on to improve the efficiency of the Illinois and New York power sectors,

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[11] *See generally* R.G. Lipsey & Kelvin Lancaster, *The General Theory of Second Best*, 24 Rev. Econ. Stud. 11 (1956).

[12] Example taken from Free Exchange, *Making the second best of it – What it means to do our second best*, The Economist (Aug. 21, 2007), https://www.economist.com/blogs/freeexchange/2007/08/making_the_second_best_of_it.

to result in lower costs over time, to provide the least-cost "bridge" to carbon-emissions reductions, or even to reduce net carbon emissions at all.

For example, the ZEC programs could force retirement of low-emissions generators that are more flexible in operation than the ZEC-eligible nuclear power plants and that would have survived had the ZEC-eligible plants retired. Similarly, beyond removing the necessary flexible units, the artificially suppressed price of power may also simply prevent the entrance of new zero-emissions generators that the ZEC programs nominally support. Overall price suppression also encourages greater consumption and, in turn, could result in higher demand for resources that are not "clean." Other unforeseen consequences might be to discourage new transmission that would bring clean power from outside the ISOs. If markets are allowed to operate, market participants can use their own initiative (and investments) to figure out the best response to the changes in market prices that have rendered the nuclear units noncompetitive.

The ZEC programs may be particularly pernicious because of their impact on flexible generation resources. By far the lowest cost, new, zero-carbon resources are variable wind and solar power generators. The least-cost path to a low-carbon future is virtually certain to include significant increases in their deployment. These renewable resources, however, are variable; they cannot guarantee to match their power injections with consumption, which system operators require for reliability. "Suppliers must generate – every day, hour, and minute – the exact amount of power necessary to meet demand from the utilities and other [LSEs] that buy power at

wholesale for resale to users." *EPSA*, 136 S. Ct. at 768. Otherwise, massive outages could occur.

To integrate these variable renewable resources into the power grids effectively requires flexible generation resources (in addition to flexible loads) – generators that can come online quickly, ramp up to meet demand that wind and solar cannot meet, and go offline quickly when supply rises or demand falls. But because current markets do not do a good job of assigning value to such flexibility – even absent state intervention – current energy markets may provide inadequate incentives to invest in flexible generation.

In this regard, the ZEC programs and associated price suppression make things worse, acting as a barrier to entry and (what amounts to the same thing) an inducement to exit to flexible generators. Instead, the ZEC programs preserve expensive, inefficient, and inflexible generation that must operate even when there is ample wind and solar energy to meet demand.[13]

For these reasons, the ZEC programs distort the efficient market dynamics on which FERC relies to produce wholesale market prices that are just and reasonable and act as a barrier to the entry of new, less costly, and more efficient generation, including the efficient zero-carbon resources and complementary flexible resources needed to achieve reasonable carbon-reduction goals. And, in doing so, they may impair progress toward a zero-carbon electric grid.

CONCLUSION

The petitions for a writ of certiorari should be granted.

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[13] *See* DOE Staff Report 114-16.

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APPENDIX

List of *Amici Curiae*[*]

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William W. Hogan, Ph.D., is Research Director of the Harvard Electricity Policy Group and the Raymond Plank Professor of Global Energy Policy at the John F. Kennedy School of Government at Harvard University. He has been actively engaged in the design and improvement of competitive electricity markets in many regions of the United States, as well as around the world, from England to Australia. His activities include designing the market structure and market rules by which regional transmission organizations, in various forms, coordinate bid-based markets for energy, ancillary services, and financial transmission rights.

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Mark Z. Jacobson, Ph.D., is a professor of Civil and Environmental Engineering and a senior fellow at the Woods Institute for the Environment and at the Precourt Institute for Energy at Stanford University. His career has focused on better understanding air pollution and global warming problems and developing large-scale clean, renewable energy solutions to them. He has written more than 155 peer-reviewed papers and three textbooks.

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Byron Schlomach, Ph.D., is Director of the 1889 Institute in Oklahoma and has served as chief economist at the Texas Public Policy Foundation and Director of the Center for Economic Prosperity at the Goldwater Institute. He has coauthored and supervised research on electric competition in Arizona and Oklahoma.

Roy J. Shanker, Ph.D., has been an independent consultant in energy markets since 1980 and consultant on electric industry matters since 1973. He has been actively involved in the design, development, and conduct of the PJM and New York Independent

System Operator markets since 1995. He has been an invited speaker at the Federal Energy Regulatory Commission and testified on numerous occasions as an expert witness.