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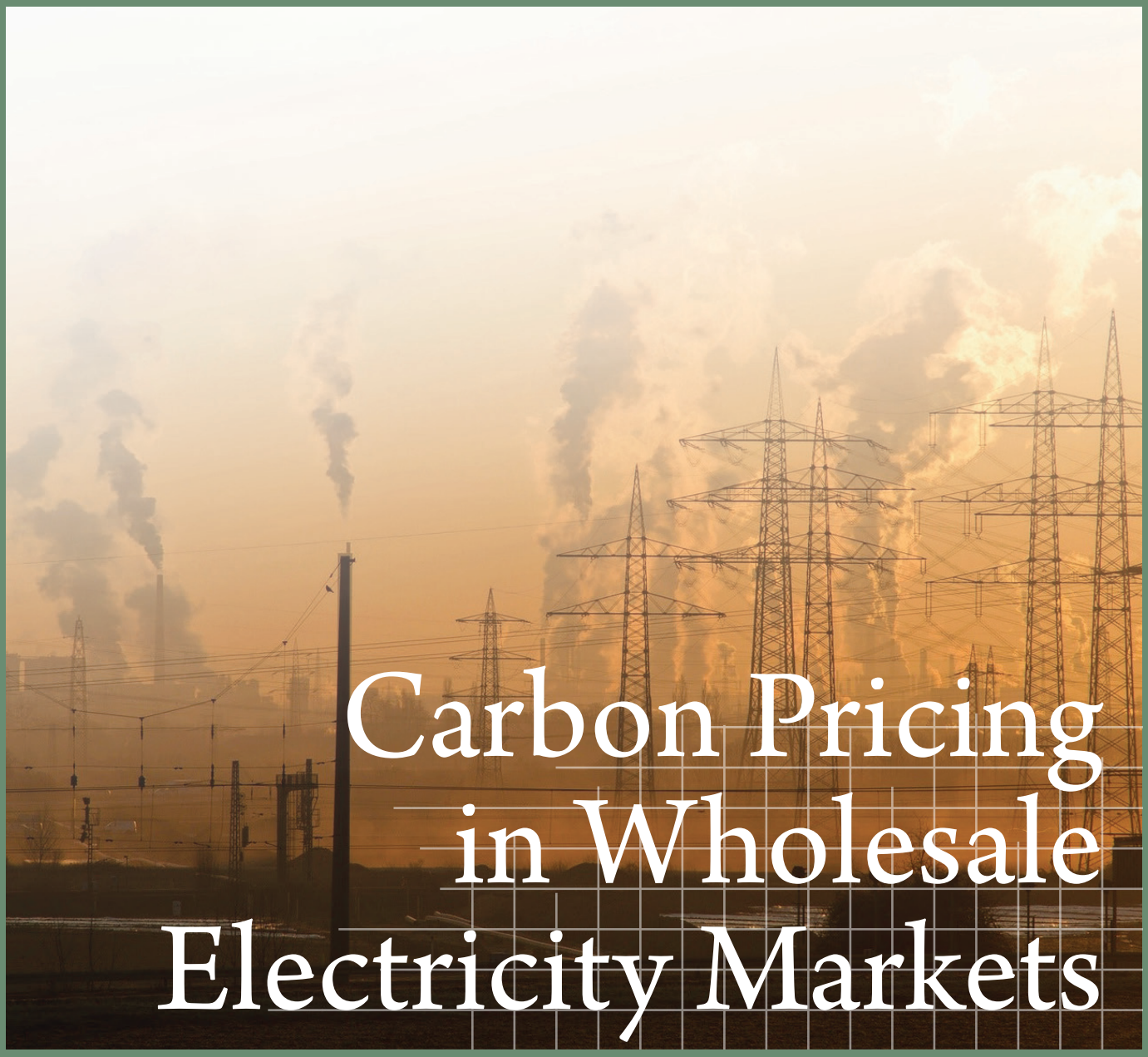

Carbon Pricing in Wholesale Electricity Markets

An Economic and Legal Guide

Matt Butner, Ph.D.
Bethany Davis Noll
Justin Gundlach
Burcin Unel, Ph.D.
Avi Zevin

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Institute for Policy Integrity
New York University School of Law
Wilf Hall, 139 MacDougal Street
New York, New York 10012

Matt Butner is an Economic Fellow at the Institute for Policy Integrity at NYU School of Law, where Bethany Davis Noll is Litigation Director, Justin Gundlach is an Attorney, Burcin Unel is Energy Policy Director, and Avi Zevin is a Senior Attorney.

Please contact burcin.unel@nyu.edu with any questions about the report.

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Table of Contents

Breakout Boxes

Executive Summary

Increasingly, policymakers are recognizing the urgent need to reduce the carbon dioxide (CO_2) emissions that contribute to climate change. Economics teaches that forcing emitters to pay a price for each ton of CO_2 that they emit can achieve the emissions reductions policymakers seek at the lowest possible cost.

With that in mind, a number of organized wholesale electricity market operators—called Regional Transmission Organizations (RTOs)—are exploring or developing *affirmative* carbon-pricing rules, in which the RTO prices CO_2 emissions directly in energy market operations. These rules have the potential to reduce CO_2 emissions in a way that complements the competitive structure of electricity markets, making this approach an important opportunity for wholesale market stakeholders to consider.

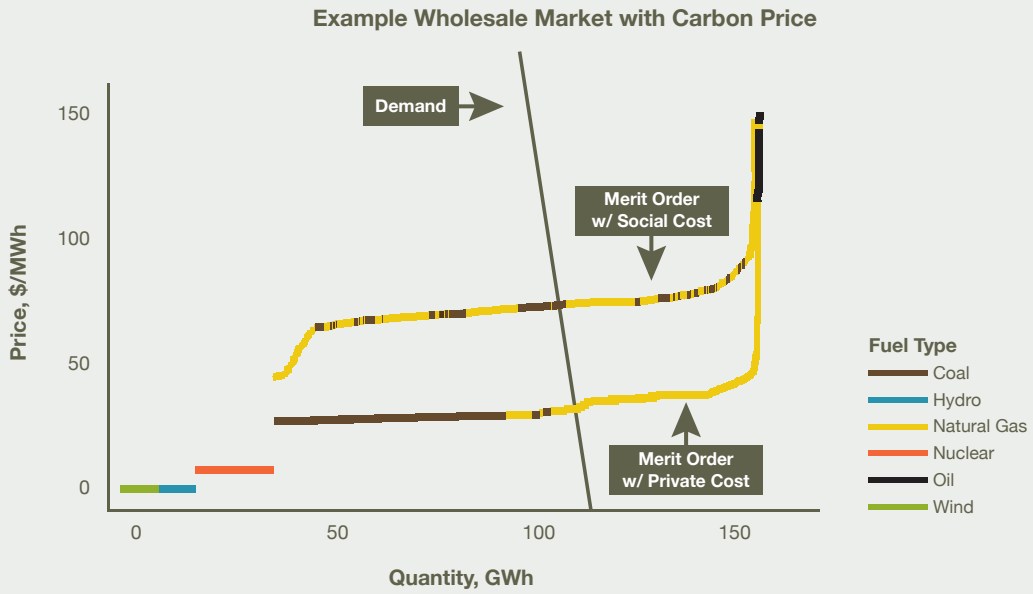
This report explains how such carbon-pricing rules in organized wholesale electricity markets can improve economic efficiency. It then explores the economic principles and legal requirements for RTOs, states, and the Federal Energy Regulatory Commission (FERC) to consider when implementing a carbon-pricing rule in organized wholesale electricity markets. And it identifies several policy-design approaches that, to varying degrees, meet those economic principles and are likely to be found legally permissible.

Well-Designed Carbon-Pricing Rules Improve Economic Efficiency

Carbon pricing in organized wholesale electricity markets can help correct a market failure that leads the electricity sector to over-emit CO_2. That market failure—a "negative externality" from pollution—imposes a cost on third parties that is not taken into account by market participants. As a result, those participants produce more emissions than is optimal from society's perspective.

An economy-wide tax on all polluters is the first-best way to address this negative externality. However, when that approach is not feasible, sector-specific carbon prices can serve as an alternative. In areas of the country with organized wholesale electricity markets, a carbon-pricing rule that incorporates the external cost of CO_2 emissions into the RTO's dispatch decisions can align market prices with the marginal social cost of electricity generation without compromising the operational efficiencies of those markets.

A carbon-pricing rule in organized wholesale electricity markets would be a more efficient policy tool to reduce CO_2emissions compared to many other climate policies targeting the electric sector. First, it would cause CO_2-emitting generators to directly internalize this externality. Second, it would provide clear investment signals that, in turn, would lead to the efficient retention or entry of clean generators, and efficient exit of emitting generators. Third, it would be technology neutral, and so allow the market to select the lowest-cost emissions-reduction opportunities. Fourth, it could include features such as border adjustments to limit emissions leakage that might occur if there are trades with entities from regions without similar carbon-pricing policies. Fifth, it would provide regulatory certainty and uniformity, lowering the overall cost of achieving various state clean energy and climate commitments.



A Carbon-Pricing Rule Must Follow Economic Principles and Meet the Requirements of the Federal Power Act and Constitution

To achieve the efficiency benefits described above, carbon-pricing rules in organized wholesale electricity markets should follow three economic principles:

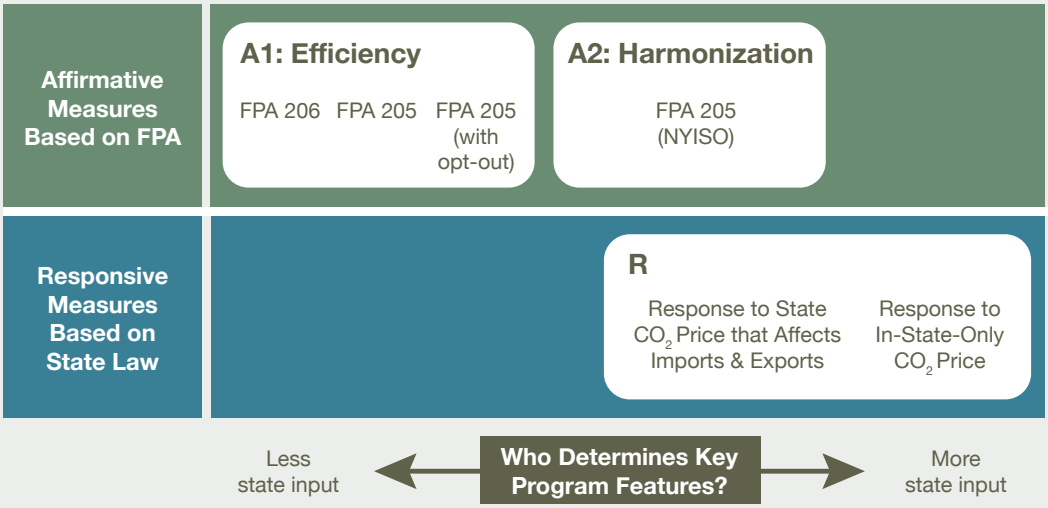
- The wholesale market price of electricity should reflect the marginal social cost of electricity.
- The scope of the design should include all producers and consumers of electricity.
- If the scope of a carbon-pricing rule is incomplete, it should optimally mitigate leakage.

In addition, any RTO market changes adopting a carbon-pricing rule must satisfy three legal requirements:

- A carbon-pricing rule in an organized wholesale market must fit within the scope of FERC's ratemaking authority under the Federal Power Act (FPA). Specifically, FERC may approve an RTO carbon-pricing rule only if it directly affects wholesale rates, and FERC may not regulate activity reserved to the states under the FPA.
- FERC may only approve, accept, or require a carbon-pricing rule that satisfies the statutory requirements established by the FPA. Specifically, such a rule must result in just and reasonable rates, must not result in undue preference or discrimination, and the factual findings underlying FERC's approval of the rule must be supported by substantial evidence.
- If states are involved in the application of a carbon price, their actions must be consistent with constitutional limits and RTO responses must enable such compliance. In particular, states may not establish a wholesale rate. Furthermore, state carbon-pricing programs may not create an undue burden on interstate commerce or be protectionist, and they may not regulate extraterritorially.

A Number of Approaches to Wholesale Market Carbon Pricing Can Satisfy the Relevant Economic Principles and Legal Requirements

As shown in the figure below, there are a variety of potential approaches to carbon-pricing rules in organized wholesale electricity markets.[1] Two factors organize these approaches: whether the carbon price is imposed under the authority provided to FERC by the FPA, or under state authority to regulate generators and their emissions;[2] and the roles the RTO and state play in designing the carbon-pricing rules.



This report outlines several approaches to designing a carbon-pricing rule. Under approach A1 (A, for *affirmative*), an RTO could affirmatively implement a carbon-pricing rule within its electricity market on the theory that doing so will improve market efficiency by internalizing an important externality that is directly connected to wholesale rates. This type of carbon-pricing rule could be implemented under section 205 or section 206 of the FPA, and can be applied to all wholesale sales within the RTO, or just to wholesale sales in states that opt in. A carbon-pricing rule adopted to increase economic efficiency would have to meet the economic principles listed above, including setting a carbon price at least at the best estimate of the marginal damage caused by a ton of CO_2 (established by the federal Interagency Working Group on the Social Cost of Greenhouse Gases), and mitigating emissions leakage.

The second approach (A2) represents a proposal under consideration by the New York Independent System Operator (NYISO) to affirmatively adopt a carbon-pricing rule under the theory that doing so will allow it to harmonize—and thereby protect the integrity of—the operation of organized wholesale electricity markets and New York State's climate and clean energy commitments. NYISO has proposed to look to the state Public Service Commission when selecting the price—which, depending on the design of the program, would be permissible so long as NYISO independently finds that such a price meets its objectives.

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[1] These approaches do not represent a comprehensive list; rather, they have been adopted, are currently being considered, or serve to highlight key factors relating to the legal basis of potential carbon-pricing measures.

[2] A carbon price could also be imposed under a congressionally enacted carbon tax or in response to Environmental Protection Agency regulation. No federal carbon pricing is imminent and so this report focuses on state-law examples of non-FPA legal authority.

The third approach (R, for *responsive*) involves RTO responses to carbon-pricing policies adopted by states. A handful of states that participate in wholesale electricity markets have also adopted, or are planning to adopt, carbon-pricing policies to reduce CO_2 emissions from the electric sector. In order for these state-level policies to be implemented effectively, RTOs will also have to make responsive changes to their market rules. FERC's approval of the California Independent System Operator's Energy Imbalance Market, which includes a border adjustment to facilitate implementation of California's Cap-and-Trade Program, provides a useful precedent.

In sum, this report explains that affirmative RTO carbon pricing represents an economically beneficial and legally feasible opportunity for cutting emissions efficiently. The approach an RTO plans to take for the *adoption* of a program cannot be determined independently from key elements of that program's *design*, such as its geographic scope, the availability of an opt-in, the address of leakage across jurisdictional borders, and the price level. Rather, these elements must all be considered in relation to one another from the outset.

Introduction

Policymakers are increasingly recognizing the urgent need to reduce the greenhouse gas emissions that contribute to climate change. Given the lack of federal policy to combat climate change, states are taking ambitious actions by implementing various policies to reduce emissions from the electric sector. While many of these policies rely on technology-specific clean energy goals, discussions about market-based policies that can reduce emissions efficiently in a technology-neutral manner, such as carbon pricing, are gaining momentum.

To date, in the United States, states have assigned prices to greenhouse gas emissions, usually as part of regional cap-and-trade programs such as the Regional Greenhouse Gas Initiative (RGGI) in the Mid-Atlantic and Northeast. However, the unique features of organized wholesale electricity markets create an opportunity for *affirmative carbon pricing*, pricing carbon dioxide (CO_2) emissions directly in energy market operations. And, indeed, several entities that administer organized wholesale electricity markets regulated by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act (FPA) have recently been considering doing so in their markets.

New York's grid operator, the New York Independent System Operator (NYISO), has developed but not yet adopted a carbon-pricing rule that it may propose to FERC in the near future.[3] And at least two others, PJM Interconnection (PJM) and the Independent System Operator of New England (ISO-NE), have conducted or are conducting stakeholder processes to consider carbon pricing.[4]

These affirmative carbon-pricing rules in the organized wholesale electricity markets represent an economically beneficial approach to addressing CO_2 emissions from the electricity sector, which RTOs and their stakeholders should consider. As this report explains, such carbon pricing in the organized wholesale electricity markets can provide the right price signals to cost-effectively reduce emissions, drive investment in clean energy resources, and provide regulatory certainty and uniformity. Further, it can align consumer incentives with the socially beneficial use of energy and, thus, create an important price signal for the electrification of the transportation and building sectors.

Such affirmative carbon-pricing rules in organized wholesale electricity markets are also legally feasible under the FPA. In this report, we explain the legal requirements these policies must satisfy, and discuss the potential paths a market operator might take to implement a carbon-pricing rule. This report covers both affirmative carbon-pricing rules such as the one NYISO has developed and responses market operators can take to align organized wholesale electricity markets with state-level carbon-pricing programs like California's Cap-and-Trade Program and RGGI.

By placing this range of policy approaches into a common frame—one that incorporates both economic objectives and legal requirements—this report aims to provide the basis for ongoing discussions of how best to implement carbon-pricing rules directly in the organized wholesale electricity markets.

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[3] *See Carbon Pricing*, NYISO, https://www.nyiso.com/carbonpricing (last visited Feb. 6, 2020).

[4] *See Carbon Pricing Senior Task Force*, PJM, https://www.pjm.com/committees-and-groups/task-forces/cpstf.aspx (last visited Feb. 6, 2020); *Integrating Markets and Public Policy*, New England Power Pool, http://nepool.com/IMAPP.php (last visited Feb. 6, 2020); *see also* Gordon van Welie, ISO-New England, New England's Wholesale Electricity Markets: The Clean Energy Transition and Future Pathways 7 (Feb. 2020), https://perma.cc/W2YD-7FEV ("Is it time to consider realistic pricing for carbon emissions in New England?").

The report is organized as follows. Part I explains how carbon-pricing rules in the organized wholesale electricity markets can efficiently reduce CO_2 emissions and improve social welfare. Part II identifies important economic criteria and legal requirements to consider when designing and adopting carbon-pricing rules for an organized wholesale market. Part III draws on those criteria and requirements to present different approaches to carbon pricing for organized wholesale electricity markets, including both affirmative rules and responses to state-level policies and programs.

I. Carbon Pricing: The Basics

This Part briefly provides key background information about the organized wholesale electricity markets and carbon pricing. It then explains the benefits of carbon pricing in the organized wholesale electricity markets as compared to other policies that address CO_2 emissions.[5] And it then explains the mechanics of how a carbon-pricing rule in these markets can be implemented.

A. Background on Organized Wholesale Electricity Markets, Carbon-Dioxide Emissions, and Carbon Pricing

Organized wholesale electricity markets serve as a critical tool for reliably meeting electricity demand at the lowest cost. However, because the buyers and sellers in these existing markets do not generally account for the damages caused by CO_2 emitted in generating the electric energy necessary to meet demand, these markets fail to promote, much less achieve, economic efficiency in their operation, even though they provide electricity reliably.

1. Organized Wholesale Electricity Markets Strive to Be Economically Efficient

Since the mid-1990s, FERC has initiated a significant transformation of the electric system by embracing open access market-based competition and the formation and enhancement of organized wholesale competitive markets.[6] FERC drove this transformation through a series of orders to encourage and regulate the formation of RTOs, independent, non-profit organizations that, among other things, manage open access transmission facilities and associated organized wholesale electricity markets. These FERC-regulated organizations run auctions for electric energy and certain ancillary services, and, in some regions, capacity markets, in accordance with FERC-approved or accepted tariffs.[7] FERC's goal with these reforms was to take advantage of competitive forces to promote efficiency in the organized wholesale electricity markets and ensure that electricity consumers pay the lowest possible price for reliable service. As a result of this transformation, today there are six FERC-regulated RTOs in the United States, managing the dispatch of most electricity generation and serving two-thirds of electricity demand.[8]

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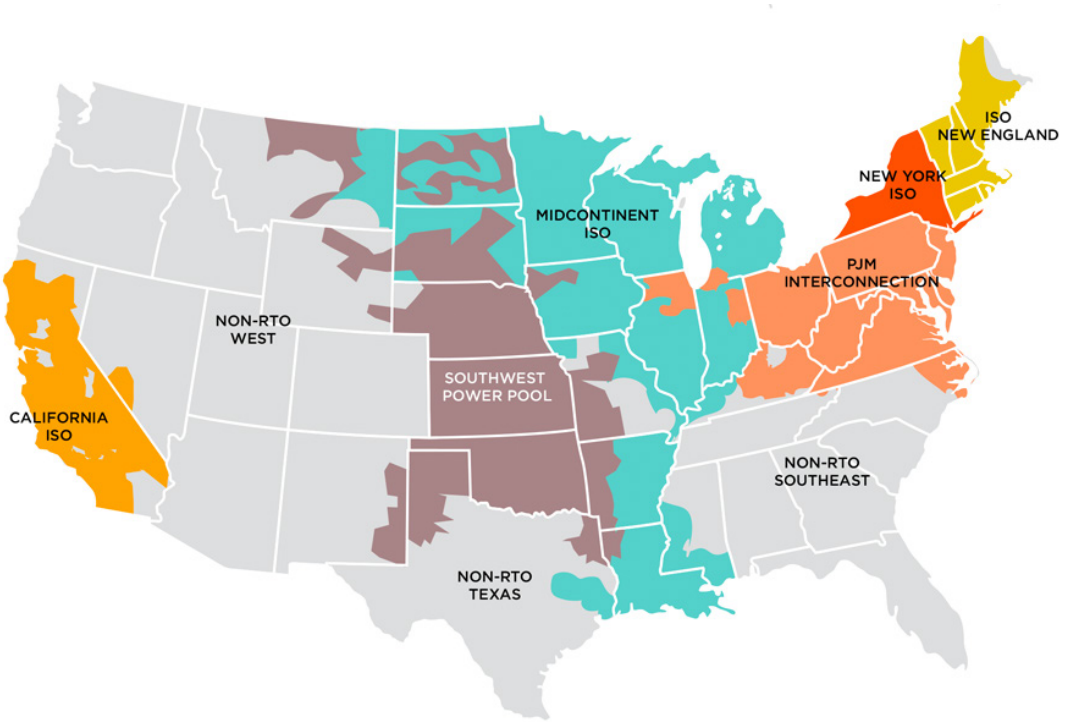
[5] This report focuses on the externality of CO_2 emissions, but does not mean to imply that FERC could not apply the reasoning presented here to other externalities of electricity generation as well.

[6] *See* Burcin Unel & Bethany Davis Noll, *Markets, Externalities and the Federal Power Act: The Federal Energy Regulatory Commission's Authority to Price Carbon Dioxide*, 27 N.Y.U. Envtl. L.J. 1, 19, 23 (2019).

[7] FERC has established two models for central management of the electric grid: independent system operators (ISOs) and RTOs. The legal and practical distinctions between ISOs and RTOs are minor and not relevant for the purposes of the issues discussed herein. Therefore, for simplicity, this report refers generally to central grid operators as RTOs.

[8] There are three RTOs in the Northeast: PJM, NYISO, ISO-NE; three in the Central United States: ERCOT, MISO, SPP; and one in the West: CAISO. However, ERCOT is not subject to FERC jurisdiction.

Figure 1



A map of FERC-regulated RTOs.
Source: http://sustainableferc.org/iso-rto-operating-regions/

Though each RTO's market rules vary, all reflect the same, statutory goal: promote efficiency in their markets and rely on competitive market forces to ensure that electricity consumers pay the lowest possible price for reliable service.[9] And, economic theory has established that, in the absence of market failures, a perfectly competitive market can maximize social welfare by meeting market demand at the lowest possible cost to consumers.[10] Competitive wholesale electricity markets elicit supply from electricity generators with the lowest marginal costs, incentivize electricity generators to reduce their costs, and facilitate mutually beneficial trades in real time.[11] In perfectly competitive markets, the resulting market prices reflect the marginal social cost of production and consumption, and provide price signals for allocating society's resources in a manner that would maximize its welfare. While the competitive organized wholesale electricity markets may never achieve the end state welfare maximization expected in perfectly competitive markets, it is a goal that FERC and their market administrators work toward.

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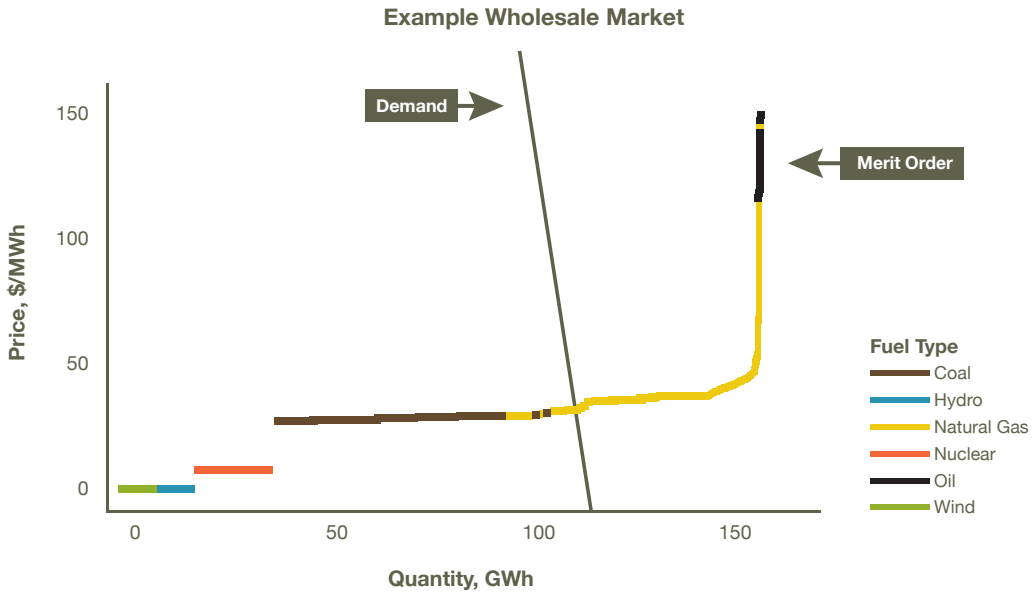
[9] *See About Us: What We Do*, ISO New England, https://www.iso-ne.com/about/what-we-do/ (last visited Mar. 9, 2020); *About Us: What We Do and FAQ*, N.Y. ISO, https://www.nyiso.com/what-we-do (last visited Mar. 20, 2020); *About PJM: PJM's Mission & Vision*, PJM, https://www.pjm.com/about-pjm/who-we-are/mission-vision.aspx (last visited Mar. 9, 2020); *About MISO*, MISO, https://www.misoenergy.org/about/ (last visited Mar. 9, 2020); About Us, Southwest Power Pool, https://spp.org/about-us/ (last visited Mar. 9, 2020); *About Us*, Cal. ISO, https://www.caiso.com/about/Pages/default.aspx (last visited Mar. 9, 2020).

[10] *See* Paul Krugman & Robin Wells, Microeconomics 106-09 (2d ed. 2009).

[11] *See generally* Severin Borenstein & James Bushnell, *The US Electricity Industry After 20 Years of Restructuring*, 7 Ann. Rev. Econ. 437 (2015); James Bushnell, Erin T. Mansur & Kevin Novan, Review of the Economics Literature on US Electricity Restructuring (2017), http://bushnell.ucdavis.edu/uploads/7/6/9/5/76951361/economics-literature.pdf (summarizing the benefits of restructuring).

In pursuit of this goal, RTOs run auctions in which generators submit offers that reflect the minimum price at which they are willing to supply a given quantity of electricity.[12] The market operator ranks these competing offers by price, generally prioritizing supply from generators willing to generate electricity at the lowest prices. This ordering creates the market supply curve, commonly referred to as "the merit order" because generators are dispatched based on their economic merit, or marginal costs. The market clearing price is then determined by the offer price of the marginal unit—the marginal cost of the last unit needed to meet demand—taking into account features of the transmission grid such as congestion and line losses.[13]

Figure 2



An example of a wholesale electricity market. Competing generators offer electricity at different market prices. Ranking the resources from lowest to highest price creates the merit order. Absent transmission constraints, the market price in any given hour is at the intersection of the merit order and demand for that hour. All electricity generators that produce electricity receive the same price for energy, as determined by the last unit required to meet demand. Electricity generators' costs of operating are calculated for a sample of generators in the United States using data on fuel costs (from the Energy Information Administration) and average heat rates (from the Environmental Protection Agency's Air Markets Program).

Over the last twenty years, the organized wholesale electricity markets have proven themselves in reducing the cost of meeting electricity demand and increasing mutually beneficial trade.[14] However, outcomes in these markets could still depart from the outcomes of an idealized, perfectly, or even a workably competitive market, partly due to technical features of electricity generation and transmission,[15] and also because of what economists call "market failures."[16]

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[12] *See* The Division of Energy and Market Oversight Office of Enforcement, FERC, Energy Primer: A Handbook of Energy Market Basics 59-61 (2015), https://www.ferc.gov/market-assessments/guide/energy-primer.pdf.

[13] *See id.* In reality, the price in most markets is a Locational Marginal Price, which varies by pricing node and every five minutes. This price includes a component for energy, transmission congestion, and transmission losses.

[14] *See* Kira R. Fabrizio et al., *Do Markets Reduce Costs? Assessing the Impact of Regulatory Restructuring on US Electric Generation Efficiency*, 97 Am. Econ. Rev. 1250, 1251-73 (2007) (showing and quantifying how cost recovery leads to above-average fuel and labor costs); *see also* Erin T. Mansur & Matthew White, *Market Organization and Efficiency in Electricity Markets* (2007) (working paper, Yale School of Management), https://pdfs.semanticscholar.org/8795/6f0ee20b13529213e4d637f9084f3e30ff06.pdf; Steve Cicala, *Imperfect Markets Versus Imperfect Regulation in US Electricity Generation* (2019) (working paper, University of Chicago), https://home.uchicago.edu/~scicala/papers/elec_gov_v_mkt/elec_gov_v_mkt_draft_2.pdf (showing market-based dispatch reduces cost and increases trade relative to bilateral contracts).

[15] Technical features include transmission losses and congestion, which prevent frictionless trade; non-convexities and capacity constraints in power plant production; and the time it takes for power plants to turn on or off, which prevents immediate production.

[16] Krugman & Wells, *supra* note 10, at 106-09.

Electricity markets exhibit many traditional market failures such as asymmetric information (when parties have private information that they can exploit to their benefit) and exertion of market power (when parties have the power to increase the market price above competitive prices).[17] As a result of these market failures, prices determined in RTO auctions can depart from the marginal social cost of providing reliable electricity, and so, lead to an inefficient allocation of resources in a manner that decreases social welfare.

When market failures exist, intervention is necessary to promote, if not ensure, economic efficiency. Indeed, in the past, FERC has recognized that these market failures exist in organized wholesale electricity markets, and has intervened to address them. In its interventions, FERC acknowledged that doing so makes the operation and outcomes of these markets more consistent with the idealized, perfectly competitive market, and thereby increases social welfare.[18]

2. Pricing Carbon-Dioxide Emissions from Electricity Generation Increases the Efficiency of the Organized Wholesale Electricity Markets

Another type of market failure that is widely recognized by economists and present in electricity markets relates to CO_2 emissions that result from electricity generation.[19] These emissions create a "negative externality," which is a cost of a market transaction that is borne by a third party to that transaction. Climate change damages caused by greenhouse gases—which include increased temperatures, property damage from sea level rise, reduced productivity, and induced mortality—can be quite large in comparison to the value of the electricity generated. For example, using the best available monetary estimate of the damages caused by a ton of CO_2, the **Social Cost of Carbon**,[20] each megawatt hour (MWh) of electricity from a coal-fired generator leads to a bit less than a ton of CO_2 and causes roughly $50 of damages. In comparison, the average energy price in RTO markets range from $30 to $50 per MWh.[21]

Despite the significant magnitude of the damages caused by CO_2 emissions, market participants have no incentive to consider them when deciding how much to consume or produce because they do not directly bear those costs. As a result, the generators dispatched in organized wholesale electricity markets based on their private economic merit order will emit more CO_2 than what is optimal from society's prospective. In other words, just like market power and asymmetric information, externalities reduce social welfare.

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[17] *See generally* Ali Hortacsu & Steven L. Puller, *Understanding Strategic Bidding in Multi-Unit Auctions: A Case Study of the Texas Electricity Spot Market*, 39 RAND J. Econ. 86 (2008) (highlighting information asymmetry and imperfectly competitive behavior); Matt Woerman, *Market Size and Market Power: Evidence from the Texas Electricity Market*, (Dec. 13, 2019) (working paper) https://drive.google.com/file/d/1ZnxPR14WoXYoUDB4HplsFlM5-YkXlvRj/view); Matt Butner, Gone With the Wind: Consumer Surplus From Renewable Generation (Jan. 20, 2019) (working paper) https://mattbutner.github.io/filecabinet/gonewiththewind.pdf (showing evidence of market power).

[18] *See* Davis Noll & Unel, *supra* note 6, at 26-38.

[19] Electricity production can also generate sulfur dioxide, nitrogen oxides, and particulate matter pollution that is harmful to human health and the environment. Although these pollutants have declined since 2010, this trend has reversed in recent years. *See* Stephen Holland, Erin Mansur, Nicholas Muller & Andrew Yates, *Decompositions and Policy Consequences of an Extraordinary Decline in Air Pollution from Electricity Generation*, Am. Econ. J. Econ. Pol'y (forthcoming), *available at* https://www.nber.org/papers/w25339; Karen Clay & Nicholas Muller, *Recent Increases in Air Pollution: Evidence and Implications for Mortality* (Nat'l Bureau of Econ. Research, Working Paper No. 26381), https://www.nber.org/papers/w26381.

[20] Though the Trump administration withdrew the IWG's technical support documents, *see* Exec. Order No. 13,783 § 5(b), 82 Fed. Reg. 16,093 (Mar. 28, 2017), experts continue to recommend that agencies rely on the IWG's estimates as the best available estimates for the monetized damages associated with an additional ton of CO_2 emissions. Richard Revesz et al., *Best Cost Estimate of Greenhouse Gases*, 357 Sci. 655 (2017).

[21] *See* FERC, State of the Markets Report 2018 14 (2019), https://www.ferc.gov/CalendarFiles/20190418105357-A-3-report.pdf.

Key Term: The Social Cost of Carbon

The Social Cost of Carbon measures and monetizes the damage that results from emission of a ton of CO_2 into the atmosphere. Because CO_2 is a global pollutant, a ton emitted causes the same amount of damage regardless of where the emission occurs.[22] As a result, a single price, applicable regardless of location, is appropriate for monetizing damages. The Interagency Working Group's (IWG) 2016 Social Cost of Carbon estimate is the best currently available estimate for the external cost of CO_2 emissions.[23] The IWG's methodology has been repeatedly endorsed by reviewers. In 2014, the U.S. Government Accountability Office concluded that IWG had followed a "consensus-based" approach, relied on peer-reviewed academic literature, disclosed relevant limitations, and adequately planned to incorporate new information through public comments and updated research.[24]

As almost every economic sector creates CO_2 emissions, the first-best way to address this negative externality is to impose an economy-wide tax on all polluters equivalent to the damages each ton of CO_2 causes.[25] When such an economy-wide tax is not an option, a sector-specific policy requiring electricity generators to pay for the damages, or at least offer their generation supply at prices that reflect the damage costs resulting from their CO_2 emissions, would still be beneficial. Such a sector-specific policy can internalize the externality in the electricity sector in a way that retains the efficiency benefits of organized wholesale electricity markets while cost-effectively reducing CO_2 emissions.

For example, a state might impose a tax on CO_2 emissions from electricity generators. In areas with organized wholesale electricity markets, those generators would incorporate the cost of this tax in their offer prices, just as they include other marginal costs, such as the cost of fuel, in their offer prices. Alternatively, a carbon-pricing rule could be implemented affirmatively by an RTO—through changes to bidding rules or by adding the cost of carbon to the economic merit order as explained in Part I.C below. In either case, market participants face the *marginal social costs* of generating electricity, which include the marginal private costs incurred by electricity generators and the marginal external damages or costs resulting from their CO_2 emissions. As a result, the market prices that result from the economic merit order dispatch of generators align with the marginal social cost of supply from those resources, resulting in markets that are economically efficient.

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[22] Jeffrey Shrader, Avi Zevin, & Burcin Unel, Valuing Pollution Reductions: How to Monetize Greenhouse Gas and Local Air Pollutant Reductions from Distributed Energy Resources 24 (2018), https://policyintegrity.org/files/publications/Valuing_Pollution_Reductions.pdf.

[23] *See* Revesz et al., *supra* note 20.

[24] U.S. Gov't Accountability Off., GAO-14-663, Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates 12-20 (2014), https://www.gao.gov/products/gao-14-663. The Social Cost of Carbon has also been adopted in a number of states. *See* Inst. for Policy Integrity, *States Using the SCC*, The Cost of Carbon Pollution, https://costofcarbon.org/states (last visited Mar. 17, 2020).

[25] *See*, e.g., Arthur Pigou, Welfare Economics (1920). When there are other market failures, like learning-by-doing or technological innovation spillovers from research and development, other policies might be necessary. *See* C. Fischer & R.G. Newell, *Environmental and Technology Policies for Climate Mitigation*, 55 J. Envtl. Econ. & Mgmt. 142, 143-44 (2008).

B. Benefits of Pricing Carbon in Organized Wholesale Electricity Markets

Carbon pricing in any otherwise economically efficient market provides benefits, because it internalizes the externality, gives correct investment signals, and is a technology-neutral approach. This way, market forces determine economically efficient outcomes without a policymaker having to pick winners and losers. The benefits of carbon pricing are even more salient in organized wholesale electricity markets, as these markets are the platform where electricity generators compete to sell their energy generation based on their marginal costs and the mix of fuels used to generate electricity is ultimately decided. In addition, properly designed carbon-pricing rules in organized wholesale electricity markets can effectively address concerns about *incomplete* carbon pricing, when the price cannot be imposed on all polluters. Finally, carbon pricing can provide regulatory uniformity and certainty. This Part discusses each of those benefits in turn.

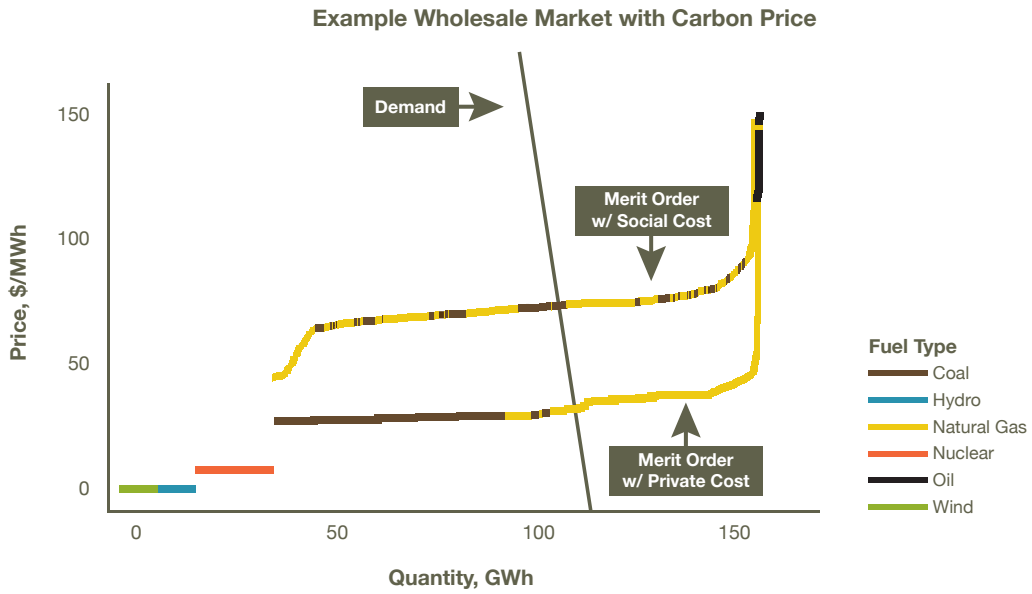
1. Carbon Pricing Internalizes the Externality

Pricing CO_2 in organized wholesale electricity markets internalizes the externality by making the monetized marginal social cost of CO_2 emissions part of the wholesale market transaction. In other words, when there is a marginal cost for CO_2 emissions, market participants take these costs into account when deciding if and how much to produce or consume, correcting the market failure. As a result, carbon pricing improves the economic efficiency of the organized markets and reduces the amount of CO_2 emissions needed to meet the demand for electricity.

In an organized wholesale electricity market, internalizing the externality of CO_2 emissions accomplishes two goals. First, it changes the economic merit order, prioritizing the dispatch of generators with the lowest marginal social cost of production (marginal private costs plus marginal external costs). As a result, a generator that has zero or low emissions of CO_2 but high fuel costs might be dispatched ahead of a generator with somewhat lower fuel costs but higher emissions of CO_2. Second, the market price of electricity increases to reflect the marginal social costs of production. This sends an important signal to both the suppliers and the ultimate consumers of electricity about the true costs of electricity consumption. Both of these mechanisms are presented in Figure 2.

Providing price signals that reflect the marginal external costs of CO_2 emissions is especially important for ensuring that electrification can make cost-effective emission reductions possible. Prices that are higher when higher-emitting resources are on the margin and lower when lower- or zero-emitting resources are on the margin, in combination with real-time or time-of-use pricing, would incentivize consumers to adopt consumption patterns that would efficiently maximize emission reductions. For example, price signals would prompt many people to charge their electric vehicles at desirable times. Furthermore, such prices encourage more efficient energy use, aligning consumer incentives with socially beneficial use and encouraging investment in energy efficiency upgrades.

Figure 3



With a carbon price, the merit order is determined by the marginal social cost of production for each electricity generator. This includes the private cost of operations and the damages CO_2 emissions cause to society. The merit order with social costs prioritizes electricity generators with the least cost to society. With carbon pricing, natural gas plants that are socially more efficient are preferred over socially inefficient coal plants. Now, the wholesale electricity market price reflects the social cost of electricity generation, increasing revenues for low carbon resources. In this example, an electricity generator's social cost of electricity generation is calculated using heat rate and fuel cost data from Figure 2, data on CO_2 emissions from the EPA's Air Markets Program, and assumes the carbon price is the IWG's Social Cost of Carbon.

2. *Carbon Pricing Provides Important Investment Signals for Entry and Exit*

Over time, price signals from carbon pricing in the organized wholesale electricity markets will direct investors towards technologies that are less carbon-intensive or even carbon-free because such technologies will earn higher market revenues. Investors will take into account the future marginal social cost of electricity supply and consumption when deciding between different types of technologies, products, and services, just like they already take into account future marginal private costs, such as the cost of fuel. For these investors, a carbon price makes investing in carbon-emitting generation technologies (such as coal- and natural-gas-fired generators) less profitable as they will earn less revenue in energy markets; hence a carbon price will drive down entry of new fossil-fuel resources. At the same time, carbon pricing will reduce the profitability of existing fossil-fuel resources and speed up their exit.

In comparison, it will be attractive to keep operating and building resources that are not carbon-intensive (such as wind, solar, and nuclear generators) because the carbon price increases the market price and thus the revenue they receive from the organized wholesale electricity market. Further, because organized wholesale electricity markets for electric energy are operated to clear with prices that can vary both by time and location, incentives for the entry of cleaner generators will be higher in locations or times where more carbon-intensive generators are the marginal resource more often. In this way, the entry of new technologies, products, and services will be directed towards the locations and times where they can provide electricity consumers with reliable service at a lower cost to society (including CO_2 emissions).

3. *Carbon Pricing Is a Technology Neutral Approach*

Relative to other policies, carbon pricing in organized wholesale electricity markets has the advantage of considering only the ability of resources to supply electric energy at the lowest marginal social cost, independent of the type of underlying technology, product, or service. This technology-neutral approach ensures every resource can prove itself in the market because the only measure by which resources are compared is their joint cost of operations and carbon intensity. By not mandating a certain technology, product, or service be employed to supply clean electricity, this method reduces CO_2 emissions while minimizing marginal social costs because it does not require the regulator to know, ex-ante, which technology, product, or service can supply electric energy at the lowest marginal social costs. Further, because it is not technology-specific, carbon pricing encourages innovation, leading markets to provide new approaches to reducing emissions.

4. *Carbon Pricing Can Directly Address Emissions Leakage*

Key Term: Emissions Leakage

Emissions leakage occurs when a reduction in CO_2 emissions in a policy region is offset by a resulting increase in CO_2 emissions somewhere else. As a result, the policy is not as effective as it might appear to be. Leakage occurs when the policy (a) induces the import of emissions-intensive goods that are not subject to the policy, (b) reduces exports of less emissions-intensive goods to regions not subject to the policy, or (c) induces an increase in domestic emissions outside the policy region to "backfill" the import of less emissions-intensive goods into the carbon-pricing region. Because the electricity from outside the carbon-pricing region is an almost perfect substitute for the electricity generated inside the carbon-pricing region, leakage is particularly a concern for regional carbon-pricing policies when the policy region is a part of a larger, interconnected grid.

A prime benefit of pricing carbon in organized wholesale electricity markets is the ability to directly address **emissions leakage**. The leakage of CO_2 emissions is a significant concern for any policy that is not a complete global carbon tax.[26] Leakage can occur when carbon pricing is "incomplete"— if some electricity suppliers are exempt from a carbon price, such as units under 25 MW in RGGI, or if there is trade between a region with a carbon price and a region without a carbon price.[27] Emissions leakage undermines the cost-effectiveness of carbon pricing, and so, addressing emissions leakage is an important design aspect of any carbon-pricing rule.

Perfectly addressing leakage is difficult. The first-best solution to emissions leakage is to make carbon pricing complete; every source of CO_2 emissions should be responsible for its costs to society. When this solution is not feasible, for political-economy or jurisdictional reasons, programs targeted at the substitution or trade between electricity generators subject to, and exempt from, carbon pricing can be designed to directly mitigate emissions leakage. Because the organized wholesale electricity market is the platform where electricity production and consumption are coordinated across different electricity generators and regions, it is an excellent venue to address emissions leakage.

For example, consider the trade between two regions that appear identical, but where one region has implemented a carbon price. Electricity generators outside of the carbon-pricing region are not liable for the external costs of their

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[26] *See, e.g.,* Harrison Fell & Pete Maniloff, *Leakage in Regional Environmental Policy: The Case of Regional Greenhouse Gas Initiative*, 87 J. Envtl. Econ. Mgmt., 1, 1-3 (2018); Meredith Fowlie, *Incomplete Environmental Regulation, Imperfect Competition, and Emissions Leakage*, 1 Am. Econ. J.: Econ. Policy 72, 73 (2009).

[27] *See* Fowlie, *supra* note 26, at 73. Another possibility is *intersectoral leakage*, where emissions reductions in the electric power sector are offset by an increase in emissions in the building, transportation, or industrial sector. Although important, intersectoral leakage is difficult to address with a sector-specific policy like RTO carbon pricing.

CO_2 emissions, and so, have a competitive advantage over electricity generators inside the carbon-pricing region. As a result of the carbon price, net-imports into the carbon-pricing region will increase. This increase in emissions can lead to emissions leakage if the induced change in net imports also increases CO_2 emissions. A natural solution to mitigate this leakage is for the wholesale market operator to adjust the price paid for imports and exports at the border of the carbon-pricing region. If designed properly, these border adjustments can cost-effectively reduce leakage and total CO_2 emissions, and so increase social welfare.[28]

5. Carbon Pricing Provides Regulatory Certainty and Uniformity

Incorporating consistent pricing of carbon into organized wholesale electricity markets provides regulatory certainty and uniformity across a region. Already, a number of large electricity suppliers use an implicit carbon price when evaluating alternative capital investments to account for the possibility of a carbon-pricing policy in the future.[29] In addition, a variety of fragmented state policies can imply different levels of carbon prices. Formalizing the carbon price explicitly in organized wholesale market rules reduces the uncertainty over the level of the carbon price within the geographic footprint of that organized market, harmonizing them into one signal. The uniformity of a carbon price, especially at the economically efficient level, across an organized market is beneficial in that all market participants competing in the same market are on a level playing field.

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[28] *See* Carolyn Fischer & Alan K. Fox, *Comparing Policies to Combat Emissions Leakage: Border Carbon Adjustments Versus Rebates*, 64 J. Envtl. Econ. & Mgmt. 199, 206 (2012). Although well-designed border adjustments can mitigate leakage to a large extent, they cannot address all emissions leakage. It is likely additional measures are necessary to remedy the issue of emissions backfill. For example, the California Independent System Operator's Energy Imbalance Market limits the amount of electricity that can attributed as imports into CAISO. *See* Dallas Burtraw et al., Cal. Envtl. Prot. Agency, 2018 Annual Report of the Independent Emissions Market Advisory Committee 30-31, 33-34 (2018), https://www.calepa.ca.gov/wp-content/uploads/sites/6/2018/10/Final_2018_IEMAC_Annual_Report_10-22-2018.pdf.

[29] *See* Manjyot Bhan Ahluwalia, Center for Climate and Energy Solutions, The Business of Pricing Carbon: How Companies are Pricing Carbon to Mitigate Risks and Prepare for a Low-Carbon Future 3-8 (2017) https://www.c2es.org/site/assets/uploads/2017/09/business-pricing-carbon.pdf.

Anticipated Benefits of Carbon Pricing in Organized Wholesale Electricity Markets

Carbon pricing in wholesale markets will:

- **Increase costs of operating fossil-fuel resources** in proportion to their CO_2 intensity. As a result, it will:
  - **Discourage investment in all new fossil-fuel resources**, especially coal and oil. New natural gas resources will only be built when their economic value exceeds the operations and associated CO_2costs. As a result, carbon pricing will incentivize only the most efficient natural gas resources.
  - **Expedite the closures of all existing fossil-fuel resources**, especially coal and oil. As these plants are less profitable in organized wholesale electricity markets, now and into the future, there is an economic incentive to shut down.
  - **Prioritize natural gas over coal** in the short run dispatch because coal is more CO_2-intensive. As coal plants run less often, there will also be co-benefits of reduced particulate matter and sulfur dioxide.
  - **Possibly allow for RTOs to offset the price impacts to consumers.** As the charges to fossil-fuel resources are collected by the RTO, these funds can be directed towards those most harmed by increased energy prices.
- **Increase energy prices** to reflect the social marginal cost of electricity. This will:
  - **Promote investment in low- or non-emitting resources** as their revenues, but not costs, will increase in organized wholesale markets for electricity.
  - **Decrease the frequent occurrence of low, sometimes negative, prices** in organized wholesale electricity markets. This mitigates "price suppression" and the "missing money problem" faced by all electricity generators.
  - **Reduce the dependence of low-CO_2 resources on capacity markets** for total revenue.
  - **Incentivize research and development** in new technologies, products, or services that can reduce the CO_2 intensity of electricity.
- **Provide granular price signals** reflecting the social cost of electricity. This will:
  - **Provide incentives for investment in transmission infrastructure** that allows low-CO_2 regions to export electricity to high-CO_2 regions. This is necessary to reduce the costs of an electricity grid that is dependent on a large share of variable, low-CO_2 resources.
  - **Encourage investment in batteries, solar panels, and other distributed resources** where it displaces the most expensive and CO_2-intensive electricity.
  - **Incentivize consumers with real-time or time-of-use pricing to align their electricity consumption with its associated CO_2 content.** In this way, industrial manufacturers, households, and commercial businesses are encouraged to use electricity when it is generated from cleaner resources. Such price signals are crucial to maximizing the benefits of electrification.
- **Maintain the integrity of climate policies** by mitigating emissions leakage. This will:
  - **Ensure that actual carbon emissions reductions result from clean energy policies** by discouraging the import of cheap, high-CO_2 electricity to displace carbon emission reductions.

C. Mechanics of Carbon-Pricing Rules in Organized Wholesale Electricity Markets

There are many ways to implement carbon-pricing rules in an organized wholesale electricity market, depending on the authority to set and implement these rules, as well as the information available to the operator of that organized market. For example, a state or other policymaker can impose a carbon price on electricity generators, which will then be reflected in their offer prices in the organized wholesale markets.

This Part focuses on another form of carbon pricing, RTO carbon pricing, in which a carbon-pricing rule is affirmatively incorporated into wholesale market rules. The first section, "Energy Plus Carbon Price Dispatch," explains how the operator of an organized wholesale market for electricity that has information on the CO_2 emissions per unit of generation output for every generator can implement a carbon price in that market. Given the importance of inter-regional trade in organized wholesale electricity markets, the second section, "Incomplete Carbon Pricing," explains how the mechanics of including border adjustments would work if carbon pricing is not applied uniformly within or across organized wholesale market(s).

1. Energy Plus Carbon Price Dispatch

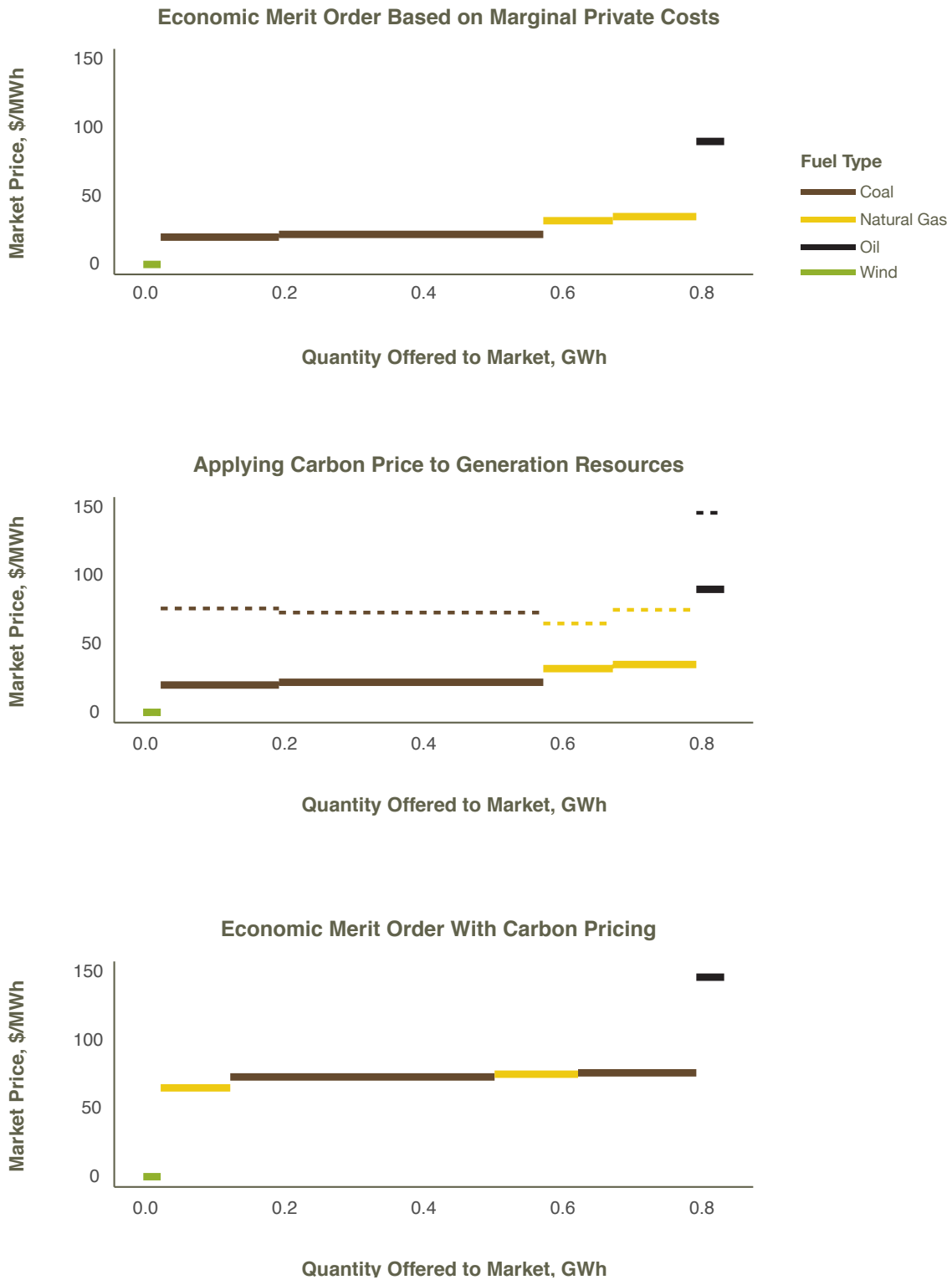
In the most illustrative case of a carbon-pricing rule, the operator of the organized wholesale market for energy receives paired price and quantity offers, as well as the amount of CO_2 emissions per unit of generation output for each generator. The market operator takes the CO_2 emissions, multiplies them by the established carbon price, and adds this amount to the relevant offer prices for every generator. The resulting offer, encompassing both the energy offer price (which will generally be the resource's private marginal cost of production) and the marginal external cost of CO_2 emissions, is the generator's effective offer price. The market operator constructs the market supply curve with the "energy plus carbon" offer prices, a merit order based on marginal social costs, and uses this order to decide which generators are dispatched at what levels to supply electric energy. Alternatively, the organized market operator can ask generators to provide them with "energy plus carbon" prices directly.

All generators receive the same market price determined by the quantity demanded and the marginal social cost of electricity for the marginal generator. Emitting generators must have offer prices that reflect the marginal external costs resulting from paying for their CO_2 emissions, as determined by the established carbon price. As a result, these generators get paid only the market price net of the CO_2 costs they impose. The load serving entities that buy electricity from the organized market must, in turn, pay a market price that reflects the marginal social cost of the marginal generator.

2. Incomplete Carbon Pricing

"Incomplete" carbon pricing—a carbon-pricing rule that does not apply to all CO_2-emitting resources competing within an organized wholesale market—introduces a number of design complications. For example, if there is trading between a neighboring RTO that does not have carbon pricing or if there is a "carbon-pricing region" within part of the wider footprint of that organized market, the revenue received and costs incurred by generators depends on which region they are located in, and which region they are selling into. This divergence introduces the concern of emissions leakage.

Figure 4



The top panel is a stylized representation of a simple organized wholesale electricity market, where the economic merit order is based on the marginal private cost of each generator. The middle panel shows the same market, however, the marginal external costs resulting from CO_2 emissions are added to the marginal private costs of each generator, represented by the dashed line. Here we see that some of the generators in the first panel with relatively lower marginal private costs are more costly to society once we take into account the marginal external costs resulting from their CO_2 emissions for a given amount of generation output. The final panel re-sorts the economic merit order so that the generators with the lowest marginal social cost are prioritized and given merit in the dispatch.

To address emissions leakage, the operators of organized wholesale electricity markets can incorporate import and export border adjustments between the carbon-pricing region and the no-carbon-pricing region as part of their carbon-pricing rules.[30] These border adjustments would have to be implemented at the borders of the RTO, if the carbon price applies to the entire RTO, or at the borders of the regions within RTO, if there is a sub-region of the RTO that has a carbon price. Import border adjustments increase the price of emissions-intensive electricity imported into the carbon-pricing region to reflect its marginal social cost. An import adjustment reduces imports into the carbon-pricing region if the would-be imports are more CO_2-intensive.[31]

Conversely, export border adjustments reduce the price paid for electricity exported from the carbon-pricing region to reflect its private marginal costs, and so encourage exports from the carbon-pricing region.[32] Export border adjustments have the potential to reduce leakage if the exported electricity is less CO_2-intensive than electricity outside the carbon-pricing region. Conversely, however, export border adjustments have the potential to increase total emissions, relative to no border adjustments, if they encourage the export of more CO_2-intensive electricity from the carbon-pricing region.

[30] *See* Burtraw et al., *supra* note 28, at 25-27.
[31] *See* Fischer & Fox, *supra* note 28, at 206.
[32] *See id.*

II. Criteria for Designing Carbon-Pricing Rules in Organized Wholesale Electricity Markets

Economic principles derived from the benefits of carbon pricing discussed above can inform the design of any carbon-pricing rule incorporated into the organized wholesale electricity markets. In addition, because the administrators of organized wholesale electricity markets—RTOs—are public utilities subject to regulation by FERC under the FPA, any wholesale market carbon-pricing rule must fall within the ratemaking authority granted to FERC under the FPA. And, when states are involved in the development or implementation of a carbon-pricing rule or program, important constitutional limits inform the specific contours of permissible state action. This Part identifies those economic and legal criteria that should inform any program to incorporate carbon-pricing rules into organized wholesale electricity markets.

A. Economic Principles

Policymakers should be guided by economic principles when designing carbon-pricing rules. This Part identifies specific criteria derived from those principles that any economically sound design of carbon-pricing rules should satisfy.

1. The Wholesale Market Price of Electricity Should Reflect the Marginal Social Cost of Electricity Generation

To address the external damages from CO_2 emissions resulting from electricity generation it is important that the wholesale market price of electricity reflects the marginal social cost of electricity generation, including both marginal private costs and marginal external costs. And, every electricity generator participating in the wholesale market should have offer prices that reflect the marginal external costs of their CO_2 emissions. In this way, producers and consumers in organized wholesale electricity markets would receive price signals that represent the true cost of electricity to society and would be incentivized to change their behavior. This principle would ensure that resulting consumption and production decisions lead to socially optimal levels of electric production and consumption and CO_2 emissions.

As outlined before, the wholesale price of electricity should reflect both marginal private costs and marginal external costs of electricity generation. And, currently, the best available estimate for the marginal external cost of CO_2 emissions is the Social Cost of Carbon. Therefore, the Social Cost of Carbon should be the basis of an RTO carbon-pricing rule that aims at achieving economic efficiency.

2. The Scope of the Carbon-Pricing Rule in an Organized Wholesale Market Design Should Include All Producers and Consumers of Electricity Bought and Sold in That Market

As a basic principle, all electricity generators should offer their generation output into the organized wholesale electricity markets at prices that include the marginal external costs of electricity generation, and all consumers should pay prices for the electricity bought in the organized wholesale electricity markets that reflects its marginal external costs. If some wholesale producers or consumers are exempt from carbon pricing in the organized wholesale electricity markets, the design of the program would be incomplete, and hence the effectiveness of the policy would be undermined due to leak-

age. The carbon-pricing mechanism for an organized wholesale market is incomplete if (i) some electricity generators are exempt from carbon pricing because they meet some criteria,[33] (ii) only generators in a certain geographical portion of the wholesale market are subject to the carbon price, or (iii) the organized wholesale market with carbon pricing trades with another wholesale market that does not price carbon. Similarly, if some consumers do not pay the price that includes the carbon price, the policy will be incomplete.

3. If the Carbon-Pricing Rule Is Incomplete It Should Optimally Mitigate Leakage

An efficient carbon-pricing rule would not include exemptions for generation based on criteria such as generator size or location. But, even if the carbon-pricing mechanism is incomplete, the best design will mitigate leakage in a manner that increases social welfare. For example, geographic leakage can be reduced through well-designed border adjustments and limits on trade between regions.[34] Not all border adjustments decrease CO_2 emissions, as the effectiveness depends on the CO_2 intensity of the trading regions and how responsive regional trade is to carbon pricing.[35] For example, export border adjustments can increase total CO_2 emissions if they encourage the export of CO_2-intensive electricity from the carbon-pricing region. As a result, border adjustments should be evaluated case-by-case.

B. Legal Requirements

RTOs, the entities responsible for managing the organized wholesale electricity markets, are public utilities regulated by FERC under the FPA.[36] Changes to RTO tariffs—the collection of rules that govern operation of the organized markets—require FERC's acceptance or approval, and so must be consistent with the requirements of the FPA. Therefore, any RTO carbon-pricing rule would have to comply with several categories of legal requirements. First, FERC may approve an RTO carbon-pricing rule only if it falls within authority provided to it by Congress under the FPA. Second, to approve a carbon-pricing rule, FERC must be able to make three specific legal findings: the wholesale market rules as modified by the carbon-pricing rules are just and reasonable,[37] the market rules are not unduly discriminatory or preferential,[38] and FERC's legal findings on both these issues are supported by substantial evidence.[39] Because some forms of carbon pricing in RTO markets may involve action by states, a third category of legal requirements relates to the scope and limits of state authority. The legal requirements in each category are discussed more fully below.

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[33] For example, the plant's capacity is less than 25 MW or the plant produces electricity according to bilateral contracts.

[34] CAISO's current tariff works to address this by imposing import border adjustments and limiting imports relative to each generator's baseline. *See* Cal. Indep. Sys. Operator Corp., 165 FERC ¶ 61,050, at PP 7-9 (2018). *See also*, Burtraw et al., *supra* note 28, at 25-41.

[35] Fischer & Fox, *supra* 28, at 14-15 ("[N]one of the [border adjustment] policies necessarily reduce global emissions, . . . [n]or do they necessarily reduce leakage, . . . [n]or is it possible to rank order the [alternative border adjustments] options. In each case, the effectiveness depends on the relative elasticities of substitution, size, and emissions rates.").

[36] *See* 18 CFR § 35.34(f) (requiring RTOs have operational control over transmission assets); 16 U.S.C. § 824(e) (defining "public utilities" to be any entity that owns or operates facilities subject to FERC's jurisdiction); *see also* Cal. Indep. Sys. Operator Corp. (*CAISO*) v. FERC, 372 F.3d 395, 404 (D.C. Cir. 2004) ("The same statutory terms that apply to FERC's regulation of CAISO apply to its regulation of all other jurisdictional utilities.").

[37] 16 U.S.C. §§ 824d(a), 824e(a).

[38] 16 U.S.C. §§ 824d(b), 824e(a).

[39] 16 U.S.C. § 825l(b).

1. *An RTO Carbon-Pricing Rule Must Fit Within the Scope of FERC's Ratemaking Authority Under the FPA*

FERC may not act unless it has "authority delegated" to it by Congress.[40] And an RTO tariff may not include a market rule that falls outside of the scope of FERC's authority.[41] As a result, an RTO carbon-pricing rule must fall within the scope of ratemaking authority Congress delegated to FERC in the FPA. The following two principles summarize the scope of FERC's ratemaking authority over the organized wholesale electricity markets as related to carbon pricing.

a) FERC may approve an RTO carbon-pricing rule only if it is a wholesale rate for the transmission or sale of electricity or directly affects wholesale rates.

The FPA provides FERC with authority to regulate "interstate . . . wholesale rates and the panoply of rules and practices affecting them."[42] Thus, FERC may regulate not just wholesale rates but also practices—or an RTO's rules—that *affect* such rates. Unlike FERC's jurisdiction over rates, which is exclusive,[43] its "affecting" jurisdiction is concurrent with that of states.[44] FERC has exercised this concurrent "affecting" authority to regulate demand response programs,[45] transmission planning decisions,[46] capacity markets,[47] and RTO stakeholder processes.[48]

This regulatory authority is not unbounded. The Supreme Court has approved the "common-sense construction" adopted by the U.S. Court of Appeals for the District of Columbia (D.C. Circuit) that defines the FPA's "affecting" authority to include only rules or practices that "*directly* affect the wholesale rate."[49] FERC can show that a rule or practice directly affects wholesale rates such that it can exercise its affecting jurisdiction by "provid[ing] … an economic principle that directly ties the practice" it seeks to regulate "to rates."[50] To illustrate, markets for inputs into electricity sector operation, such as steel, are beyond this limit.[51] Thus, as applied to carbon pricing, FERC may approve, accept, or require changes to RTO market rules if it finds, based on an economic principle, the rules related to carbon pricing directly affect wholesale rates.

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[40] *See* Clean Air Council v. Pruitt, 862 F.3d 1, 9 (D.C. Cir. 2017); *accord* Maine v. FERC, 854 F.3d 9, 24 (D.C. Cir. 2017) (internal quotation marks omitted) ("As a creature of statute, FERC has only those powers endowed upon it by statute."); *CAISO*, 372 F.3d at 398.

[41] *See* Towns of Concord, Norwood, & Wellesley v. FERC, 955 F. 2d 67, 70-72 (D.C. Cir. 1992) (explaining that under filed rate doctrine, public utilities may not charge rates other than those filed with FERC); Detroit Edison v. FERC, 334 F.3d 48, 54-55 (D.C. Cir. 2003) (rejecting FERC approval of a MISO tariff provision related to unbundled retail distribution service as outside FERC's jurisdiction).

[42] FERC v. Elec. Power Supply Ass'n (EPSA), 136 S. Ct. 760, 773 (2016), *as revised* (Jan. 28, 2016) (citing 16 U.S.C. § 824(b)(1) (2012)).

[43] Nantahala Power & Light Co. v. Thornburg, 476 U.S. 953, 966 (1986).

[44] *See* Jim Rossi, *The Brave New Path of Energy Federalism*, 95 Tex. L. Rev. 399, 436 (2017) (explaining that "EPSA clearly indicates that the FPA's allocation of federal-state authority allows for concurrent federal and state authority over the practices affecting rates").

[45] *Id.* at 774.

[46] *See* FERC Stats. & Regs., Transmission and Cost Allocation by Transmission Owning and Operating Public Utilities ¶ 31,323, at P 112 (2011) (Order No. 1000) ("… the transmission planning activities that are the subject of this Final Rule have a direct and discernable effect on rates."), *aff'd by* S.C. Pub. Serv. Auth. (*SCPSA*) v. FERC, 762 F.3d 41, 74 (D.C. Cir. 2014) (upholding FERC's conclusion in Order No. 1000 that rules regarding rights of first refusal directly affect rates).

[47] *See* New England Power Generators Ass'n, v. FERC, 757 F.3d 283, 290 (D.C. Cir. 2014) ("the price of capacity is indisputably a matter within the Commission's exclusive jurisdiction"); *see also* Conn. Dep't of Pub. Util. Control v. FERC, 569 F.3d 477, 481–83 (D.C. Cir. 2009) (FERC may regulate aspects of capacity market that affect FERC jurisdictional rates, even if the regulation results in the construction of new facilities, a matter under state jurisdiction).

[48] PJM Interconnection, 157 FERC ¶ 61,229, at PP 10-13 (2016).

[49] *EPSA*, 136 S. Ct. at 774 (quoting CAISO, 372 F.3d at 403) (emphasis added). *See also CAISO*, 372 F.3d at 403 (FERC's actions must be addressed to "methods or ways of doing things on the part of the utility that directly affect the rate or are closely related to the rate.").

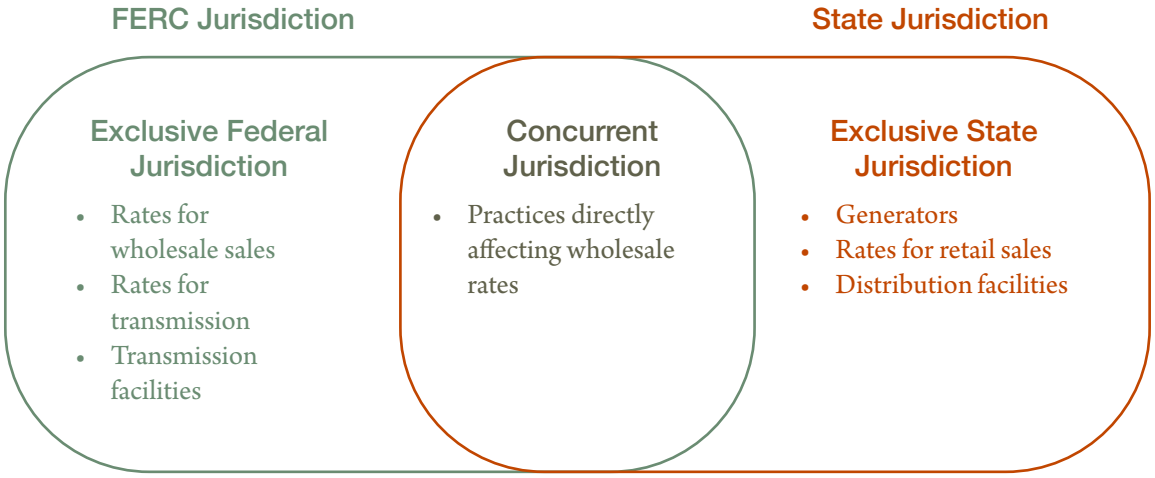
[50] *SCPSA*, 762 F.3d. at 74-75 (upholding challenged exercise of FERC's affecting jurisdiction because challenged orders "provide … an economic principle that directly ties the practice [FERC] sought to regulate to rates").

[51] *See EPSA*, 136 S. Ct. at 774; *CAISO*, 372 F.3d at 403 (FERC does not have jurisdiction over composition of CAISO's board); *see also* NAACP v. Fed. Power Comm'n, 425 U.S. 662, 664 (1976) (FERC does not have jurisdiction to address employment discrimination by utilities unless it finds such discrimination directly affects rates).

b) An RTO carbon-pricing rule may not regulate activity expressly reserved to the states.

Section 201 of the FPA expressly reserves several areas exclusively to state authority,[52] such as "retail electricity sales"[53] and "the need for additional generating capacity, the type of generating facilities to be licensed, land use, [retail] rate-making, and the like."[54] That reservation also includes "facilities used in local distribution"[55] and the reliability of such facilities' operation.[56]

Figure 5



Categories of jurisdiction

FERC cannot take an action that intrudes directly into this zone of exclusive state authority, "no matter how direct, or dramatic" the impact such action would have on wholesale rates.[57] Notably, when asked to "curtail, limit, or otherwise regulate" operation of generation facilities in order to address environmental concerns under the National Environmental Policy Act (NEPA), FERC disclaimed authority to do so because that would conflict with the FPA's direction that states have exclusive jurisdiction over generation.[58] At the same time, "[w]hen FERC regulates what takes place on the wholesale market, as part of carrying out its charge to improve how that market runs, then no matter the effect" on areas

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[52] *See* 16 U.S.C. § 824(a) (". . . such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States.").

[53] *EPSA*, 136 S. Ct. at 775 (citing 16 U.S.C. § 824(b)(1) and New York v. FERC, 535 U.S. 1, 17 (2002)).

[54] Pac. Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n, 461 U.S. 190, 212 (1983); *see also* Entergy Nuclear Vt. Yankee, LLC v. Shumlin, 733 F.3d 393, 417 (2d Cir. 2013) (traditional state authority includes the ability to "direct the planning and resource decisions of utilities"); *Conn. Dep't of Pub. Util. Control*, 569 F.3d at 481 (states have authority over existing generators); S. Cal. Edison Co. San Diego Gas & Elec. Co., 71 FERC ¶ 61,269, at p. 62,076 (1995) (states can "diversify their generation mix to meet environmental goals"); *In re* S. Cal. Edison Co., 70 FERC ¶ 61,215, at p. 61,676 (1995) (states may "favor particular generation technologies over others"); Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities, 61 Fed. Reg. 21,540, 21,626 n.544 (May 10, 1996) (to be codified at 18 C.F.R. pts. 35, 385) [hereinafter Order No. 888] (noting "state authority in such traditional areas as the authority over local service issues, including reliability of local service; administration of integrated resource planning and utility buy-side and demand-side decisions, including [demand-side management]; authority over utility generation and resource portfolios; and authority to impose non-bypassable distribution or retail stranded cost charges.").

[55] 16 U.S.C. § 824(b)(1).

[56] *See id.* § 824o.

[57] *EPSA*, 136 S. Ct. at 775.

[58] Monongahela Power Co., 40 FERC ¶ 61,256, at p. 61,861 (1987) (finding no authority to "regulate the environmental effects" of a plant's operation under the National Environmental Policy Act "because jurisdiction over the capacity planning, determination of power needs, plant siting, licensing, construction, and the operations of coal-fired plants had been deliberately withheld from our control or responsibility when Congress specifically preserved the States' authority over such matters in section 201(b) of the FPA").

that are subject to exclusive state authority, such as retail sales, the FPA "imposes no bar."[59] As a result, RTO carbon-pricing rules must be carefully structured as rules that govern the operation of the organized wholesale electricity markets rather than rules that directly regulate matters expressly reserved for regulation by the states, such as the operation of generators.

2. *An RTO (or FERC) Must Satisfy Several Requirements to Adopt Carbon-Pricing Rules in an Organized Wholesale Market*

FERC must meet three key legal standards when requiring, approving, or accepting a change to an RTO's market rules.

a) An RTO carbon-pricing rule must result in rates that are just and reasonable.

Any market-rule change must result in wholesale rates that are "just and reasonable."[60] Courts have said that the term "just and reasonable" is "incapable of precise definition"[61] and does not bind FERC "to the use of any single formula or combination of formulae."[62] Instead, FERC's authority under these provisions allows it to adjust rates within a "zone" or "range of reasonableness."[63]

The Supreme Court has said that FERC's method for determining whether a rate is just and reasonable must "entail[] an appropriate 'balancing of the investor and the consumer interests.'"[64] FERC also has the authority, if not the duty, to consider the consequences of its decisions on issues that fall outside of its jurisdiction when deciding if practices affecting rates are just and reasonable.[65]

In the context of RTO market rules, FERC "undertakes to ensure 'just and reasonable' wholesale rates by enhancing competition—attempting . . . 'to break down regulatory and economic barriers that hinder a free market in wholesale electricity.'"[66] Thus, FERC will have a basis to conclude that a carbon-pricing rule would make rates just and reasonable if it determines the rule enhances the competitive markets.

Legal theories that would support such a determination relate to the effect that internalizing externalities and harmonizing wholesale market operation with state energy policy have on the competitive markets—and therefore on just and reasonable rates. These theories are discussed in Parts III.A.2 and III.A.3.

Additionally, as discussed in Part II.B, for competitive market rules to be just and reasonable, they must provide resources an opportunity to recover their costs.[67] Relevant here, FERC has concluded that organized wholesale electricity

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[59] *EPSA*, 136 S. Ct. at 776.
[60] 16 U.S.C. §§ 824d(a), 824e(a).
[61] Morgan Stanley Capital Grp. v. Pub. Util. Dist. No. 1 of Snohomish Cnty., 554 U.S. 527, 532 (2008) (citing Fed. Power Comm'n v. Texaco Inc., 417 U.S. 380, 389 (1974); Permian Basin Area Rate Cases, 390 U.S. 747, 767 (1968)).
[62] Fed. Power Comm'n v. Hope Nat. Gas Co., 320 U.S. 591, 602 (1944).
[63] Ill. Cities of Bethany v. FERC, 670 F.2d 187, 191 (D.C. Cir. 1981) (citing Fed. Power Comm'n v. Conway Corp. (*Conway*), 426 U.S. 271, 278-79 (1976)).
[64] *Morgan Stanley Capital Grp.*, 554 U.S. at 532 (quoting Hope Nat. Gas Co., 320 U.S. at 603).
[65] *See Conway*, 426 U.S. at 280 (rejecting Commission claim that, because retail rates were outside its ratemaking authority, it must ignore the consequences of a proposed wholesale rate increase on retail rates, and holding that the Commission has the necessary authority, if not the duty, to consider the broader factual context in which a proposed wholesale rate will function).
[66] *EPSA*, 136 S. Ct. at 768 (quoting *Morgan Stanley Capital Grp.*, 554 U.S. at 536).
[67] *See* Cal. Indep. Sys. Operator Corp., 147 FERC 61,231, at P 238 (2014).

market rules that allow resources to reflect their costs of compliance with policies designed to reduce emissions of pollutants—including state policies that price CO_2 emissions—are just and reasonable.

b) An RTO carbon-pricing rule must not result in undue preference or discrimination.

A change to an RTO's market rules must not result in wholesale rates that are unduly discriminatory or preferential. Put simply, a market rule may not treat "similarly situated entities differently,"[68] or treat differently situated entities the same.[69] In the language of the FPA, rules may not be unduly preferential or discriminatory.[70] Preference and discrimination are permissible "if the utility can justify the disparate effect."[71] With respect to carbon-pricing rules, FERC must be able to find that the carbon price faced by applicable generators does not unduly discriminate against similarly situated generators.[72]

Different Paths to Changing RTO Market Rules Carry Different Legal Burdens

The FPA provides two paths for changing RTO market rules, one under section 205 and the other under section 206.[73] Each section involves a different legal process and a different legal burden. As a result, the choice of process can play a significant role in any carbon-pricing proposal.

Under **section 205**, FERC considers changes to market rules that are filed by an RTO.[74] FERC must approve a proposed change so long as it concludes that the change would yield rates that are just and reasonable and not unduly discriminatory or preferential.[75] The burden of showing that the proposed rule changes would be lawful rests on the RTO.[76] As such, when evaluating such a proposed market rule change, FERC plays "an essentially passive and reactive" role.[77] FERC cannot require the RTO to substantially modify the proposed tariff change, but must either approve or deny it depending on whether it is just and reasonable and not unduly discriminatory or preferential.[78]

By contrast, when acting under **section 206**, FERC can compel a modification to market rules, either upon a complaint or on its own motion.[79] In order to act under section 206, FERC must find first that the existing market rule is not just and reasonable or is unduly discriminatory or preferential, and then find that a replacement for or modification to that rule (which could be proposed by FERC) will be just and reasonable and not unduly discriminatory or preferential.[80] The section 206 bar is thus higher both because it requires two substantive legal findings and because the first legal finding must satisfy a higher evidentiary burden in concluding that a current market rule produces wholesale rates that fall outside the "zone" or "range of reasonableness" that encompasses multiple just and reasonable rates.

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[68] Transmission Agency of N. Cal. v. FERC, 628 F.3d 538, 551 (D.C. Cir. 2010) (citing Sacramento Mun. Util. Dist. v. FERC, 474 F.3d 797, 802 (D.C. Cir. 2007)); *see also* Black Oak Energy, LLC v. FERC, 725 F.3d 230, 239 (D.C. Cir. 2013) ("FERC reasonably determined that the virtual marketers are not similarly situated to the rest of PJM's market participants."); Cal. Indep. Sys. Operator Corp., 119 FERC ¶ 61,061, at PP 69-70 (2007).

[69] *See* Ala. Elec. Co-op., Inc. v. FERC, 684 F.2d 20, 27-28 (D.C. Cir. 1982); Calpine Corp.,163 FERC ¶ 61,236, at P 68 n.112 (2018).

[70] *See* 16 U.S.C. §§ 824d(b), 824e(a)-(b).

[71] *Transmission Agency of N. Cal.*, 628 F.3d at 549 (citing Ark. Elec. Energy Consumers v. FERC, 290 F.3d 362, 367 (D.C. Cir. 2002)).

[72] In fact, FERC might be able to determine that a carbon price remedies undue discrimination that arises from the equal treatment of emitting and non-emitting generators. *Cf.* Joel B. Eisen, *FERC's Expansive Authority to Transform the Electric Grid*, 49 U.C. Davis L. Rev. 1783, 1841-42 (2016).

[73] *See* 16 U.S.C. §§ 824d, 824e.

[74] *See id.* § 824d.

[75] *See* City of Bethany v. FERC, 727 F.2d 1131, 1136 (1984); *accord* Cal. Indep. Sys. Operator Corp., 141 FERC ¶ 61,237, at P 23 (2012); City of Winnfield v. FERC, 744 F.2d 871, 875 (D.C. Cir. 1984).

[76] *See* Kansas Gas & Elec. Co. v. FERC, 758 F.2d 713, 719–20 (D.C. Cir. 1985).

[77] Atlantic City Elec. Co. v. FERC, 295 F.3d 1, 10 (D.C. Cir. 2002) (quoting *City of Winnfield,* 744 F.2d at 876).

[78] *See* NRG Power Mktg. v. FERC, 862 F.3d 108, 114 (D.C. Cir. 2017).

[79] *See* 16 U.S.C. § 824e.

[80] Emera Maine, 155 FERC ¶ 61,233, at PP 32-39 (2016); *see also Cal. Indep. Sys. Operator Corp.*, 141 FERC ¶ 61,237, at P 30.

c) Factual findings underlying FERC's decision regarding inclusion of a carbon price in an RTO's market rules must be supported by substantial record evidence.

It is not enough for FERC to simply conclude that a regulation or tariff will result in just, reasonable, and not unduly discriminatory or preferential rates; such conclusions must be supported by "substantial evidence" in the record relied on by FERC.[81] For filings made under section 205 or 206 of the FPA, the filing party should provide such substantial evidence.[82] Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion."[83]

This requirement does not mean that empirical evidence is necessary to support all findings—some findings can be demonstrated using "reasonable economic propositions," for instance that more market competition will result in lower prices.[84] But whether the evidence presented is empirical, theoretical, or a mix of both, FERC must "specify the evidence on which it relied and explain how that evidence supports the conclusion it reached."[85] In the context of carbon pricing, a robust evidentiary record will have to support FERC's reasoning for approving, accepting, or otherwise requiring inclusion of a carbon-pricing rule in the applicable market rules, and any specific design elements such as the appropriate level of the carbon price, which resources are covered by the carbon-pricing rule, and the presence and structure of any border adjustment.

3. *States Have Broad Authority to Price Carbon-Dioxide Emissions but Constitutional Requirements Must Guide State Policies and RTO Responses*

Some forms of carbon pricing may involve state action prior to an RTO market rule change or as part of a cooperative approach to regulation. As a result, the legal requirements that guide state climate policy as it applies to the electricity sector may play a significant role in any RTO market rule changes related to carbon pricing.

States have broad authority to regulate generation facilities including the environmental consequences of using those facilities.[86] The FPA preserved long-standing state authority over generation facilities by excluding their regulation from FERC.[87] And around the country, states have played a significant role in addressing the environmental challenges of fossil-fuel generation. For example, among other initiatives, 29 states and Washington D.C. have renewable portfolio

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[81] *SCPSA*, 762 F.3d at 65 (quoting 5 U.S.C. § 706(2)(E)).

[82] *See* Ameren Servs. Co. v. Midwest Indep. Transmission Sys. Operator, Inc., 121 FERC ¶ 61,205, at P 32 (2007) ("In a section 206 matter, the party seeking to change the rate, charge or classification has a dual burden—it must first *provide substantial evidence* that the existing rate is unjust, unreasonable or unduly discriminatory, and then *demonstrate through substantial evidence* that the new rate is just, reasonable and not unduly discriminatory.") (emphasis added); Iso New England Inc. & New England Power Pool Participants Comm., 158 FERC ¶ 61138, at P 49 (2017) (approving as just and reasonable a filing under section 205 based on the substantial evidence presented by the RTO).

[83] *See* Murray Energy Corp. v. FERC, 629 F.3d 231, 235 (D.C. Cir. 2011) (quoting Colo. Interstate Gas v. FERC, 599 F.3d 698, 704 (D.C. Cir. 2010)).

[84] *SCPSA*, 762 F.3d at 65.

[85] *Id.* at 54 (quoting Wis. Gas Co. v. FERC, 770 F.2d 1144, 1156 (1985)) (internal quotation marks omitted).

[86] *See Pac. Gas & Elec. Co.*, 461 U.S. at 212.

[87] *See generally* 16 U.S.C. § 824(b); *S. Cal. Edison Co.*, 71 FERC ¶ 61,269, at p. 62,076 (states can "diversify, their generation mix to meet environmental goals").

standards (RPS).[88] These policies are adopted to encourage significant growth in renewable energy generation in order to reduce air pollution and greenhouse gas emissions, among many other goals.[89]

Three important principles limit state activities in this area.

a) Any state involvement in the application of a carbon price must not result in the state establishing a wholesale electricity rate.

FPA section 201(b) assigns FERC exclusive authority over wholesale sales of electricity.[90] The Supreme Court has interpreted this to mean that state programs may not set or replace wholesale rates by tethering subsidies to participation in organized wholesale electricity markets.[91] Importantly, however, the Court emphasized that this does not mean that the FPA also preempts state policy "measures untethered to a generator's wholesale market participation."[92] Such untethered measures can include, for instance, RPS.[93] And so long as Renewable Energy Credits (RECs) are "unbundled"—meaning that they represent attributes that are separable from the associated volume of renewable electricity—the state program that determines their value avoids FERC regulation.[94] Similarly, FERC has recognized that instruments associated with state emission-pricing policies fall outside of FERC's jurisdiction so long as they are not bundled with wholesale energy sales.[95] Thus, state programs can charge emitting generators or compensate clean generators for attributes related to environmental impacts, but cannot condition those charges or compensation on the generators' participation in organized wholesale electricity markets.[96] Preemption issues are discussed further in Part III.A.4.

b) State carbon-pricing actions may not create an undue burden on interstate commerce or be protectionist.

The Dormant Commerce Clause of the U.S. Constitution prohibits states from discriminating against or unduly burdening interstate commerce. This prohibition does not prevent states from adopting regulations that have an incidental burden on out-of-state entities, so long as those regulations serve valid policy objectives other than protectionism[97] and any

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88 *See* Galen Barbose, Berkeley Lab, U.S. Dep't Energy, U.S. Renewables Portfolio Standards, 2019 Annual Status Update 8 (2019), https://eta-publications.lbl.gov/sites/default/files/rps_annual_status_update-2019_edition.pdf.

89 *See* Jan Hamrin, Clean Energy States All., REC Definitions and Tracking Mechanisms Used by State RPS Programs 4-7 (2014), https://www.cesa.org/assets/2014-Files/RECs-Attribute-Definitions-Hamrin-June-2014.pdf (finding most states define RPS compliance credits based on a resource's environmental attributes).

90 *See* 16 U.S.C. § 824(b)(1).

91 *See* Hughes v. Talen Energy Mktg., 136 S. Ct. 1288, 1298-99 (2016). Whether FERC's acceptance, approval, or requirement of a carbon-pricing rule would create grounds for preemption of state action is discussed on page 45 below.

92 *Hughes*, 136 S. Ct. at 1299 (internal quotation marks omitted); *see also* Coal. for Competitive Elec. v. Zibelman, 906 F.3d 41, 52 (2d Cir. 2018).

93 *See* Allco Fin. Ltd. v. Klee, 861 F.3d 82, 101-02 (2d Cir. 2017), *cert. denied*, 138 S. Ct. 926 (2018) (Connecticut RPS did not violate the "bright line laid out in *Hughes*" because it did not "require bids that are tethered to a generator's wholesale market participation or that condition payment of funds on capacity clearing the auction") (internal quotations omitted).

94 *See* WSPP Inc., 139 FERC ¶ 61,061, at PP 23-24 (2012).

95 *See* Edison Elec. Inst., 69 FERC ¶ 61,344, at p. 62,288 (1994).

96 *See Zibelman*, 906 F.3d at 52.

97 *See Allco*, 861 F.3d at 106 ("Connecticut's RPS program serves its legitimate interest in promoting increased production of renewable power generation in the region, thereby protecting its citizens' health, safety, and reliable access to power."); *see also* Dep't of Revenue of Ky. v. Davis, 553 U.S. 328, 340 (2008) ("... laws favoring such States and their subdivisions may be directed toward any number of legitimate goals unrelated to protectionism.") (internal quotation marks omitted)).

distinction in treatment between in- and out-of-state resources is based on differences related to those objectives.[98] As a result, while states are not prohibited from applying their carbon-pricing program to electricity imported into the state (or exempting in-state resources that export electricity), they must carefully design their programs so that the requirements on imported (and exported) electricity match requirements on in-state generation in relevant respects.

c) State carbon-pricing policies may not regulate extraterritorially.

The Dormant Commerce Clause also prohibits states from imposing regulations on entities located and activity conducted beyond their borders.[99] A state law may be deemed impermissibly extraterritorial "when it 'requires people or businesses to conduct their out-of-state commerce in a certain way.'"[100] But a regulation of a product consumed within a state that applies similarly regardless of whether the product is made in-state or elsewhere is not impermissibly extraterritorial.[101] In the context of carbon pricing, a state may not regulate out-of-state generators, but regulation of the carbon emissions associated with imports may be permissible.

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[98] *See* Rocky Mtn. Farmers Union v. Corey, 730 F.3d 1070, 1089 (9th Cir. 2013) ("All factors that affect carbon intensity are critical to determining whether the Fuel Standard gives equal treatment to similarly situated fuels."); *see also Allco*, 861 F.3d at 103 (finding that RECs created pursuant to Connecticut's RPS were dissimilar to those produced by Allco's Georgia facility).

[99] *See* C & A Carbone, Inc. v. Town of Clarkstown, 511 U.S. 383, 390-91 (1994); *see also* North Dakota v. Heydinger, 825 F.3d 912, 921-22 (2016) (holding a Minnesota law prohibiting imports of electricity from high-emitting sources was an impermissible extraterritorial regulation because out-of-state generators selling into MISO could not elect to avoid the regulation).

[100] *Heydinger*, 825 F.3d at 919 (quoting Cotto Waxo Co. v. Williams, 46 F.3d 790, 793 (8th Cir. 1995)).

[101] *See Rocky Mtn. Farmers Union*, 730 F.3d at 1102-03.

III. Carbon-Pricing Rules in Organized Wholesale Electricity Markets: Affirmative Rules and Responses to State Programs

Several RTOs have adopted wholesale market rules that respond to state-level carbon-pricing programs, while others are considering whether to affirmatively incorporate carbon-pricing rules into the organized wholesale electricity markets they administer. The legal basis for a carbon-pricing rule itself, and for any corresponding cost that wholesale market participants may face for CO_2 emissions, will either rest solely on FERC's authority to regulate the electricity markets under the FPA or will rest on state authority to regulate generators and their emissions.[102] Whatever measures an RTO takes to implement a carbon-pricing rule within the markets it administers will need to be justified under the FPA.

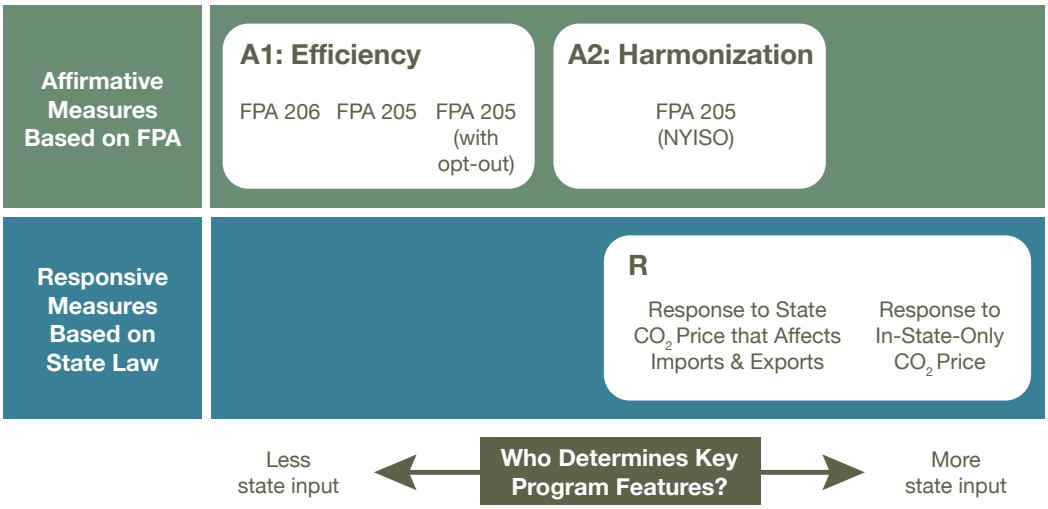
The source of decisions about the design of carbon-pricing rules is, however, not binary. Instead, such decisions may result from at least some interaction, and possibly collaboration, between an RTO and state legislators or regulators.

As shown in Figure 6, organizing different carbon pricing measures according to these features results in three categories. The first two categories (labeled here as A1 and A2, for affirmative) involve measures affirmatively undertaken by an RTO or FERC. The third category (labeled R, for responsive) involves RTO responses to measures undertaken by one or more states. The two rows divide carbon pricing measures by whether they are an affirmative effort by an RTO or FERC under the FPA, or an effort to respond to a carbon price implemented under state law. The horizontal spectrum organizes existing and proposed measures in terms of the roles that RTOs and states have played or would play in decisions about the design of the carbon-pricing rules.

The specific carbon-pricing approaches discussed in this report are not intended to be comprehensive; rather, they have been chosen because they have been adopted, are currently being considered, or serve to highlight key factors relating to the legal basis of potential carbon-pricing rules.

[102] A carbon-pricing rule could be imposed not only under the FPA and state law, but also under a federal law other than the Federal Power Act, such as a congressionally enacted carbon tax or a cap-and-trade program adopted in response to EPA regulation of the power sector. No federal carbon-pricing program is imminent and so this report focuses on state law examples of non-FPA legal authority for carbon-pricing rules.

Figure 6



A framework of carbon pricing in wholesale electric markets.

This Part is organized around the categories of carbon pricing represented in Figure 6. First, it applies the legal and economic considerations discussed in the previous Part to two affirmative approaches to carbon pricing. For the approach identified in the A1 category, it explains how a carbon-pricing rule for an organized wholesale market could be approved, accepted or required by FERC on the theory that such a rule would improve the economic efficiency of that wholesale market. For the approach identified in the A2 category, it describes a carbon-pricing rule developed by NYISO to harmonize the NYISO-administered wholesale market for electric energy with New York State's clean energy policies. And third, this Part describes carbon pricing that is implemented by a state acting solely under state law, but that would nonetheless involve action by FERC to approve, accept, or require responsive changes to an RTO's market rules. This third approach has already been implemented, to varying degrees, by RTOs and approved by FERC.

Before discussing different carbon pricing alternatives, it is useful to highlight an important insight from the discussion of the relevant economic principles and legal requirements. The key elements of any policy design must flow from both the legal authority on which the policy stands and the particular theory that supports the RTO's market changes as consistent with its obligations under the FPA.

For example, an RTO that seeks to implement a carbon-pricing rule on the theory that doing so will improve wholesale market efficiency will have to propose a rule and an associated carbon price that the RTO can demonstrate will improve efficiency by internalizing externalities. Selecting a different price risks being rejected by FERC as not supported by substantial evidence. Alternatively, an RTO that seeks to implement a carbon-pricing rule to improve or protect the integrity of the relevant organized wholesale electricity markets in light of state policies will have to propose a rule and associated carbon price or prices that it can demonstrate will serve to integrate state programs with the organized wholesale electricity markets.

Similarly, for carbon-pricing policies implemented by states, the design of the policy must reflect the constitutional requirements on states. Of course, those requirements apply only to a *state's* actions in establishing a carbon-pricing program. For example, the Dormant Commerce Clause does not apply to federal regulations. So, its relevant requirements—such as the limit on extraterritorial application of a state carbon price—will not apply to an affirmative RTO

carbon-pricing rule implemented pursuant to the FPA. Nonetheless, an RTO looking to make responsive changes to its market rules in order to facilitate implementation of the state program must take into account how those changes allow or impede the state's ability to achieve its carbon pricing objectives while complying with those constitutional requirements.

A. Affirmative RTO Carbon-Pricing Rules

This Part first looks at arguments that can be used to show that an affirmative carbon-pricing rule approved, accepted, or required by FERC is within the scope of ratemaking authority provided to FERC by the FPA. Then, it describes how such a rule might be implemented, focusing on an approach based on the theory that a carbon-pricing rule will improve the economic efficiency of the wholesale electricity markets (A1). It also discusses an alternative approach (A2), which is illustrated by a carbon-pricing rule being considered by NYISO. While there are other legal theories discussed in the academic literature for why FERC might be able to approve, accept, or require a carbon-pricing rule for an organized wholesale market, they are not currently being discussed in any RTO, and so are not fully discussed here.[103] Finally, this Part identifies steps that states, RTOs, and FERC can take to forestall any arguments that an affirmative RTO carbon-pricing rule preempts state climate policy.

1. An Affirmative Carbon-Pricing Rule Is Within the Scope of FERC's Ratemaking Authority Under the FPA

Both of the approaches to carbon-pricing rules described below—one based on wholesale market efficiency, the other on harmonization of wholesale market operations and state clean energy policies—would likely satisfy the legal criteria described above regarding the scope of FERC's ratemaking authority.

a) An affirmative RTO carbon price directly affects rates.

Whether or not a rule that affirmatively incorporated a carbon price into wholesale rates would itself be considered a wholesale rate subject to FERC's exclusive jurisdiction, such a carbon-pricing rule would certainly directly affect wholesale rates and so would fall within the scope of FERC's authority under the first legal requirement identified above. RTO rules are considered to directly affect rates when "a generally accepted principle of economics directly connects" the practice or rule to rates.[104] Imposing a price on the CO_2 emissions from generating resources will cause changes in generators' offer prices. And these changes in offer prices will change the resources selected by the RTO's security-constrained economic dispatch algorithm and the market-clearing price of electricity. Imposing a carbon cost on wholesale sales of electricity would also affect the relative revenue of higher-emitting and lower-emitting generators such that, for lower-emitting generators "greater pay leads to greater participation" and vice versa.[105] In other words, RTO carbon pricing directly affects rates "with room to spare."[106]

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[103] Two other legal theories have been briefly discussed in the academic literature but have not been fully developed. In a 2014 article, Christopher Bateman and James Tripp argue that FERC has authority to incorporate environmental harm into its evaluation of whether rates are just and reasonable, mandate that wholesale market sales of electricity reflect and incorporate the social cost of carbon, and allow wholesale market operators to meet this requirement through social cost dispatch. Christopher Bateman & James Tripp, *Toward Greener FERC Regulation of the Power Industry*, 38 Harv. Envtl. L. Rev. 275, 329-32 (2014). In a 2016 article, Joel Eisen argues that FERC can use its authority to remedy undue discrimination as the basis for approving RTO carbon pricing. Eisen, *supra* note 70, at 1840-42. These theories have not been developed to the same degree as the market efficiency and market integrity theories and so are not fully discussed here.

[104] S.C. Pub. Serv. Auth. v. FERC, 762 F.3d 41, 74 (D.C. Cir. 2014).

[105] FERC v. Elec. Power Supply Ass'n (EPSA), 136 S. Ct. 760, 774-75 (2016), *as revised* (Jan. 28, 2016).

[106] *Id.* at 774.

Even if that criterion by itself was not sufficient, the practices that a carbon-pricing rule is meant to address also directly affect rates in at least two ways. First, CO_2 emissions affect the marginal social cost of each unit of wholesale electricity. The failure of current market rules to account for an important cost of generation directly affects whether wholesale rates are too high or too low to produce economically efficient outcomes. Second, existing state policies intended to reduce CO_2 emissions may have an effect on the efficient operation of the organized wholesale electricity markets; a carbon price within the organized wholesale electricity markets may better harmonize state policies and organized wholesale electricity markets in a way that ultimately reduces rates. These two legal theories for carbon pricing are discussed more fully in Parts III.A.2 and III.A.3, respectively. But each raises a way in which CO_2 emissions directly affect rates. Therefore, an RTO market rule to price those emissions would fall within FERC's affecting jurisdiction because both the rule itself directly affects wholesale rates and because the practice the rule is meant to address directly affects rates.

b) Carbon pricing is not reserved exclusively to the states under the FPA.

Even if rules directly affect rates, they may still fall outside of FERC's jurisdiction if they have been reserved exclusively to the states under section 201 of the FPA.[107] Section 201(b) of the FPA lists the areas exclusively reserved to the states: sales of electricity at retail, facilities used for the generation of electric energy, facilities used in local distribution, and facilities used for intrastate transmission.[108] The FPA contains no explicit reservation to the states regarding carbon pricing. Some have argued that FERC lacks jurisdiction to approve a carbon-pricing rule within RTO markets because doing so would conflict with the FPA's limitation on FERC authority to regulate generation, which has been reserved to the states.[109] But implementing a carbon-pricing rule *within the RTO market rules* is not equivalent to the regulation of generation.

Both FERC and the courts have long recognized the distinction between (permissible) FERC regulation that affects areas reserved to the states and (impermissible) regulation of areas that are reserved to the states. In approving FERC's orders regarding the participation of demand response in the organized wholesale electricity markets, the Supreme Court found that such a regulation is not impermissible "just because it affects—even substantially—the quantity or terms of retail sales."[110] FERC recognized a similar distinction when it issued regulations regarding the participation of energy storage—including distribution-connected storage—in organized wholesale electricity markets. FERC found that it had not overstepped the jurisdictional limits of the FPA because it was merely regulating wholesale market rules rather than generation or distribution, which are reserved to the states.[111] Similarly, the D.C. Circuit has determined that FERC's orders regarding the creation and administration of organized wholesale capacity markets in various RTOs is a permissible exercise of its affecting jurisdiction.[112] This is because FERC has demonstrated that, while such markets may have the

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[107] *Id.* at 775 ("FERC cannot take an action transgressing that limit no matter how direct, or dramatic, its impact on wholesale rates.").

[108] 16 U.S.C. § 824(b)(1) (FERC "shall not have jurisdiction . . . over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.").

[109] John S. Moot, *Subsidies, Climate Change, Electric Markets and the FERC*, 35 Energy L.J. 345, 358 (2014) ("Part I gives the FERC jurisdiction to consider environmental impacts in regulating a hydroelectric project. The FERC does not, however, possess the same authority over coal plants or other fossil fuel generators and, indeed, FPA Part II put direct regulation of generating facilities beyond the FERC's reach.") (citations omitted).

[110] *EPSA*, 136 S. Ct. at 776; *see also id.* ("When FERC regulates what takes place on the wholesale market, as part of carrying out its charge to improve how that market runs, then no matter the effect on retail rates, § 824(b) imposes no bar.").

[111] Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, Order No. 841-A, 167 FERC ¶ 61,154, at PP 38-39 (2019) [hereinafter Order No. 841-A].

[112] *See* Conn. Dep't of Pub. Util. Control v. FERC, 569 F.3d 477, 482-84 (D.C. Cir. 2009) (upholding capacity requirement and recounting history, dating back to 1978, of similar decisions).

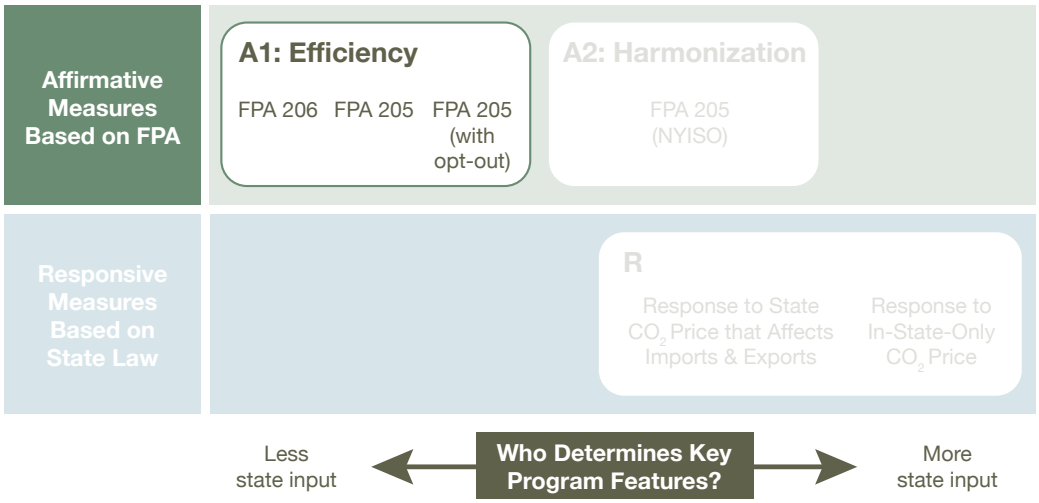
effect of incentivizing, for instance, construction of new generators, they are not requirements to construct generation and so are not direct regulation of an area of exclusive state authority.[113]

FERC's authority to approve, accept, or require RTO carbon-pricing rules would rest on similar grounds. A carbon-pricing rule included in an RTO's market rules on the basis of FERC's FPA authority would involve regulation of the operation of the RTO markets—specifically, the RTO's rules for bidding, dispatch, and revenue allocation. This would necessarily affect the incentives to build and operate generation but would not itself regulate generators.

To clarify the distinction between the regulation of wholesale market rules and generators, consider which electricity sales would be subject to the RTO's carbon-pricing rule. Wholesale sales of electricity from emitting generators would be subject to the carbon-pricing rule specified in the RTO tariff. But sales made outside of the organized wholesale electricity markets—for example, distribution-connected generators making retail energy sales under retail tariffs—would not be subject to a carbon price under this rule.

2. *Affirmative RTO Carbon-Pricing Rules that Improve the Economic Efficiency of the Organized Wholesale Electricity Markets (A1)*

Figure 7



Affirmative RTO carbon pricing based on improving market efficiency.

The economic efficiency-based legal theory presented here holds that FERC may approve, accept, or require an RTO carbon-pricing rule based on its authority as an economic regulator. That is, because market efficiency cannot be achieved without consideration of the external costs of CO_2 emissions that are directly related to electricity generation, FERC may approve RTO carbon pricing as a means of ensuring that rates in the organized wholesale electricity markets are just and reasonable and not unduly discriminatory or preferential.[114] While this is not the only viable legal theory for an RTO carbon-pricing rule, it is the one that would most clearly allow for the design of a carbon-pricing rule that meets the economic criteria outlined in Part II.A above. For that reason, RTOs and stakeholders interested in RTO carbon pricing

[113] *Id.*
[114] Davis Noll & Unel, *supra* note 6, at 44.

should give it serious consideration. This Part first explains how the FPA authorizes an RTO to affirmatively propose and FERC to approve a carbon-pricing rule that improves the economic efficiency of the organized wholesale electricity markets. Then, it identifies three distinct ways that the carbon-pricing rule could be incorporated into the rules for the organized wholesale electricity markets on an economic efficiency basis. Each option raises specific legal and implementation considerations.

Economic efficiency has, over time, become the policy and legal touchstone for FERC in its determinations of whether organized wholesale electricity market rules ensure that rates in those markets are just and reasonable and not unduly discriminatory or preferential.[115] Thus, under this framework, FERC may approve, accept, or require carbon-pricing rules in the RTOs because doing so would enhance the economic efficiency of the organized wholesale electricity markets.[116] Where FERC relies on economic efficiency and workable competition to ensure lawful rates in the organized wholesale electricity markets, the presence of significant and pervasive market failures that distort price signals in those markets undermines FERC's reliance on these rationales. Only when price signals in competitive organized wholesale electricity markets are accurate can they be relied on to encourage efficient allocation of resources, adjust supply, promote expansion, and help determine where new resources should be located.[117] As discussed in Part I.A.2 above, externalities cause the market price and the socially efficient price (the marginal social cost) in the organized wholesale electricity markets to diverge, leading to a market failure.[118] FERC approving, accepting, or requiring the inclusion of market rules that correct for this failure by internalizing the external costs resulting from the CO_2 emissions of wholesale suppliers would move prices closer to the "efficient" level and move the markets closer to the efficient operation that FERC relies on to ensure that rates are lawful under the FPA.

For these reasons, a carbon-pricing rule premised on correcting market failures is consistent with FERC practice and judicial interpretations of FERC's statutory authority.[119] FERC has embraced market-based solutions aimed at promoting economic efficiency and increasing competition.[120] For example, FERC approved the use of market-based rates for electricity sales to harness efficiencies that flow from market solutions.[121] It has approved rules that correct many other market failures such as market power and asymmetric information.[122] FERC has also approved and directed market rule changes that seek to increase efficiency by addressing externalities.[123] And courts have upheld FERC orders designed to improve market efficiency by internalizing externalities.[124] In fact, courts have *rejected* FERC's regulations when FERC has failed to address market failures adequately.[125]

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[115] *Id.* at 22-26.
[116] *See generally id.*
[117] *See* America Electric Power Co., 103 FERC ¶ 61,089, at P 11 (2003).
[118] Davis Noll & Unel, *supra* note 6, at 42.
[119] *See id.* at 26-41.
[120] *See* FERC v. Elec. Power Supply Ass'n (EPSA), 136 S. Ct. 760, 768 (2016), *as revised* (Jan. 28, 2016); Grid Reliability & Resilience Pricing, 162 FERC ¶ 61,012, at P 9 (2018) ("[T]he Commission has largely adopted a pro-market regulatory model, wherein the Commission relies on competition in approving market rules and procedures that, in turn, determine the prices for the energy, ancillary services, and capacity products (where applicable).").
[121] Progress Power Mktg., Inc., 76 FERC ¶ 61,155 (1996).
[122] *See* Davis Noll & Unel, *supra* note 6, at 26-38.
[123] *See* Pa.-N.J.-Md. Interconnection Atl. City Elec. Co., 81 FERC ¶ 61,257, at p. 62,253-56 (1997) (approving PJM's locational marginal pricing model, which was intended to address network externalities).
[124] Wis. Pub. Power, Inc. v. FERC, 493 F.3d 239, 250–51 (D.C. Cir. 2007).
[125] *See* Tejas Power Corp. v. FERC, 908 F.2d 998, 1006 (D.C. Cir. 1990) (finding that FERC had not adequately addressed market power concerns in approving a gas pipeline company's proposed charge).

Some commenters have questioned whether FERC's disclaimer of authority to regulate the environmental consequences of its rates[126] limits its ability to take into consideration environmental externalities when evaluating whether wholesale rates are lawful.[127] FERC considered this question in its foundational Order No. 888.[128] There, FERC conducted an environmental analysis of its open access rules,[129] but rejected requests from environmental advocates to adopt an emissions-pricing scheme or emissions controls.[130] FERC explained that it did not have authority to mitigate air pollution under NEPA, or under the FPA's directions that FERC regulate in the "public interest" and that it ensure that wholesale rates are just, reasonable, and not unduly discriminatory or preferential.[131] In a footnote, FERC also took the position that the FPA did not authorize FERC to take into account external costs that were not incurred by a utility.[132]

In reaching these conclusions, FERC relied heavily[133] on an earlier Supreme Court decision, *National Association for the Advancement of Colored People v. FPC (NAACP)*. In this case, the Court held that the FPA's direction that FERC act in the "public interest" did not authorize it to address employment discrimination unless doing so would encourage, "the orderly production of plentiful supplies of electric energy and natural gas at just and reasonable rates."[134] FERC interpreted this and subsequent cases to mean its authority extends only to actions that fulfill "goals that Congress has directed this Commission to pursue."[135] In the case of remedying undue discrimination in the use of the transmission system, FERC concluded this did not include "the types of environmental mitigation measures proposed by the commenters."[136]

FERC's authority may well not be as limited as it claimed in Order No. 888. When the issue was litigated, the D.C. Circuit explicitly did not "resolve the parties' debate about FERC's legal authority to order environmental mitigation."[137] And FERC retains discretion to change its interpretation.[138] But even if it were limited in its ability to change that interpretation, approving, accepting, or requiring carbon-pricing rules in the market rules for RTOs in order to improve economic efficiency is distinguishable from the mitigation requested by stakeholders in Order No. 888. As Bethany Davis Noll and Burcin Unel explain in a recent article, just as FERC's jurisdiction distinguishes practices that directly affect rates from those that indirectly affect rates, FERC can draw a distinction between externalities that directly affect rates of production and those that are more indirect.[139]

FERC said in Order No. 888, "in order to impose . . . environmental conditions . . . a direct connection must be established between those conditions and our duty to determine that the rates, terms and conditions of service under our

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[126] *See* Grand Council of the Crees (of Quebec) v. FERC, 198 F.3d 950, 957 (D.C. Cir. 2000); PSI Energy, Inc., 55 FERC ¶ 61,254, at p. 61,811 (1991); Monongahela Power Co., 39 FERC ¶ 61,350, at p. 62,096 (1987).

[127] Todd S. Aagaard, *Energy-Environment Policy Alignments*, 90 Wash. L. Rev. 1517, 1546 (2015) (discussing caselaw and arguing that "[b]roadening FERC's authority to encompass externalities and other market failures . . . would fundamentally re-orient the agency in ways that would likely generate significant opposition from both inside and outside the agency—and perhaps from courts as well.").

[128] Order No. 888, 61 Fed. Reg. 21,540 (1996).

[129] *Id.* at 21,682.

[130] *Id.* at 21,680-82 (discussing proposals to mitigate air pollution and internalize externalities).

[131] *Id.* at 21,683 (discussing FERC's limited authority to pursuant to NEPA); *id.* at 21,683-84 (discussing FERC's limited authority to regulate in the public interest); *id.* at 21,686, 21,688 (discussing FERC authority to set just and reasonable rates).

[132] *Id.* at 21,687 n.1042.

[133] *Id.* at 21,683-84 & n.1016.

[134] NAACP v. Fed. Power Comm'n, 425 U.S. 662, 669-70 (1976).

[135] Order No. 888, 61 Fed. Reg. at 21,684.

[136] *Id.*

[137] Transmission Access Policy Study Grp. v. FERC (*TAPS*), 225 F.3d 667, 737 (2000).

[138] *See* Bateman & Tripp, *supra* note 103, at 300-03, 305-12 (explaining that FERC has discretion to change its interpretation).

[139] *See* Davis Noll & Unel, *supra* note 6, at 45-46.

open access tariffs are not unjust, unreasonable, unduly discriminatory, or preferential."[140] There, FERC rejected requests to establish an air pollution mitigation program along with but separate from the open access changes because there was no direct connection between the two.[141] That is, where environmental harms have only an indirect connection with rates and are not attributable to marginal generating decisions (for example, destruction of bird habitat caused by power plant construction), they are not a relevant factor in FERC's consideration of whether rates are just and reasonable. Similarly, the connection between "the statutory standards which authorize [FERC] to act"[142] and induced upstream production and related emissions from fossil-fuel generation may not be sufficiently direct. However, greenhouse gas emissions cause damage for every unit of electricity generated and sold, and so they directly affect the marginal social cost of production.[143] Here, a carbon-pricing rule intended to bring market offer prices and resulting market clearing prices in the organized wholesale electricity markets closer to the true marginal social cost of production and consumption in those markets is *directly connected to*—and in fact, adopted for the express purpose of—improving the economic efficiency of the markets and so too ensuring that the operation of those markets will result in rates that are just and reasonable and not unduly discriminatory or preferential.

In addition, FERC's authority to address direct externalities, environmental or otherwise, may be on particularly strong footing in the context of RTO market rules.[144] That is because in section 202(a), Congress enumerated additional relevant purposes of the FPA with respect to regional markets such as those managed by RTOs.[145] Section 202(a) was a key provision that FERC used as the basis for forming and regulating RTOs.[146] In section 202(a), Congress gave FERC power to establish regional markets such as RTOs expressly for the purpose of "assuring an abundant supply of electric energy throughout the United States *with the greatest possible economy* and with regard to the proper utilization and *conservation of natural resources.*"[147] And FERC's authority to act pursuant to section 205 or 206 should be read in light of these additional purposes.[148] Both—ensuring electric energy in RTOs is made with "the greatest possible economy" and ensuring electric energy in RTOs is produced "with regard to the conservation of natural resources"—support FERC approval of an efficiency-enhancing RTO carbon price that internalizes externalities of CO_2 emissions.

Given that legal foundation, FERC, or RTOs, can improve market efficiency by affirmatively incorporating a carbon-pricing rule in the RTO's market rules in at least three distinct ways. They are described below in turn.

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[140] Order No. 888, 61 Fed. Reg. at 21,686.

[141] *Id.*

[142] *Id.*

[143] *See* Davis Noll & Unel, *supra* note 6, at 45-46.

[144] *See* Avi Zevin, *Regulating the Energy Transition: FERC and Cost-Benefit Analysis*, 40 Colum. J. Envtl. L. at *39-40 (forthcoming 2020) (discussing FERC authority under section 202(a)). Historically, FERC orders and judicial decisions have considered FERC's authority to address environmental consequences outside the context of RTO market rules. *See* Order 888, 61 Fed. Reg. 21,540 (addressing authority to mitigate environmental consequences that result from open access transmission); *PSI Energy, Inc.*, 55 FERC ¶ 61,254, at p. 61,811 (addressing authority to consider environmental consequences of interconnection agreements); Grand Council of the Crees (of Quebec), 198 F.3d at 957 (addressing authority to act based on environmental consequences of market-based rate approval); *Monongahela Power Co.*, 39 FERC ¶ 61,350 (addressing authority to consider environmental consequences of bilateral sale of energy and capacity).

[145] 16 U.S.C. § 824a(a).

[146] Regional Transmission Organizations, Order No. 2000, 89 FERC ¶ 61,285, at *131 (2000) (relying on Section 202(a) to support authority to approve RTOs); Pub. Util. Dist. Snohomish Cty. v. FERC, 272 F.3d 607, 615 (D.C. Cir. 2001) (relying on the fact that FERC used section 202(a) to uphold Order No. 2000).

[147] 16 U.S.C. § 824a(a) (emphasis added).

[148] Cent. Iowa Power Coop. v. FERC, 606 F.2d 1156, 1168 (D.C. Cir. 1979) ("We agree with South Dakota that the Commission should consider the policies of the [FPA] [in section 202(a)] in making a determination under [section 206].").

a) FPA 205

An RTO could develop a carbon-pricing rule to improve the economic efficiency of its organized wholesale electricity markets and file the corresponding changes to its tariff with FERC under section 205 of the FPA. Under most RTO operating rules, this would occur through a stakeholder process.[149] Consistent with its responsibility under section 205 for designing and justifying market changes, the RTO would primarily dictate the rule's design. States would play a direct role only to the extent that they participate in RTO governance and the stakeholder process. Following stakeholder resolution, the market rule changes needed to implement the carbon-pricing rule would be submitted to FERC for approval under section 205 of the FPA.[150] As long as FERC determines, based on the RTO's filing and legal reasoning, that the market rule changes are just, reasonable, and not unduly discriminatory or preferential, FERC would approve or accept the carbon-pricing rule.[151]

With a section 205 filing, FERC must be able to make two findings, based on the RTO's filing and any other evidence presented in the record: first, that improving the economic efficiency of the market by internalizing the externality of CO_2 emissions is consistent with FERC's ratemaking authority; and second, that the design of the proposed carbon-pricing rule is consistent with the market efficiency legal theory such that it would result in just and reasonable and not unduly discriminatory or preferential rates.

On the first finding, as explained above, improving the economic efficiency of the organized wholesale electricity markets by internalizing externalities is consistent with FERC's ratemaking authority. On the second finding, proponents of the carbon-pricing rule must show that the rule would improve the economic efficiency of the organized wholesale electricity markets so that FERC can point to substantial evidence in the record supporting such a determination.[152] Substantial evidence can include "reasonable economic propositions."[153] As discussed above, prescriptions to internalize externalities are well-defined in economic theory.

Crucially, proponents of the carbon-pricing rule would have to demonstrate to FERC that the RTO's proposed design of the rule would actually internalize the CO_2 externality according to economic principles. Specifically, they would need to show that the RTO's proposal meets the three economic criteria that are discussed in Part II.A above.

First, the proposal should "internalize" the externality so that the wholesale market price of electricity reflects the marginal social cost. This principle suggests that the level of the carbon price under the carbon-pricing rule should be based on sound economic and scientific estimates of the external damages caused by CO_2 emissions. Currently, the IWG's Social Cost of Carbon represents the best estimate for the external damages of CO_2 emissions.[154]

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[149] *See* Wholesale Competition in Regions with Organized Electric Markets, Order No. 719, 125 FERC ¶ 61,071, at P 513 (2008) [hereinafter Order No. 719] ("RTOs and ISOs will be obligated to demonstrate that they are responsive to the needs of customers and other stakeholders through a direct collaboration among the RTOs and ISOs and their constituencies.").

[150] 16 U.S.C. 824d(a),(d).

[151] Atlantic City Elec. Co. v. FERC, 295 F.3d 1, 10 (D.C. Cir. 2002) (explaining FERC plays "an essentially passive and reactive" role when acting under section 205).

[152] *See* Davis Noll & Unel, *supra* note 6, at 51-54.

[153] S.C. Pub. Serv. Auth. v. FERC, 762 F.3d 41, 65 (D.C. Cir. 2014).

[154] *See* Revesz et al., *supra* note 20.

Second, a carbon price should apply to the largest scope of producers and consumers of electricity transacted through the relevant organized wholesale market that are within FERC's authority to regulate. In other words, the RTO carbon price should cover all organized wholesale electricity market sales in its footprint from any resources that emit greenhouse gases, including sales by small generators and imports.[155]

Third, if the carbon-pricing rule is limited in geographic scope to just one RTO, it should optimally mitigate leakage to neighboring RTOs and control areas that are not subject to an equivalent carbon-pricing rule. Leakage can undermine efficiency by increasing emissions that cause uninternalized social damage and by distorting the dispatch of generators in favor of those outside of the carbon-pricing region that carry lower private costs but higher social costs. In fact, failing to include leakage mitigation could lead to unduly discriminatory market rules, because similarly situated resources (emitting generators within the carbon-pricing region and those outside of it) would be treated differently when serving the same load located within the carbon-pricing region. Border adjustments for imported and exported electricity between these RTOs can counteract that effect, thereby improving economic efficiency and making rates just and reasonable and not unduly discriminatory.

b) FPA 205, with opt-out provision

An RTO could also design a carbon-pricing rule that is similar to the one described above in all respects, except that it would allow states within the RTO's footprint territory to opt out. More specifically, the state would be able to elect whether RTO market participants in their state are subject to a carbon price implemented under an RTO carbon-pricing rule. The RTO would functionally have a carbon pricing zone for states that opt in to the program and a non-carbon pricing zone for those that opt out.

In addition to the legal and design issues considered above, allowing opt-outs would raise at least two more.

The first is whether the legal rationale for an affirmative, FPA-based carbon-pricing rule is compatible with a state opt-out feature. Precedent established by Order Nos. 719 and 745 suggests that in cases where RTO market rules implicate traditional areas of state control, FERC may provide states an opportunity to opt out of those market rules.[156] Notably, FERC has allowed states to do so even when its rationale for adopting changes to market rules characterized those changes as being necessary to improve the economic efficiency of the organized wholesale electricity markets and thereby provide for wholesale rates that are lawful under the FPA.

In Order No. 719, FERC required RTOs to provide for the participation of demand response resources in organized wholesale electricity markets. It reasoned that excluding those resources from participation created barriers to competition that reduced market efficiency and so led to unjust and unreasonable rates.[157] But FERC also permitted states to prohibit demand response resources from participating in the organized wholesale electricity markets,[158] notwithstanding

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[155] Note that, even in this case, RTO carbon pricing will be incomplete because it will apply only to wholesale electricity sales.

[156] FERC has argued it is not *required* to provide a state opt-out for all market rules that implicate areas of traditional state authority. *See* Order No. 841-A, 167 FERC ¶ 61,154, at P 9. But that does not present any obstacle from doing so here. *Cf.* Advanced Energy Economy, 161 FERC ¶ 61,245, at PP 57 (2017) ("Finally, we decline to opine on requirements the Commission would impose in the future in the event that a RERRA requests the Commission to adopt a rule, regulation, or policy giving RERRAs authority to opt out and bar, restrict, or otherwise condition the sale of third-party EERs or other energy technologies into the wholesale electricity markets.")

[157] Order No. 719, 125 FERC ¶ 61,071, at P 16 (finding demand response participation "improves the economic operation of electric power markets").

[158] *Id.* at P 155.

the apparent contradiction between a state opt-out and FERC's reasons for adopting the order. Similarly, in Order No. 745, which also dealt with demand response resources, FERC reasoned that facilitating their participation in organized wholesale electricity markets "helps to ensure the competitiveness of organized wholesale energy markets and remove barriers to the participation of demand response resources, thus ensuring just and reasonable wholesale rates."[159] Here again, FERC's order made clear that states had authority to prohibit their resources from selling into organized wholesale electricity markets.[160] FERC explained that it included this opt-out provision in order to recognize the fact that "jurisdiction over demand response is a complex matter that lies at the confluence of state and federal jurisdiction."[161] In reviewing the program, the Supreme Court explained that the opt-out provision helped disprove the allegations that FERC's demand response order impermissibly intruded into the States' sphere of authority.[162]

Consistent with the precedent established by Order Nos. 719 and 745, FERC could reason that while it has the legal authority to approve or accept carbon-pricing rules for the RTOs, states' longstanding authority to regulate generators—including the environmental consequences of generation—merits allowance of a state opt-out. In effect, in deciding whether the RTO carbon-pricing rule is just and reasonable or not,[163] FERC would balance the economic efficiency benefits of the carbon-pricing rule against the benefits of permitting states to maintain a veto over an area closely related to an area of traditional state authority.[164]

If FERC approves a carbon-pricing rule on the basis that it improves the economic efficiency of the organized wholesale electricity markets, allowing states to opt out would introduce a further issue: intra-RTO leakage. If the RTO does not implement changes to its dispatch algorithm such as a border adjustment, there might be significant leakage of emissions from the carbon price region to the non-carbon price region. Such leakage would undermine the economic efficiency benefits of the carbon price within the carbon price region, and so undermine the legal justification for implementing the carbon-pricing rule in the first place. A leakage mitigation component to the carbon-pricing rule, such as a border adjustment, would limit the extent to which leakage undermines market efficiency. Whether a one-way border adjustment that addresses imports or a two-way border adjustment that addresses both imports and exports is the appropriate leakage mitigation approach for an RTO will depend on the specific generation mix inside and outside of the carbon-pricing region; an RTO's choice should be supported by substantial evidence that the selected approach improves market efficiency.

c) FPA 206

The FPA section 206 approach is very similar to the FPA section 205 approach described above, except that FERC would *require* RTOs to design and implement a carbon-pricing rule, rather than evaluating an RTO-submitted revision to its market rules. FERC could act by regulation, directing all RTOs to include a carbon-pricing rule in their market rules, or if

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[159] Demand Response Compensation in Organized Wholesale Energy Markets, Order No. 745, 76 Fed. Reg. 16,658, 16,658 (2011) [hereinafter Order No. 745].

[160] FERC v. Elec. Power Supply Ass'n (*EPSA*), 136 S. Ct. 760, 779 (2016), *as revised* (Jan. 28, 2016) (citing Order No. 745, 76 Fed. Reg. at 16,676, at P 114).

[161] Order No. 745, 76 Fed. Reg. at 16,676, at P 114

[162] *EPSA*, 136 S. Ct. at 779-80 (2016).

[163] NRG Power Mktg. LLC v. FERC, 862 F.3d 108 (2017) (holding FERC cannot modify RTO proposed tariff changes, but must either approve or deny them depending on whether they are just and reasonable and not unduly discriminatory or preferential).

[164] Some have argued that an opt-out would be inconsistent with FERC's findings that a particular market change is necessary for just and reasonable rates and so is not permissible. *See* Joint Brief of Environmental Defense Fund, Natural Resources Defense Council, and Vote Solar in Support of Respondents at 15-17, Nat'l Assoc. of Regulatory Util. Comm'rs v. FERC, No. 19-1142 (D.C. Cir. filed Feb. 7, 2020).

it found specific circumstances justified a carbon-pricing rule in only one or a limited set of RTOs, it could issue an order specific to those RTOs.[165] As a result, this approach is located furthest to the left in Figure 6—leftward of approaches that are more likely to involve some state participation in market design through the stakeholder process.

To proceed under section 206, FERC would have to act pursuant to the two-step framework described in Part II.B.2.[166] FERC must first determine, based on a complaint or on its own initiative, that the existing market rules are resulting in rates in the relevant organized wholesale market(s) that are unjust, unreasonable, unduly discriminatory, or preferential, because there is an uninternalized externality that is limiting the economically efficient operation of the organized wholesale market(s). FERC would then have to determine that a (new) carbon-pricing rule would remedy the problem identified with the existing market rules, either on its own or in combination with other measures.

Taking this approach would require FERC to specify at least the high-level carbon-pricing rules that would remedy the flaw in the existing market rules, consistent with FERC's reasoning for finding that, absent a carbon-pricing rule, the existing RTO market rules are unjust, unreasonable, unduly discriminatory, or preferential.[167] But FERC would not need to specify a complete carbon-pricing rule on its own. FERC could make an initial finding that the existing market rules are unlawful and identify general carbon-pricing rules, or principles for such rules, while leaving the design specifics of an RTO's carbon-pricing rule to the RTO's compliance filing.[168]

Two important differences distinguish this approach from those that proceed under section 205 of the FPA. The first difference relates to the scope of the carbon-pricing rule's effect. By acting under section 206, FERC could cause the carbon-pricing rule to apply broadly to all market sales within the RTO. As a result, it could better fulfill the economic principle that incomplete carbon pricing should be avoided. The second difference relates to the heavier legal burden of persuasion that FERC must carry under section 206 of the FPA to show that existing market rules are unlawful because they fail to include a carbon-pricing rule. The Supreme Court has said that "FERC has the authority—and, *indeed, the duty*—to ensure that rules or practices 'affecting' wholesale rates are just and reasonable."[169] And, as explained above, the fact that carbon-pricing rules should improve the economic efficiency of the organized wholesale electricity markets would be consistent with FERC taking action under FPA 206 because FERC has regularly found existing designs to be unjust and unreasonable when they fail to produce economically efficient outcomes.[170]

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[165] Transmission Access Policy Study Grp. v. FERC (*TAPS*), 225 F.3d 667, 687-88 (2000) (holding section 206 provides FERC with authority to cure unjust, unreasonable, or unduly discriminatory rates through a rulemaking that applies across the power sector).

[166] Emera Me. v. FERC, 854 F.3d 9, 25 (2017).

[167] Colo. Office of Consumer Counsel v. FERC, 490 F.3d 954, 956 (D.C. Cir. 2007) (explaining that the scope of the replacement rate ordered by the Commission is appropriately tailored to the scope of the Commission's finding that rates are unjust and unreasonable).

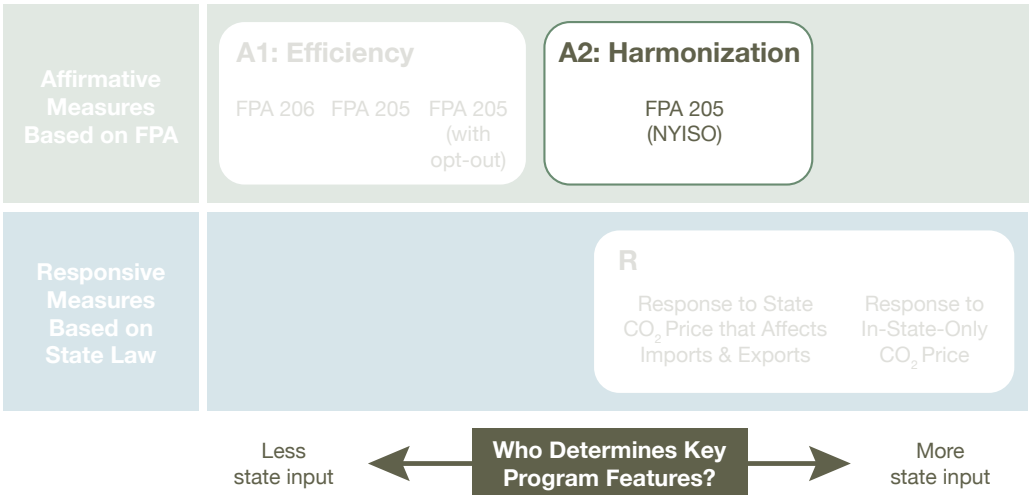
[168] *E.g.*, Calpine Corp. v. PJM Interconnection, 169 FERC ¶ 61,239 (2019) (establishing general replacement rules and directing PJM to submit a compliance filing within 90 days).

[169] *EPSA*, 136 S. Ct. at 774 (emphasis added).

[170] Davis Noll & Unel, *supra* note 6, at 26-41 (discussing examples).

3. *NYISO's Alternative Approach (A2)*

Figure 8



Affirmative RTO carbon pricing based on harmonizing state policies and markets.

This Part first describes an alternative approach to affirmative carbon-pricing rules that has been proposed by NYISO and notes how it is different from the FPA section 205 approach discussed above. Then, it describes the sort of legal theory and evidence NYISO will have to present to support its proposal, and points out an important similarity between NYISO's carbon-pricing rule proposal and the current joint approach to resource adequacy taken by the state and NYISO. Importantly, depending on the design of the state's program, the state's role in shaping and steering NYISO's affirmative carbon-pricing rule may be limited to initial design decisions.

a) NYISO's proposal

NYISO's proposed carbon-pricing rules would involve changes to its energy market that would be submitted to FERC pursuant to FPA section 205.[171] The proposed approach would include greater state involvement and, as a result, a different legal basis than an economic efficiency-based affirmative carbon-pricing rule. The proposal's key components include a carbon price charged to emitting resources that sell into NYISO's markets and a two-way border adjustment mechanism for imports into and exports out of the NYISO system. The price of carbon would be determined by the New York Public Service Commission (PSC) "pursuant to the appropriate regulatory process."[172]

According to NYISO's current plan, the New York PSC would not itself impose a new cost on emitters or change the application of other state programs that direct out-of-market payments to non-emitting resources, but would instead participate in the design of the NYISO program by specifying the carbon price to be implemented under the NYISO's carbon-pricing rule. Like the carbon-pricing rule approach described above (A1), NYISO's proposed approach would be a form of affirmative carbon-pricing rule—that is, its legal basis would rest on the FPA. For that reason, NYISO's

[171] NYISO, *IPPTF Carbon Pricing Proposal* (Dec. 7, 2018) (draft) [hereinafter *IPPTF Proposal*], https://perma.cc/ZG84-FL2X.

[172] *Id.* at 4; *see also id.* at 4-5 ("It is envisioned that the Gross SCC would be set in a manner that is comparable to and compliments existing New York State clean energy programs. . . . The details of the PSC's regulatory processes are outside the scope of this proposal."). Under NYISO's proposal, resources subject to RGGI would be subject to a "gross" carbon price minus the RGGI price, while resources not subject to RGGI would be subject to the gross carbon price without adjustment. *Id.* at 5-6.

proposal must fall within the scope of FERC's authority.[173] But NYISO's proposed approach is distinguishable from the affirmative carbon-pricing rules discussed above because it would rely on the state rather than the RTO to choose the carbon price level. As a result, this approach is represented in the right of the top row of the framework diagram.

b) NYISO's legal theory: harmonization of organized wholesale electricity markets and state policy

The decision to involve the state in the design of the carbon price for NYISO's carbon-pricing rule has significant implications for how NYISO could present its proposed rule to FERC. Because the New York PSC would be involved in establishing the carbon price, this approach must be careful not to violate the legal prohibition on a state replacing a FERC-jurisdictional wholesale rate.[174] FERC's precedent is clear that a carbon price bundled with wholesale energy sales is FERC-jurisdictional because it affects the wholesale rate.[175] NYISO must thus show why the price its program would employ is correct for NYISO's own purposes—that is, the carbon carbon-pricing rule will result in wholesale rates for power bought and sold through NYISO's energy market that are lawful under the FPA because they are just and reasonable and not unduly discriminatory or preferential.[176]

NYISO's most recent description of its carbon-pricing rule proposal indicates that it will rely on an argument that its carbon-pricing rule will result in lawful rates in NYISO's energy market because it will harmonize New York State's clean energy policies with the operation of NYISO's organized wholesale electricity markets.[177] Specifically, NYISO states that, "[s]ome stakeholders have indicated that they would prefer the NYISO to set the [carbon price.] NYISO believes this is inconsistent with the goal of coordinating wholesale markets and public policy."[178] In contrast to the economic efficiency theory described above, a coordination or harmonization theory emphasizes that the FPA effectively requires RTOs to carry out their duties in the midst of state policies that lie beyond FERC's direct authority, such as RPSs, renewables procurements, and Clean Energy Standards (CESs).[179] Notably, according to the Supreme Court, those RTO duties include an obligation "to promote the orderly production of plentiful supplies of electric energy . . . [at] reasonable rates"[180] and to "maintain[] competition to the maximum extent possible."[181]

The evidence that proponents of NYISO's proposed carbon-pricing rule need to present to FERC would be different than the evidence needed to support an argument based on improving the economic efficiency of the organized wholesale electricity markets by internalizing externalities. To make the case that NYISO's carbon-pricing rule will lead to just

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[173] *See* Part III.A.1.

[174] Hughes v. Talen Energy Mktg., LLC, 136 S. Ct. 1288, 1299 (2016). Note that this concern may only apply if either (1) NYISO justifies its carbon price as fitting within the scope of FERC's authority as a wholesale rate rather than merely a rule or practice affecting wholesale rates, or (2) FERC and/or courts adopt an expansive reading of *Hughes* under which field preemption applies not only to areas of FERC's exclusive jurisdiction—namely wholesale sales—but also to FERC's affecting jurisdiction.

[175] *WSPP Inc.*, 139 FERC ¶ 61,061, at P 23; *Edison Elec. Inst.*, 69 FERC ¶ 61,344, at p. 62,289.

[176] *Cf.* FPC v. Conway Corp., 426 U.S. 271, 278-79 (1976) (holding that FERC can and should consider the broader factual context in which a proposed wholesale rate will function).

[177] *IPPTF Proposal*, *supra* note 171, at 5. For discussions of "harmonizing" theories of wholesale market tariffs, *see* Ari Peskoe, *Easing Jurisdictional Tensions by Integrating Public Policy in Wholesale Electricity Markets*, 38 Energy L.J. 1, 12-14, and Justin Gundlach & Romany Webb, *Carbon Pricing in New York ISO Markets: Federal and State Issues*, 35 Pace Envtl. L. Rev. 1, 66-68 (2017).

[178] *IPPTF Proposal*, *supra* note 171, at 5.

[179] *WSPP Inc.*, 139 FERC ¶ 61,061, at P 23 (concluding that RECs sold pursuant to RPS program are not FERC jurisdictional if unbundled from corresponding units of wholesale electricity); *Allco*, 861 F.3d at 97–102 (upholding Connecticut's renewables procurement program as not preempted by federal law); Coal. for Competitive Elec. v. Zibelman, 906 F.3d 41, 57 (2d Cir. 2018) (upholding New York's Clean Energy Standard), *cert. denied sub nom. Electric Power Supply Ass'n v. Rhodes*, 139 S. Ct. 1547 (2019).

[180] *NAACP*, 425 U.S. at 670.

[181] *Otter Tail Power Co. v. United States*, 410 U.S. 366, 374 (1973).

and reasonable and not unduly discriminatory or preferential rates by protecting the integrity of wholesale markets and better harmonizing those markets with state policies, NYISO might highlight that state policies pursue CO_2 emissions reductions using out-of-market payments,[182] and describe any possible inefficiencies in scattershot state-federal regulation of greenhouse gases.[183] NYISO could then explain how a carbon-pricing rule would address these inefficiencies by relying on NYISO's organized wholesale electricity markets to help the state achieve its policy goals.

FERC has previously accepted market design proposals on the grounds that they serve wholesale market objectives in a way that limits disruption to state policy goals. In 2013, FERC approved changes to ISO-NE's capacity market rules, which provided special treatment to renewable generation in order to "balance . . . economically efficient markets . . . [and] the ability of states to pursue other legitimate state policy objectives."[184] FERC's decision to balance these considerations and the specific balance FERC struck were upheld by the D.C. Circuit.[185] In 2018, FERC approved a further change to ISO-NE's capacity market rules in order to implement "a better way to integrate . . . state policies into the competitive organized wholesale electricity markets."[186] FERC found that the requested changes reconciled state policies with the ISO-NE capacity market's continued ability "to produce a level of investor confidence that is sufficient to ensure resource adequacy at just and reasonable rates."[187] NYISO could similarly argue that a carbon-pricing rule would improve wholesale market operation in a way that supported rather than undermined state policies.[188]

Other permutations of an affirmative carbon-pricing rule based on the legal theory of harmonization that resembles the one NYISO has developed are also plausible. For instance, an RTO could propose a carbon-pricing rule pursuant to FPA section 205 using the same harmonization theory but without direct input from state agencies. Or, pursuant to FPA section 206, FERC could require an RTO to implement a carbon-pricing rule on the basis that harmonizing wholesale markets and state policy is necessary for rates to be just and reasonable. For simplicity, we limit discussion of affirmative carbon pricing under the harmonization theory to the current form of NYISO's proposal. Alternatively, New York State could adopt a carbon pricing policy outside of the wholesale market, which would require responsive changes by NYISO. This option is discussed in Part III.B below.

c) Relevant precedent: New York State involvement in NYISO's capacity market

FERC's orders approving NYISO's capacity market design provide useful support for the premise that an RTO may rely on state policy preferences when designing a program under the FPA, provided that it does so within certain limits.

There, FERC recognized that resource adequacy is an area of traditional state responsibility, and FERC's "goal is to appropriately recognize state and local jurisdiction over resource adequacy while at the same time fulfilling [its] statutory mandate under the FPA to ensure that rates . . . are just, reasonable and not unduly discriminatory or preferential."[189] Given that relationship, FERC has approved a market design in which NYISO relies on a New York PSC-approved de-

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[182] *See* Calpine Corp., 163 FERC ¶ 61,236 (LaFleur, *comm'r, dissenting* at 46) (noting that state policies may be in "tension" with organized wholesale electricity markets).

[183] Bateman & Tripp, *supra* note 103, at 313.

[184] New England States Comm. on Elec., 142 FERC ¶ 61,108, at P 35 (2013).

[185] *NextEra Energy Resources v. FERC*, 898 F.3d 14 (D.C. Cir. 2018).

[186] ISO New England Inc., 162 FERC ¶ 61,205, at P 6 (2018) (internal quotation marks omitted).

[187] *Id.* at P 21.

[188] *See* Reply Comments of the Institute for Policy Integrity 18-19, Calpine Corp. et al. v. PJM Interconnection, Docket No. EL16-49-000 (Nov. 6, 2018) (explaining why carbon pricing can achieve FERC's goals regarding the interaction of state policy and organized wholesale electricity markets in an efficient manner).

[189] New York Independent Sys. Operator, 122 FERC ¶ 61,186, at P 40 (2008).

termination as a key input to its capacity market design. In its initial order approving the formation of NYISO, FERC approved as just and reasonable the reliance by NYISO on minimum installed capacity requirements that are set by a separate organization, the New York State Reliability Council (NYSRC).[190] The NYSRC is regulated, in relevant part, by the New York PSC.[191] These installed capacity requirements now serve as the starting point for the amount of capacity that NYISO procures through its capacity market.[192] FERC "consider[ed] the NYPSC's role in developing" this market design "to be an important factor" in its approval.[193] That is, the New York PSC-regulated NYSRC establishes a key input into a critical FERC-jurisdictional RTO market.

This precedent supports the legality of a market design in which NYISO looks to the New York PSC when choosing the appropriate carbon price, particularly given that, like resource adequacy, carbon pricing affects both a traditional area of state control (i.e., generation and environmental protection) and the operation of FERC jurisdictional markets.

Importantly, these orders also suggest that even if NYISO points to the New York PSC regulation to initially establish a carbon price under its carbon-pricing rule, the PSC might not thereafter be able to unilaterally change that carbon price. In approving the ability of the NYSRC to establish the minimum installed capacity requirements, FERC made clear that "any dispute between the New York ISO and the NYSRC concerning . . . matters subject to [FERC's] jurisdiction under the FPA . . . must be resolved directly by [FERC], and not submitted first to the New York Commission."[194] More recently, FERC has stated that "[s]hould the NYSRC, as a result of New York Commission action, adopt a different [requirement], then it is our expectation that the NYSRC would make a filing with [FERC] to that effect."[195] So, should FERC apply this precedent to a carbon-pricing rule, it might determine that a revision to the carbon price would also have to be submitted by NYISO to FERC and be justified as consistent with the FPA requirements that the resulting rates are just, reasonable, and not unduly discriminatory.[196]

d) Carbon-pricing rule design and supporting evidence

NYISO has indicated that it anticipates the carbon price selected by the New York PSC for inclusion in its carbon-pricing rule will match the value currently used by the New York PSC in its Benefit-Cost Analysis Framework and Clean Energy Standard program.[197] Regardless of what carbon price the PSC chooses, NYISO's section 205 submission to FERC will have to affirmatively show that this price accomplishes the harmonization goals that underlie its theory for why carbon pricing in its organized wholesale electricity market would result in just and reasonable and not unduly discriminatory or preferential rates in this market (even if this carbon price might not be the economically efficient price). Similarly, to justify the border adjustment components of its carbon-pricing rule, NYISO must also demonstrate that minimizing leakage would support both wholesale market integrity and state policy goals. This would be a fact-based inquiry regarding the particulars of state programs such as whether they are intended to address emissions associated with out-of-state generation used to meet in-state load.

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[190] Cent. Hudson Gas & Elec. Corp. 83 FERC ¶ 61,352, at p. 62,411 (1998)
[191] *See* In the Matter of Reliability Rules, Order Adopting New York State Reliability Rules, Case 05-E-1180 (issued Feb. 9, 2006).
[192] *See* New York Independent Sys. Operator, 103 FERC ¶ 61,201, at P 53 (2003).
[193] *Id.* at P 15.
[194] *Central Hudson Gas & Electric Corp.*, 83 FERC ¶ 61,352, at p. 62,412.
[195] *New York Independent Sys. Operator*, 122 FERC ¶ 61,186, at P 40.
[196] Matthew R. Christiansen, *FPA Preemption in the 21st Century*, 91 N.Y.U. L. Rev. Online 1, 15, 17 (2016) ("The exclusive authority vested in FERC by the FPA requires only that FERC be able to review the wholesale rate, unencumbered by any similar determination by a State. . . . It was [the] usurpation of FERC's exclusive right to evaluate whether the rate was just and reasonable that rendered [a state] statute field preempted, not merely the fact that it was addressed at the wholesale rate generally.").
[197] IPPTF Proposal, *supra* note 171, at 4-5.

Several analyses show that NYISO's proposed carbon-pricing rule will achieve the state's decarbonization goals while reducing out-of-market payments, compliance costs, and net consumer costs over the long term.[198]

Types of Evidence to Support Harmonization Theory

NYISO can point to the following types of evidence to support a carbon-pricing rule justified on the basis that it will harmonize state policy preferences with efficient wholesale markets.[199]

- State policy goals (e.g., renewable deployment targets and annual CO_2 emissions reductions) would be achieved even as the costs of compliance with state policy requirements fall or stay flat.
- Market entry by technologies given priority by state policy would continue at a steady or faster rate despite reduced levels of out-of-market payments from state programs.
- Similarly situated resources that received disparate levels of out-of-market payments pursuant to state policies would instead compete on a more level playing field.
- State policies related to clean energy deployment are designed not to conflict with or duplicate a carbon price, including by automatically adjusting payments to reflect the additional revenue provided by a carbon price.[200]
- Over the long term, reduced levels of investment in emitting resources would occur alongside flat or falling electricity prices.

If other states located within an RTO service territory also adopt climate change mitigation programs that have indirect effects on organized wholesale electricity markets, the RTOs that operate there may look to NYISO's carbon-pricing rule and the legal theory supporting its adoption to inform their own approach to affirmative carbon pricing.[201]

4. States, RTOs, and FERC Can Mitigate Any Risk that Affirmative RTO Carbon-Pricing Rules Could Be Seen as Preempting State Programs

Some commentators and advocates of ambitious CO_2 emissions reductions have raised concerns that affirmative RTO carbon-pricing rules could affect the ability of states to adopt their own programs to reduce CO_2 emissions from the

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[198] *See* Susan F. Tierney & Paul J. Hibbard, Clean Energy in New York State: The Role and Economic Impacts of a Carbon Price NYISO's Organized Wholesale Electricity Markets (2019), https://www.analysisgroup.com/globalassets/uploaded-files/content/news_and_events/news/2019-analysis-group-nyiso-final-report.pdf; Samuel A. Newell et al., Pricing Carbon into NYISO's Wholesale Energy Market to Support New York's Decarbonization Goals (prepared for NYISO) (2017), https://www.nyiso.com/documents/20142/2244202/2017-Brattle-NY-Carbon-Study.pdf/156a738d-e471-ccad-e146-07ac593ec0c3 (comparing consumer costs under carbon pricing to consumer costs under state Clean Energy Standard policy in 2016).

[199] *See* Peskoe, *supra* note 177, at 14; Gundlach & Webb, *supra* note 177, at 66-68.

[200] *See* N.Y. Pub. Serv. Comm'n, Order Adopting a Clean Energy Standard, No. 15-E-0302, at 144 (Aug. 1, 2016), http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b44C5D5B8-14C3-4F32-8399-F5487D6D8FE8%7d ("The Commission also agrees and determines that the design and duration of the mechanism shall be such that it can be modified or eliminated by the Commission if there is a national, NYISO, or other program instituted that pays for or internalizes the value of the zero-emissions attributes in a manner that adequately replicates the economics of the program[.]"); N.Y. Pub. Serv. Comm'n, Order Modifying Tier 1 Renewable Procurements, No. 15-E-0302, at 3 (Jan. 16, 2020) , http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={1F9CA0EB-3968-41DB-BBE0-C251A3FE52DE} ("[T]he Index REC has the added benefit of avoiding a double payment for the renewable attributes in the event that carbon pricing is implemented within the wholesale energy market.").

[201] *See* Peskoe, *supra* note 177, at 31-32 (describing how a similar harmonization theory might permit carbon pricing within ISO-NE given the carbon reduction commitments of New England states).

power sector.[202] For example, these issues might come into play if an affirmative RTO carbon-pricing rule sets a price at one level and a state program sets a carbon price applicable to electricity generators at a different, perhaps higher level.[203] Some have also expressed concern about the potential for affirmative RTO carbon-pricing rules to provide a basis for claims that other state clean energy programs, such as RPSs and CESs, are preempted.[204]

Under the United States Constitution,[205] state action can be preempted by federal authority in several ways, two of which are relevant here.[206] One way, field preemption, occurs where "Congress has legislated comprehensively to occupy an entire field of regulation, leaving no room for the States to supplement federal law."[207] The other way, conflict preemption, occurs where state action "stands as an obstacle to the accomplishment and execution of the full purposes and objective" of a federal law or regulation.[208]

But there are a number of reasons why courts may disfavor finding that an affirmative RTO carbon-pricing rule preempts state carbon pricing and clean energy policies. And there are important steps that states, RTOs, and FERC can take to further limit the risk that preemption arguments would be successful.

First, environmental regulation and selection of a state's generation resource mix are decidedly examples of traditional state powers.[209] And courts tend to look skeptically at preemption claims related to traditional areas of state control without a clear statement from Congress that such preemption was intended.[210]

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[202] *See*, e.g., Jennifer Chen, *Carbon Pricing in PJM: Are State Policies at Risk?*, Greentech Media (Apr. 24, 2019), https://perma.cc/MD7S-E8W3; Shelley Welton, *Electricity Markets and the Social Project of Decarbonization*, 118 Colum. L. Rev. 1067, 1118 (2018) ("Once a state cedes policy objectives to its regional electricity market, the state may suffer limits on its ability to craft supplementary policies or to reclaim the objectives if it does not like the results the market produces."); Memorandum from New England States Committee on Electricity to New England Power Pool Regarding Feedback to NEPOOL on Long-Term "Achieve"-style IMAPP Proposals 4-5 (Apr. 7, 2017) https://perma.cc/HSM2-MA65 (expressing concerns about how affirmative RTO carbon pricing could result in states ceding jurisdiction over key issues to ISO-NE and FERC).

[203] For example, FERC might approve use of the Interim Social Cost of Carbon currently being employed by federal agencies. *See* EPA, Regulatory Impact Analysis for the Repeal of the Clean Power Plan, and the Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units 7-1 to 7-8 (2019), https://perma.cc/436Q-APMM. This value is substantially lower than the Social Cost of Carbon developed by the Interagency Working Group in 2016. *See* Interagency Working Grp. on Soc. Cost of Greenhouse Gases, Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 at 4 (2016), https://perma.cc/R7NC-XH6S. However, a low FERC-approved carbon price may be vulnerable to legal challenge that it is not supported by substantial evidence. *See* Brief of the Institute for Policy Integrity at New York University School of Law as Amicus Curiae in Support of Plaintiffs' Motions for Summary Judgment 12-17, *California v. Zinke*, No. 4:18-cv-05712 (N.D. Cal. filed June 21, 2019) (explaining errors with using interim Social Cost of Carbon estimate).

[204] *See* Chen, *supra* note 202; Welton, *supra* note 202, at 1125-27. For an overview of RPSs and CESs, including a survey of existing examples, *see* Ctr. for Climate & Energy Solutions, *Electricity Portfolio Standards*, https://www.c2es.org/content/renewable-portfolio-standards/ (last accessed Mar. 15, 2020).

[205] U.S. Const. Art. VI, cl. 2.

[206] A third type of preemption—which arises where a congressional directive expressly preempts state law, *see, e.g.,* Oneok, Inc. v. Learjet, Inc., 575 U.S. 373, 376 (2015)—is not at issue in the case of carbon pricing.

[207] Hughes v. Talen Energy Mktg., LLC, 136 S. Ct. 1288, 1297 (2016) (quoting Nw. Cent. Pipeline Corp. v. State Corp. Comm'n of Kan., 489 U.S. 493, 509 (1989)).

[208] *Oneok*, 573 U.S. at 377 (internal quotation marks omitted); *see also* Clean Air Mkts. Group v. Pataki, 338 F. 3d 82, 87 (2d Cir. 2003).

[209] Pac. Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n, 461 U.S. 190, 205 (1983) (recognizing states' "traditional responsibility in the field of regulating electrical utilities for determining questions of need, reliability, cost and other related state concerns"); *see also* Entergy Nuclear Vt. Yankee, LLC v. Shumlin, 733 F.3d 393, 417 (2d Cir. 2013) (traditional state authority includes the ability to "direct the planning and resource decisions of utilities" (internal quotation marks omitted)); Conn. Dep't of Pub. Util. Control v. FERC, 569 F.3d 477, 481 (D.C. Cir. 2009) (states have authority "to require retirement of existing generators").

[210] *See* Bond v. United States, 572 U.S. 844, 866 (2014) (requiring a "clear statement" from Congress before upsetting traditional constitutional role of states in the area of criminal law); *Oneok*, 575 U.S. at 387 (rejecting broad application of field preemption under analogous provisions of the Natural Gas Act because "the Natural Gas Act does not pre-empt 'traditional' state regulation").

With respect to field preemption, the Supreme Court has framed "the critical question in determining whether a state law is field preempted [as] whether 'the target at which the state law aims' is a matter under FERC's *exclusive* jurisdiction"—that is, not an area of concurrent federal and state jurisdiction.[211] Under the FPA, FERC's exclusive jurisdiction is limited to its authority over "garden-variety" wholesale rates rather than the broader category of rules and practices affecting rates, which encompasses areas where states have concurrent jurisdiction.[212] So long as an affirmative RTO carbon price was justified as an exercise of FERC's affecting jurisdiction, field preemption may not be applicable and so would not put state environmental or clean energy deployment policies at risk.[213]

With respect to conflict preemption, mere "[t]ension between federal and state law is not enough to establish conflict preemption,"[214] particularly in areas that have been traditionally reserved to the states such as health and safety regulation,[215] or for statutes like the FPA that involve a careful balance of federal and state interests.[216] Contrary to some commentators' initial concerns after the Supreme Court's decision in *Hughes v. Talen Energy Marketing*,[217] a spate of recent court decisions have consistently rejected attempts to wield FPA preemption in an attempt to undermine state clean energy policy.[218]

Second, states, when designing their programs, can mitigate any risk that preemption claims will be made. State-level clean energy procurement programs generally aim at several targets, of which climate change mitigation is just one.[219] Thus, consistent with the limits on field preemption established by the Supreme Court, states could specify that their programs are "aimed" at a different "target" from establishing a just and reasonable wholesale rate.[220] For example, if the RTO carbon-pricing rule was adopted on the efficiency theory, a state can make clear that its own program is aimed at a target other than internalizing an externality at the efficient level. Alternative targets might include compliance with a

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[211] Christiansen, *supra* note 196, at 8 (emphasis added) (quoting *Oneok*, 575 U.S. at 385).

[212] FERC v. Elec. Power Supply Ass'n (*EPSA*), 136 S. Ct. 760, 778 (2016), as revised (Jan. 28, 2016) ("Our decisions uniformly speak about rates, for electricity and all else, in only their most prosaic, garden-variety sense. As the Solicitor General summarized that view, 'the rate is what it is.' Tr. of Oral Arg. 7"); *see also Hughes*, 136 S. Ct. at 1297 ("[T]he FPA allocates to FERC exclusive jurisdiction over 'rates and charges ... received ... for or in connection with' interstate wholesale sales" (second and third alterations in original) (quoting 16 U.S.C. § 824d)); Jim Rossi, *supra* note 44, at 436 (explaining that "*EPSA* clearly indicates that the FPA's allocation of federal-state authority allows for concurrent federal and state authority over the practices affecting rates").

[213] Christiansen, *supra* note 196, at 19 ("[T]he better understanding of *Oneok*'s application to state electricity-sector regulation is that the FPA does not field preempt state laws directed at practices affecting matters that are firmly on States side of the FPA's dividing line, even if those practices are also subject to FERC regulation. . . . This interpretation of *Oneok* suggests that FERC's exclusive jurisdiction cannot extend to the impact of the wholesale rate on the matters that the FPA reserves for the States." (internal quotation marks and alterations omitted))

[214] Rocky Mountain Farmers Union v. Goldstene, 719 F. Supp. 2d 1170, 1187 (E.D. Cal. 2010) (quoting Incalza v. Fendi N. Am., Inc., 479 F.3d 1005, 1010 (9th Cir. 2007)).

[215] Hillsborough County v. Automated Med. Labs., 471 U.S. 707, 715 (1985) (recognizing "presumption that state or local regulation of matters related to health and safety is not invalidated under the Supremacy Clause").

[216] *See* Coal. for Competitive Elec. v. Zibelman, 906 F.3d 41, 41 (2d Cir. 2018) ("Given the FPA's dual regulatory scheme 'conflict-pre-emption analysis must be applied sensitively in this area, so as to prevent the diminution of the role Congress reserved to the States while at the same time preserving the federal role.' . . . So long as a state is 'regulating production or other subjects of state jurisdiction, and the means chosen are at least plausibly related to matters of legitimate state concern,' there is no conflict preemption 'unless clear damage to federal goals would result.'" (internal alterations removed) (quoting *Nw. Cent. Pipeline Corp.*, 489 U.S. at 515, 518, 522)).

[217] *See, e.g.*, Welton, *supra* note 202, at 1125-27.

[218] *See* e. Zibelman, 906 F.3d 41; Elec. Power Supply Assoc. v. Star, 904 F.3d 518 (7th Cir. 2018); Allco Fin. Ltd. v. Klee, 861 F.3d 82 (2d Cir. 2017), *cert. denied*, 138 S. Ct. 926 (2018).

[219] *See*, e.g., N.J. Stat. Ann. § 48:3-87.3 § 1(b) (explaining purpose of New Jersey Zero Emission Certificate program includes reducing criteria air pollution); N.Y. Pub. Serv. Comm'n, Order Adopting a Clean Energy Standard, No. 15-E-0302, at 7 (Aug. 1, 2016) http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b44C5D5B8-14C3-4F32-8399-F5487D6D8FE8%7d ("The [Clean Energy Standard], along with [the Reforming the Energy Vision program], will benefit New York energy consumers and the overall economy by encouraging new investments in the State, maintaining existing jobs, and attracting capital from outside the State.").

[220] *Oneok*, 575 U.S. at 385.

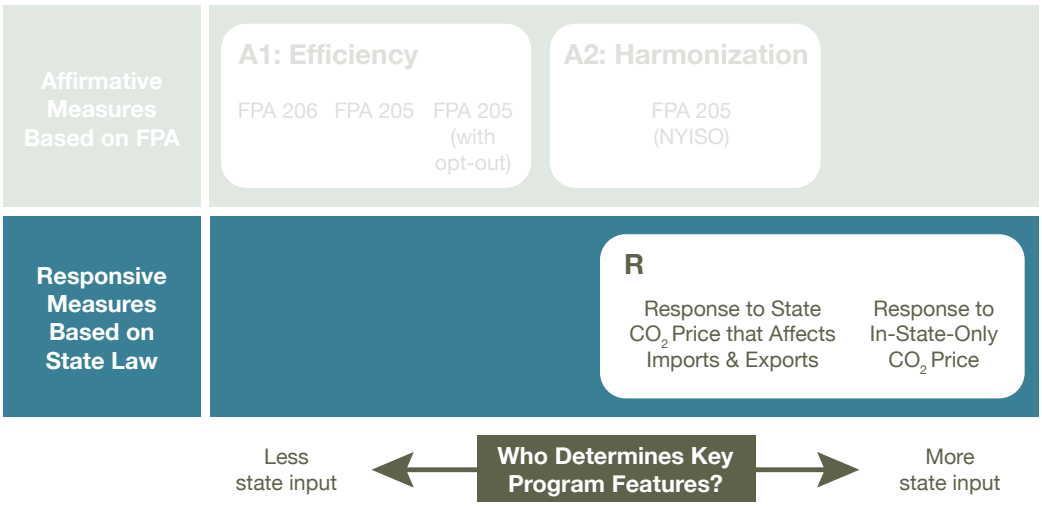
decarbonization target date, increased deployment of renewable resources, or reduction of local pollution. The state can also demonstrate that it is aiming at a different target by establishing a different regulatory scope. For example, a field preemption challenge would be on weaker ground if the state policy were an economy-wide carbon price.[221] To the extent there is any ambiguity on this front, the state can make clear that its program has diverse goals, none of which is to produce just and reasonable wholesale rates.

Similarly, with conflict preemption, states can minimize any risk by emphasizing that they are exercising their traditional state authority to protect public health and the environment. States can develop rules explicitly intended to go beyond the environmental outcomes achieved by the affirmative RTO carbon-pricing rule. As Jim Rossi and Thomas Hutton have argued, given the structure, history, and purpose of the FPA, the most appropriate approach to conflict preemption of clean energy-related issues is to consider federal action a "floor" that can be built upon by more aggressive state action rather than a ceiling that constrains state action.[222]

RTOs and FERC also have a role to play in mitigating the preemption risk. Any FERC order approving or requiring a carbon-pricing rule could make clear that FERC is relying on its affecting jurisdiction rather than its exclusive jurisdiction over wholesale rates. The RTO tariff filing to implement a carbon-pricing rule could include an explicit savings clause that nothing in the filing is intended to preempt more stringent state law. And FERC can act pursuant to court holdings that, if some conflict arises, the proper remedy lies with FERC's authority to design its markets in light of state policy, not preemption of that state policy.[223]

B. RTO Responses to Carbon-Pricing Measures Adopted by States (R)

Figure 9



RTO responses to state carbon pricing.

[221] *Id.* at 387 ("Antitrust laws, like blue sky laws, are not aimed at natural-gas companies in particular, but rather all businesses in the marketplace. This broad applicability of state antitrust law supports a finding of no pre-emption here.").

[222] *See generally* Jim Rossi & Thomas Hutton, *Federal Preemption and Clean Energy Floors*, 91 N.C. Law. Rev. 1283 (2013).

[223] *See, e.g., Star*, 904 F.3d at 524 (supporting FERC's position that "[i]nstead of deeming state systems such as Illinois' to be forbidden, the Commission has taken them as givens and set out to make the best of the situation they produce").

Within their borders, states have broad regulatory authority, including over land use and environmental protection, which extends to the regulation of electricity generation facilities' siting and environmental impacts and the environmental consequences of electricity consumed by in-state customers. With this authority, states can adopt legislation (or regulations that implement existing statutes) to assign a price to CO_2 emissions from any number of emitting sources, including electricity generators, and to CO_2 emissions from electricity consumption.[224]

In that case, to satisfy the FPA's legal obligations outlined in Part II above, an RTO has the obligation to recognize various state-imposed costs, including costs related to a state-level carbon-pricing policy, and adjust its tariff to reflect those costs in wholesale rates.[225] That obligation arises from the general rule that in order for rates to be just and reasonable, RTO tariffs must "provide generators a reasonable opportunity to recover their variable energy costs."[226] Pursuant to that obligation, ISO-NE, NYISO, and PJM have all adopted tariff adjustments to reflect in wholesale rates the costs arising from compliance with the Regional Greenhouse Gas Initiative (RGGI),[227] and the California Independent System Operator (CAISO) has done so to reflect the costs arising from compliance with California's Cap-and-Trade Program.[228] These organized wholesale market rule changes are needed to accommodate and, in some cases, assist in implementing state carbon-pricing measures.

If additional states that operate within RTO service territories adopt state carbon pricing requirements for electricity generators, or if states modify their existing programs to apply in new or different circumstances, the relevant RTOs will have to make corresponding, responsive changes to their market rules. This section identifies two types of RTO responses to state carbon-pricing measures, which can be divided by whether the state imposes a carbon price only on in-state generators or to both in-state generators and imports of electricity used to supply in-state electricity demand (or exempts in-state generators from the carbon price if their electricity is exported out-of-state). In short, whereas for in-state-only programs, RTO market rules must be modified to allow the carbon price to be reflected in cost-based energy bids, for state programs that address imports (or exports), RTO market rule changes must be revised more substantially to facilitate attribution of emissions associated with imports (and exports).

1. RTO Responses to Carbon Pricing of In-State Generation

Most states that have adopted carbon-pricing programs and are located within an RTO impose the carbon price only on electricity generators located within the state. The primary example is RGGI. RGGI is a cap-and-trade scheme established pursuant to a memorandum of understanding signed by a group of Northeast and Mid-Atlantic states. Each member state has adopted conforming legislation or regulations.[229] RGGI applies only to electricity generators that exceed 25 MW,[230] and applies only to in-state generators (that is, not to electricity imports).[231] Qualifying generators in

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[224] Some states, such as California and Maryland, have enacted such policies through legislation. Others, such as New York, have done so through regulation.

[225] *See Cal. Indep. Sys. Operator Corp.*, 141 FERC ¶ 61,237, at PP 29–30.

[226] *Id.* at P 29.

[227] *See* ISO-NE, Market Rule 1, App'x A § III.A.7.5.1 (effective Mar. 1, 2020); NYISO Market Services Tariff §§ 4.1.9.2, 23.3.1.4.1.3 (effective Aug. 12, 2019); PJM Interconnection, Inc., Operating Agreement Sch. 1 § 3, Sch. 2 Exh. A (effective Dec. 3, 2019).

[228] CAISO, Fifth Replacement FERC Electric Tariff §§ 11.7.4, 11.18, 11.29, 30.4.1.1.1 (effective Sept. 28, 2019).

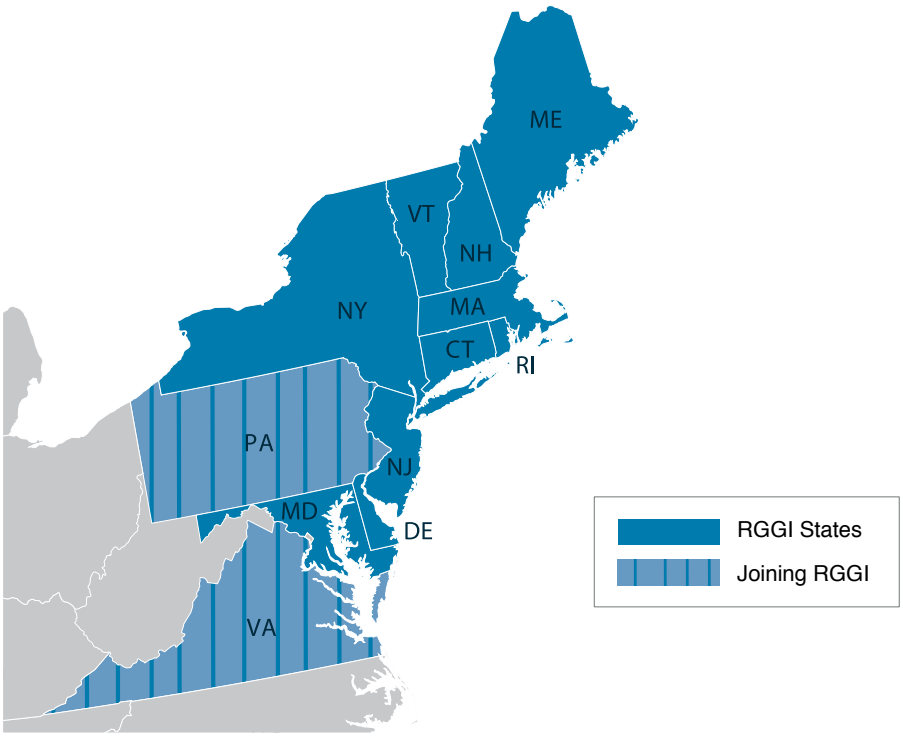
[229] Regional Greenhouse Gas Initiative, *A Brief History of RGGI*, https://www.rggi.org/program-overview-and-design/design-archive (last visited Mar. 16, 2020); Regional Greenhouse Gas Initiative, *State Statutes and Regulations*, https://www.rggi.org/program-overview-and-design/state-regulations (last visited Mar. 16, 2020).

[230] Regional Greenhouse Gas Initiative, Elements of RGGI, https://www.rggi.org/program-overview-and-design/elements (last visited Mar. 16, 2020).

[231] *Id.* As a result, RGGI raises no concerns about violating the Dormant Commerce Clause.

participating states must purchase allowances at quarterly auctions.[232] Through those allowance purchases, the generators internalize some of the external costs of their CO_2 emissions. The resulting carbon price, and the costs imposed on emitting generators in RGGI states, is a product of state law.

Figure 10



Map of current RGGI members and of states that have announced an intention to become or are exploring becoming RGGI members.

The RTOs that are home to one or more RGGI states—ISO-NE, NYISO, and PJM—have each adopted limited modifications to their tariffs to account for the effect on generators' organized wholesale market offer prices of the requirement that they purchase emissions allowances.[233] For example, PJM will calculate and include a resource's expected cost of purchasing RGGI allowances whenever a resource submits a cost-based energy market offer, such as when the resource is subject to market power mitigation.[234] Those modifications satisfy the requirement under the FPA that generators be given an opportunity to recover the out-of-market cost of complying with a program adopted under state law.[235]

[232] *Id.*

[233] *See supra* note 227 and accompanying text.

[234] Melissa Pilong, PJM, Cost-Based Offers (Oct. 24, 2019), https://pjm.com/-/media/committees-groups/task-forces/cpstf/20191024/20191024-item-04-cost-based-offers.ashx.

[235] *See* Nat'l Grid Generation, LLC, 143 FERC ¶ 61,163, PP 5, 12 (2013) (permitting recovery of RGGI compliance costs in formula rate); *see also* Ratemaking Treatment of the Cost of Emissions Allowances in Coordination Rates; Order No. 579, 60 Fed. Reg. 22,257, 22,258 (May 5, 1995) (allowing recovery of emissions allowance costs in coordination rates).

Additional states may adopt carbon-pricing programs, including states located in RTOs that have not yet modified their market rules in response to carbon pricing. In that case, the RTO will have to make responsive changes similar to those adopted by PJM, NYISO, and ISO-NE.

Because the RTO's market changes are merely responsive to the state carbon-pricing program, the outcomes facilitated by the RTO's market changes—including the extent to which they meet the economic criteria described in Part II.A above—will depend almost entirely on the states' design choices.

2. RTO Responses to State Carbon-Pricing Programs that Include Border Adjustments

In addition to imposing the carbon price on in-state generators, state carbon-pricing programs can impose border adjustments on imports and exports to minimize leakage. If RTOs are to facilitate implementation of such a program in the context of centralized RTO electricity dispatch, they must make corresponding market rule changes. There is precedent for an approach that addresses imports, though no precedent on crediting exports.

Unlike RGGI, the California Cap-and-Trade Program imposes a carbon price on both emitting in-state generators and on emissions arising from electricity imported into California from other states.[236] Initially, the application of the Cap-and-Trade Program to imports had only limited implications for organized wholesale electricity markets. Imports that occurred through bilateral transactions could reflect the applicable carbon price in the negotiated price of those imports. Imports that CAISO used to meet California load could be tracked relatively easily and so out-of-state generators selling into CAISO's markets had the proper incentive to add any cost of compliance with the Cap-and-Trade Program into their offer prices.[237]

However, in 2014, CAISO expanded its footprint to provide real-time dispatch for generators and load located outside of California through the CAISO-managed Western Energy Imbalance Market (EIM).[238] Under CAISO's market rules, all generators are dispatched simultaneously to meet all load (both inside and outside the state). By dispatching generation to meet load both inside and outside of California, the EIM created a compliance complication with the Cap-and-Trade Program.[239]

Without further market-rule changes, it would not be possible to know whether a particular MWh generated outside of California was used to meet load inside or outside of California—and therefore, whether that MWh was subject to the Cap-and-Trade Program's carbon price or not. As a result, CAISO modified its market rules in a way that allows it to determine which out-of-state generation was deemed to have been imported into California (and so carried Cap-and-Trade obligations and received revenue to cover those obligations) and which out-of-state generation was not deemed to be imported into California (and so did not recover the cost of Cap-and-Trade obligations). CAISO did so by implementing a one-way border adjustment in which resources outside of California submit a two-part energy offer price—one to be used if they are dispatched to meet load outside of California and a second offer price if they are dispatched to meet load inside of California. This two-part approach allows CAISO's dispatch algorithm to determine which resources are

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[236] Cal. Health & Safety Code § 38562(b)(8) ("in furtherance of achieving the statewide greenhouse gas emissions limit, the state board shall . . . minimize leakage"); Cal. Code Regs. tit. 17, § 95811 (explaining that "[e]lectricity importers" are covered under the program).

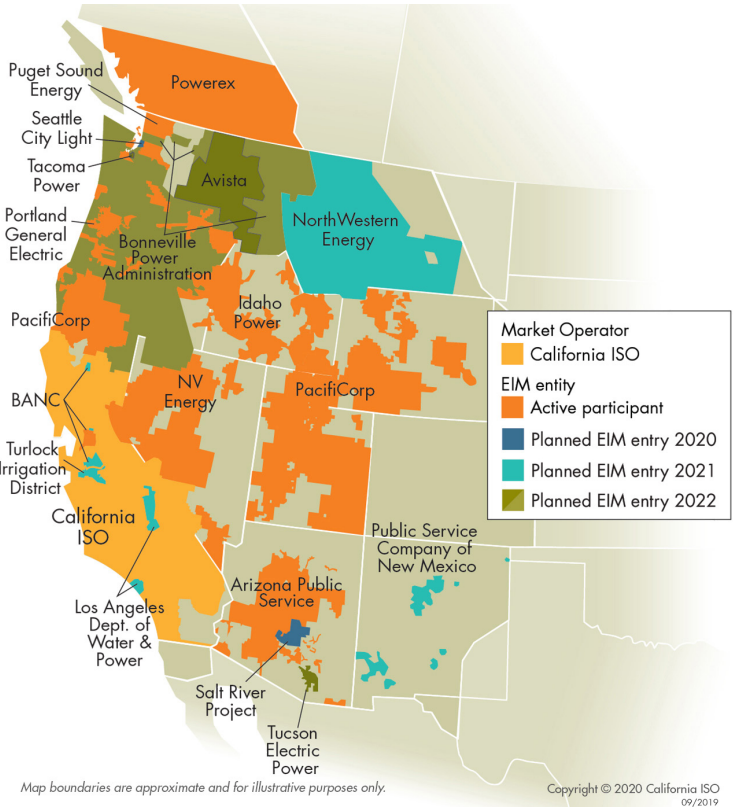
[237] *See* California ISO, Regional Integration California Gas Compliance 3 (2016), https://www.caiso.com/Documents/IssuePaper-RegionalIntegrationCaliforniaGreenHouseGasCompliance.pdf.

[238] Press Release, Cal. Indep. Sys. Operator Corp. & Pacificorp, FERC Actions Support Expansion of Real-Time Market in the West (June 19, 2014), https://www.westerneim.com/Documents/FERCActionsSupportExpansion-Real-TimeMarket-West.pdf.

[239] *Cal. Indep. Sys. Operator Corp.*, 147 FERC ¶ 61,231, at PP 228-32 (2014).

deemed to be imported into California and which are not, which in turn is used to assign Cap-and-Trade Program allowance obligations. [240]

Figure 11



Map of the Western Energy Imbalance Market

Design elements of the Cap-and-Trade Program itself and of CAISO's EIM address concerns about the legal requirements outlined in Part II.B, including the constitutional requirements applicable to state programs and the FPA requirements applicable to responsive RTO market changes.[241]

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[240] *Cal. Indep. Sys. Operator Corp.*, 141 FERC ¶ 61,237, at PP 7-13. CAISO implements this with a "net export allocation" constraint in their Security Constrained Economic Dispatch algorithm. This constraint requires all imports to CAISO from the EIM to be liable for the carbon adder they submit. Relaxing this constraint implies the marginal unit remains the same, but is no longer liable for the carbon adder, or the marginal unit is replaced by a unit with a lower energy bid. As a result, the shadow price on this constraint determines the carbon price of imports. *See* CAISO, Energy Imbalance Market Draft Final Proposal 88 (2013), http://www.caiso.com/Documents/EnergyImbalanceMarket-DraftFinalProposal092313.pdf.

[241] Later, the California Air Resources Board (CARB) modified the Cap-and-Trade Program and CAISO proposed further responsive changes to the EIM in order to address concerns related to an additional form of leakage—increased backfill emissions. Dallas Burtraw et al., 2018 Annual Report of the Independent Emissions Market Advisory Committee 30-31, 33-34 (2018), https://www.calepa.ca.gov/wp-content/uploads/sites/6/2018/10/Final_2018_IEMAC_Annual_Report_10-22-2018.pdf (explaining concern about backfill emissions and CARB and CAISO solutions). FERC approved CAISO's changes as just and reasonable under the FPA. *Cal. Indep. Sys. Operator Corp.*, 165 FERC ¶ 61,050, P 17. These changes may raise additional constitutional considerations. *See* Comments of Near Zero to EIM Greenhouse Gas Enhancements: Second Revised Draft Final Proposal 3-4 (Mar. 1, 2018), http://www.caiso.com/Documents/NearZeroComments-EIMGHGEnhancements-SecondRevisedDraftFinalProposal.pdf. Because changes to address backfill emissions are not presently under consideration in states outside of California, they are not discussed further in this report. Should states move to address backfill emissions, evaluation of additional legal and implementation considerations may be required.

California's program is designed to address whatever Dormant Commerce Clause concerns might arise from applying the carbon price to electricity imports. First, because the animating purpose of California's regulations is emissions reduction—a purpose that is neutral with respect to the location of generation facilities[242]—it is not impermissibly protectionist or an undue burden on out-of-state resources.[243] And second, the Cap-and-Trade Program avoids extraterritorial application of a California regulation by not directly applying requirements to out-of-state *generators*.[244] Instead, the program assigns compliance costs to the "first deliverer" of electricity within California borders.[245]

CAISO's responsive market changes to California's program assist with implementing it in a way that both addresses possible constitutional concerns and meets the requirements of the FPA. FERC has determined that CAISO complied with the FPA requirements regarding just and reasonable and not unduly discriminatory rates when it adopted market rules that provided for the two-part approach.[246] FERC's approval depended on the fact that CAISO's rules were designed, in part, to ensure that the Cap-and Trade Program's application to imports facilitated by the EIM avoids Dormant Commerce Clause limits on extraterritorial application of California's regulation.[247] Specifically, by employing a two-part offer price structure, resources located outside of California can ensure that they are not subject to California regulation as a condition of participation in the federally-regulated EIM.[248]

Other states could similarly adopt carbon-pricing programs that apply the price to imports of electricity used to serve in-state load. Some states have already passed laws allowing their utility regulators to adopt similar programs or signaling their interest in doing so. New Jersey, which rejoined RGGI in January 2020,[249] has adopted legislation directing the New Jersey Board of Public Utilities (BPU) to reduce leakage of electricity sector CO_2 emissions that results from the state's simultaneous participation in RGGI and PJM.[250] In an Executive Order on joining RGGI, Pennsylvania's Gover-

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[242] *Rocky Mtn. Farmers Union*, 730 F.3d at 1089-90 (upholding California's low carbon fuel standard against Dormant Commerce Clause challenge).

[243] *Cf. Davis*, 553 U.S. at 340 (recognizing that "laws favoring [individual] States and their subdivisions may be directed toward any number of legitimate goals unrelated to protectionism" (internal quotation marks omitted)).

[244] *Cf.* North Dakota v. Heydinger, 825 F.3d 912, 922 (8th Cir. 2016) (determining that a Minnesota law imposed an impermissibly extraterritorial regulation on generators outside of Minnesota's borders because it applied to out-of-state resources participating in the MISO electricity markets).

[245] Cal. Code Regs. tit. 17, § 95852(b). In the context of the EIM, California has adopted a rule intended to make clear that it is not regulating extraterritorial generation. Namely, it has placed the Cap-and-Trade Program obligation on the entity that manages the sale of electricity into the EIM, the "EIM Participating Resource Scheduling Coordinator," rather than the out-of-state generator itself. Cal. Code Regs. tit. 17, § 95102(a) (definition of "Imported electricity").

[246] *Cal. Indep. Sys. Operator Corp.*, 147 FERC ¶ 61,231, at P 238 ("We find that the GHG bid adder will provide a reasonable avenue . . . for EIM Participating Resources that are dispatched into California to recover the additional GHG compliance costs of such dispatch during the initial operation of the EIM.").

[247] A stakeholder raised concerns about whether CAISO's EIM design would result in impermissibly extraterritorial application. Protest of Powerex Corp. 40-46, Docket No. ER14-1386-000 (Mar. 28, 2014) (expressing concern that the EIM market rules not "impermissibly use the Commission-jurisdictional tariff to extend the application of California state regulations beyond the state's borders"); *id.* at 55 ("These legal concerns [regarding the extra-territorial effect of a state program] are significantly compounded by CAISO's active facilitation of CARB's state policy objectives in interstate markets."). FERC rejected this claim, pointing to the market design that allowed resources to choose whether their offers would be deemed imported into California. Cal. Indep. Sys. Operator Corp., 149 FERC ¶ 61,058, at PP 15, 18 (2014). FERC later approved an even more explicit mechanism for resources to choose whether their EIM transfers would be imported into California. Cal. Indep. Sys. Operator Corp., 153 FERC ¶ 61,087, at P 57 (2015).

[248] *See Heydinger*, 825 F.3d at 921 (striking down a Minnesota provision prohibiting imports of electricity from high-emitting generators, including those participating in the MISO markets, as impermissibly regulating beyond its borders because MISO provided no way to attribute which out-of-state generation would be deemed imported into Minnesota).

[249] N.J.A.C. 7:27C-1.2 (defining "[i]nitial control period" as "the calendar-year period from January 1, 2020, through December 31, 2020").

[250] N.J. Stat. Ann. § 48:3-87(c)(2) (directing the Board of Public Utilities to adopt a regulation or other mechanism to mitigate leakage).

nor directed the state to prioritize leakage mitigation.[251] States looking to apply a carbon price to their imports can look at the design features in California's program—including application of the price to importers rather than out-of-state generators and use of a consistent price for both in-state generators and imports[252]—to mitigate litigation risk regarding the Dormant Commerce Clause.

And because of the interconnected nature of the electric system and the use of centralized dispatch, RTOs that, like CAISO, manage multi-state markets in which only some states have imposed a carbon price (including a price on imports or credit for exports) will have to make responsive changes to their market rules for the state policy to be viable.[253] These changes can be largely modeled on CAISO's approach to facilitating California's Cap-and-Trade Program application to imports that result from out-of-state generators' participation in the EIM—an approach that has already been approved by FERC as just and reasonable.

In the absence of a national or RTO-wide carbon price, state carbon-pricing policies that include a price on imports (and, potentially, a credit for exports) can significantly reduce leakage and, as a result, improve economic efficiency as compared to an approach that does not include a border adjustment.[254] To accomplish this goal, states have the ultimate responsibility for designing their carbon price programs; RTO market changes would be merely responsive. But RTOs may have a role to play at the design stage as well. Namely, RTOs may need to provide an affirmative signal to states that such changes are possible. For example, the New Jersey BPU has previously discounted the possibility of addressing leakage by imposing a carbon price on imports, in part, because PJM had not provided a means to determine which resources were deemed to have imported electricity into New Jersey.[255] PJM has initiated a stakeholder process to explore carbon pricing options for the RTO,[256] which can provide states like New Jersey and Pennsylvania a means to fulfill their self-imposed obligations to minimize leakage. Other RTOs could take a similar approach.

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[251] Pa. Exec. Order No. 2019-07, Commonwealth Leadership in Addressing Climate Change through Electric Sector Emissions Reductions (Oct. 3, 2019), https://www.oa.pa.gov/Policies/eo/Documents/2019-07.pdf ("The DEP, working with the Public Utility Commission, shall engage with PJM Interconnection to promote the integration of this program in a manner that preserves orderly and competitive economic dispatch within PJM and minimizes emissions leakage.").

[252] Other RTOs might not use a concept equivalent to the "EIM Participating Resource Scheduling Coordinator." However, they can nonetheless mimic California's approach by placing the carbon price on the entity that sold energy into the RTO market (i.e., the bidder) rather than the out-of-state entity that generated the electricity.

[253] *See Heydinger*, 825 F.3d at 921.

[254] Leakage from backfill emissions may continue without further policy design; however, the state law and responsive RTO market changes may raise additional legal and implementation considerations that are beyond the scope of this report. *See supra* note 241.

[255] In the Matter of a Green House Gas Emission Portfolio standard and Other Regulatory Mechanisms to Mitigate Leakage 14, Docket No. EO08030150 (Dec. 17, 2008), https://www.njcleanenergy.com/files/file/GHG%20emission%20porfolio%20and%20RGGI%20Leakage%20Mitigation%20Order%2012-17-08-8i.pdf.

[256] *See* Memorandum from PJM Regarding Issue Charge for Carbon Pricing Senior Task-Force (2019), https://pjm.com/-/media/committees-groups/task-forces/cpstf/postings/issue-charge.ashx?la=en.

IV. Conclusion

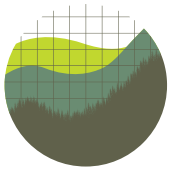
As this report has explained, affirmative RTO carbon-pricing rules represent an economically beneficial and legally feasible opportunity for RTOs and their stakeholders to consider. An RTO seeking to develop and adopt an affirmative carbon-pricing rule that could be approved by FERC pursuant to its FPA authority could take one of several approaches.

One approach would involve a proposal submitted to FERC pursuant to FPA section 205 that affects only an individual RTO's service territory. But it is also possible for FERC to act pursuant to FPA section 206 so that a carbon-pricing rule would be included in several or all RTO wholesale market rules.

Several of these approaches can be supported on the grounds that their adoption, by addressing a significant market failure, would improve the efficiency of organized wholesale electricity markets and thereby make wholesale rates just, reasonable, and not unduly preferential or discriminatory. The alternative approach being considered by NYISO would rest on another theory that an affirmative carbon-pricing rule would yield just and reasonable rates by harmonizing organized wholesale electricity market operations with state policies and thereby protect the integrity of organized wholesale markets.

Even if the RTOs and FERC decide not to advance affirmative carbon-pricing rules, RTOs may still have a role to play in developing responsive market rules that assist with the implementation of carbon-pricing programs adopted by the states. Responsive RTO action may be particularly important for states to implement carbon-pricing programs that minimize leakage by applying the price to imported electricity or by crediting electricity exports.

As the descriptions of different approaches above make clear, the economic and legal features of an RTO's affirmative carbon-pricing rule are closely bound up with one another. Consequently, the approach an RTO plans to take for the *adoption* of a program cannot be determined independently from key elements of that program's *design*, such as its geographic scope, the availability of an opt-out, its leakage mitigation features across jurisdictional borders, and the price level. Rather, these elements must all be considered in relation to one another from the outset.



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Institute for Policy Integrity
New York University School of Law
Wilf Hall, 139 MacDougal Street, New York, New York 10012
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