



HARVARD LAW SCHOOL

Environmental Law Program

Policy Initiative

CLIMATE IMPLICATIONS OF FERC PROCEEDINGS

ARI PESKOE | KATE KONSCHNIK



November 27, 2017

CLIMATE IMPLICATIONS OF FERC PROCEEDINGS

Introduction

The Federal Energy Regulatory Commission (FERC) oversees interstate electricity transmission and wholesale rates as well as interstate natural gas pipelines. The electricity and natural gas sectors are responsible for more than forty percent of U.S. greenhouse gas emissions.¹ While FERC does not directly regulate emissions, its decisions can have substantial consequences for the competitiveness of different fuels and technologies and thus greenhouse gas emissions from the energy sector.

This paper connects FERC's market oversight to these indirect effects. It also discusses legal strategies employed by opponents of new natural gas infrastructure in FERC permitting proceedings and litigation. The paper is intended for advocates, policymakers, and technical experts who are broadly familiar with FERC's responsibilities and would benefit from a review focused on how FERC decisions facilitate or hamper greenhouse gas reduction efforts.

After an introduction to FERC's role, the paper outlines the electricity industry's structure and the Federal Power Act. The paper then describes how electricity markets set prices and illustrates with recent decisions how FERC's decisions affect the competitiveness of various resources. Markets do not explicitly favor one fuel over another, but may value certain attributes, such as the ability to produce energy on demand, to quickly increase or decrease output, and to operate during system emergencies. FERC's decisions about which attributes to value and how to price those attributes affect resource types unevenly.

The paper also connects FERC's authority over electricity markets and transmission to state renewable energy laws and summarizes FERC's role in implementing the Public Utility Regulatory Policies Act of 1978 (PURPA). Finally, the paper reviews the Natural Gas Act, explains how FERC reviews infrastructure siting applications, and summarizes legal arguments that advocates are pursuing to compel FERC to consider climate change effects in its decisions.

CONTENTS

What is FERC?	4
Electric Power	5
Electricity Industry Structure	5
RTO Markets	6
Powering the Grid	7
The Federal Power Act	8
Key Provisions	8
Legal Standards	8
Climate-Relevant FERC Proceedings about RTO Markets	9
Participating in a FERC Proceeding	9
Energy Market Price Formation	10
Rulemakings	12
RTO Proposed Tariff Changes	14
Complaints about an RTO Tariff	15
Future Climate-Relevant Proceedings	17
Transmission	20
Rates	20
Regional Planning and Cost Allocation	20
Technical and Reliability Standards	22
Transmission Siting	22
PURPA	22
Natural Gas	24
The Natural Gas Act	25
Opposing Infrastructure Siting	25
Objecting to Public Interest and Need Findings	26
Challenging Eminent Domain Authority	27
Delaying Projects or Mitigating Their Effects with Federal Environmental Statutes	27
Urging Consideration of Climate Change Impacts	28
Endnotes	30

What is FERC?

The Federal Energy Regulatory Commission is an independent federal agency. It is composed of up to five Commissioners who are nominated by the President and confirmed by the Senate. Unlike many other federal government appointees, FERC Commissioners do not serve “at the pleasure of the President,” but are appointed to five-year terms. FERC has approximately 1,500 employees, organized in twelve different offices, including Energy Market Regulation, Administrative Litigation, and the General Counsel.

FERC was created by Congress in 1920. Then called the Federal Power Commission, its initial task was to license the construction of hydroelectric dams. In the 1930s, Congress enacted the Federal Power Act (FPA) and the Natural Gas Act (NGA), providing the Commission with jurisdiction over interstate transmission of electricity and transmission of natural gas, as well as rates for wholesale sales in interstate commerce. In 1977, jurisdiction over the rates for interstate oil pipeline transmission was transferred to FERC, as well.²

In the FPA and the NGA, Congress declared that the electricity and natural gas industries are “affected with a public interest”³ and required FERC to consider the public interest when it makes decisions.⁴ The Supreme Court has explained that the breadth of the term “public interest” in the FPA and NGA is informed by the statutes’ principal purpose — to provide FERC with authority “to encourage the orderly development of plentiful supplies of electricity and natural gas at reasonable prices.”⁵

The Court’s conclusion speaks to the nature of FERC’s role. It is an economic and technical regulator, promoting competition, enhancing market efficiency, and ensuring reliability.⁶ Its primary responsibilities include establishing “just and reasonable” rates for wholesale electricity and natural gas sales, permitting the construction of interstate gas pipelines, and overseeing the high-voltage electric grid.

FERC’s decisions can have far-reaching economic and environmental effects. However, those consequences do not allow FERC to act outside its statutory mandate to promote the general public welfare.⁷ As discussed below, FERC has flexibly interpreted its duty to ensure “just and reasonable” rates. But it has never understood that “just and reasonable” rates must account for the environmental effects of energy production and consumption.⁸

Nonetheless, FERC’s oversight of electricity markets is particularly relevant to greenhouse gas emission reduction efforts. Many decarbonization scenarios are premised on electrification of transportation and other sectors, highlighting the importance of decreasing emissions from the electricity sector.⁹ Some scenarios envision a grid powered mostly by intermittent power generation, such as wind and solar.

In some respects, FERC-regulated markets and electric reliability standards are already enabling a transition to a low-carbon grid by, for example, facilitating the interconnection and integration of intermittent power generators.¹⁰ Whether FERC can and should do more to support a low-carbon grid is a topic of ongoing debate that will not be resolved here. Notably, FERC itself has begun exploring the possibility that it should.

For instance, as discussed on page 17, FERC hosted a conference in May 2017 to discuss whether electricity market rules should account for state renewable energy and climate laws. Since that conference, two market operators are considering new rules to boost revenues for fossil fuel fired plants, to mitigate the price-suppressive effects of state renewable and CO₂ policies. A third market operator is studying whether a price on carbon emissions can further state energy goals. Any rule changes require FERC’s approval.

FERC is an economic and technical regulator, aiming to promote competition, enhance market efficiency, and ensure reliability.

Electric Power

Electricity Industry Structure

Electric utilities distribute power to consumers within a defined geographic territory. Because they enjoy a monopoly over electricity distribution service, investor-owned utilities are subject to wide-ranging oversight, including rate regulation, by state public utility commissions (PUC). Cooperative and government-owned utilities, which are in every state and serve approximately 20 percent of the country's demand, typically set their own rates but may face obligations under state law, such as renewable energy purchase mandates.

A key distinction among utilities is whether they own power plants. Within their service territories, utilities were once typically the only entities that generated power for resale. These vertically integrated utilities built power plants to meet consumer demand and earned a rate-of-return on power plant construction through state-approved retail rates. But utilities' share of electric generation has been declining for decades as independent power producers have proliferated:¹¹

Year	% of Power Generated by Utilities
1985	96
1995	89
2005	63
2015	59

The rapid decline in utility-owned generation since the late 1990s was rooted in earlier reforms. The Public Utilities Regulatory Policies Act of 1978 (PURPA) required utilities to interconnect with and purchase power from certain renewable energy and combined heat and power (CHP) facilities owned by non-utilities. Spurred on by PURPA, many states required utilities to seek third-party bids to construct any new plant, rather than simply having the utility build it.¹² These reforms demonstrated that there were no fundamental economic barriers that prevented electric generation from becoming an open and competitive industry.

At the same time, significant cost overruns at utility power plant construction projects increased consumer rates and provided the impetus for policymakers to begin "deregulating" the sector. This transformation aimed to break the near monopoly on generation

and shift the risks of expensive projects and cost overruns from retail ratepayers to investors. In this restructured industry, competitive markets rather than administrative orders would discipline wholesale power prices and captive ratepayers would no longer bear the risks of power plant construction projects.

To compete, new market entrants needed to connect to the utilities' transmission grid to deliver power. Much of this physical infrastructure necessary for competition already existed. By 1970, utilities had formed twenty-one "power pools," contractual arrangements that enabled trades of electricity during emergencies and maintenance, seasonal exchanges of energy, sharing of reserve capacity, and grid optimization.¹³ The high-voltage transmission lines that made these inter-utility agreements possible were a necessary precondition for open wholesale markets. Yet, federal law and industry practices inhibited market development.

The Energy Policy Act of 1992 removed a critical legal barrier. A federal law passed in the wake of the 1929 stock market collapse had effectively prevented utilities from investing in competitive power generation and discouraged new entrants to the power production market. The 1992 Act modified the earlier law and allowed for the creation of exempt wholesale generators (EWG), companies that exclusively generate electricity and do not own transmission or distribution assets. An EWG, whether owned by a utility's corporate parent or a non-utility independent company, could "compete free of the structural and financial regulations designed for utility companies possessing franchise retail monopolies."¹⁴

To sell power, these new market entrants still needed the cooperation of the vertically integrated utilities that owned the transmission systems. But utilities had an incentive to provide better terms to their own power plants (or generation owned by a corporate affiliate) than to independent competitors. To facilitate competition, FERC ordered transmission-owning utilities to provide non-discriminatory access to all transmission customers.¹⁵

In 1999, FERC concluded that these open-access transmission tariffs were insufficient and that "traditional management of the transmission grid by vertically integrated utilities . . . was inadequate to

support the . . . development of competitive electricity markets.”¹⁶ To encourage regional coordination, FERC established standards for Regional Transmission Operators (RTOs),^a entities that would operate the transmission grid in support of competitive regional markets. Today, FERC-regulated RTOs operate the grid in thirty-five states.

Meanwhile, state restructuring efforts seeded the market with consumer demand and non-utility power suppliers. While details varied by state, restructured utilities typically sold their power plants or transferred those assets to an affiliate company. The new EWGs then sold their power through wholesale markets. The “wires-only” utilities retained ownership of transmission and distribution infrastructure and had to procure power through wholesale markets to meet retail consumer demand.

State restructuring shifted regulatory authority over power plant revenues. In restructured states, power plants earn revenue through FERC-regulated wholesale markets. Where the industry remains dominated by vertically integrated utilities, utility generation investments are recovered in state-regulated retail rates.

RTO Markets

As discussed in more detail below, FERC has jurisdiction over RTO tariffs, which prescribe detailed market rules.

RTO-administered wholesale power markets aim to meet consumer demand at the lowest cost by facilitating competition among generators. Because demand for electricity varies throughout the day and year, not all power plants are needed to meet demand at any given moment. For each hour, the

RTO chooses which generators must produce by conducting auctions. Generators submit offers to sell quantities of energy, and buyers, such as utilities, submit offers to buy. The RTO computes the price where supply intersects with demand, and then accepts all sellers’ offers below the clearing price. The RTO then orders those sellers to produce energy and pays them all the clearing price.¹⁷ This methodology is known as “economic dispatch.”

Three eastern RTOs — the New York Independent System Operator (NYISO), New England ISO (ISO-NE), and PJM — also oversee capacity markets that operate under similar economic principles.¹⁸ Generators and resources that reduce consumer demand bid commitments into these markets, to be available to produce energy or reduce demand during a specified future month or year. The RTO selects bids from least to highest cost until it has met projected future system peak demand and pays the clearing bidders the market-clearing price.

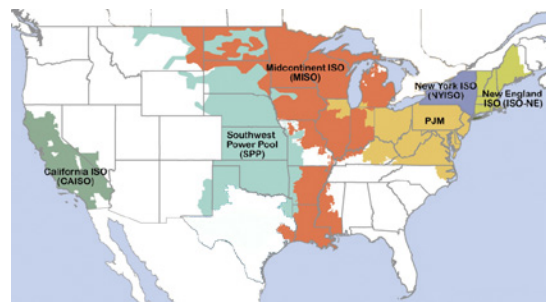
Together, energy and capacity markets account for nearly all the revenue paid to generators in the eastern RTO markets. Approximately two-to-four percent of total market revenue in recent years¹⁹ is paid to resources that maintain grid reliability by providing “ancillary services.” Ancillary services include balancing supply and demand in real-time and supplying reserve capacity to meet last-minute needs. As the penetration of intermittent wind and solar generation grows, the need for ancillary services may also increase.²⁰

Power plants owned by traditional vertically integrated utilities and by independent power producers compete in RTO energy, capacity, and ancillary

“Restructured” States



RTO Territories



^aFERC uses the term RTO/ISO to include Independent System Operators (ISO). For simplicity, this paper uses the term RTO. FERC has certified each of the multi-state ISOs (PJM, SPP, MISO, ISO-NE) as an RTO.

services markets. Utilities participating in MISO and SPP are generally vertically integrated and thus buy and sell power in the market. Independent generators and cooperative and government-owned entities also participate. In New England, New York, and California, utilities typically own little to no power generation (although many have corporate affiliates that do). PJM utilities include both wires-only companies and vertically integrated utilities.

Throughout the country, generators may sell to utilities through bilateral contracts, as well. Parties to these contracts set their own terms and conditions, including price. Long-term bilateral power purchase agreements are typically essential for new capacity, particularly large-scale renewable energy projects.²¹

Powering the Grid

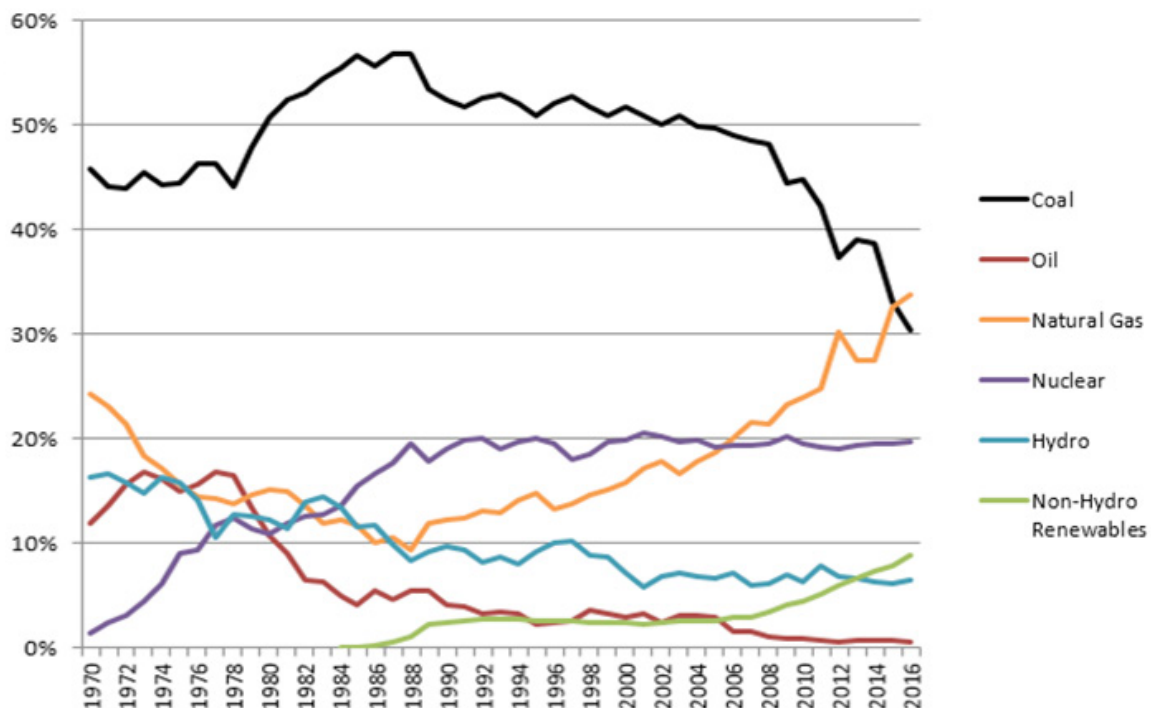
Coal, natural gas, and nuclear are the dominant fuel sources in the electricity sector and have together generated more than 80 percent of U.S. power since the 1980s. Coal generation peaked in 2007 and has since fallen by nearly one-third. Natural gas gener-

ation has more than doubled since 2000; wind and solar generation have increased nearly forty-fold.²² Non-hydro renewables, two-thirds of which are wind but which also include geothermal, wood, waste, and solar, recently surpassed hydro for the first time.

Fuel mixes vary by region due to geography, state policy, and historic preferences. In New England, a region that produces no fossil fuels, natural gas accounted for more than 40 percent of power generated in 2016, while coal provided only two percent.²³ By contrast, in PJM, coal generated 34 percent of the region's power, and natural gas provided 26 percent.²⁴ PJM states produce 35 percent of the nation's coal and 26 percent of its natural gas.²⁵

The disparity in coal generation also reflects historic choices. Less than one gigawatt of coal-fired generation has been added to the New England grid since 1970. Power companies in PJM states added more than 65 gigawatts of coal capacity in that time, and invested billions of dollars in refurbishing older coal-fired plants.²⁶

Share of U.S. Electricity Production



The Federal Power Act

The FPA empowers FERC to regulate the transmission grid and interstate sales of power for resale. Originally enacted in 1935, its core provisions are largely unchanged.

Key Provisions

Section 201 of the FPA sets FERC's jurisdiction while preserving pre-existing state authority. FERC oversees the "transmission of electric energy in interstate commerce and [] the sale of electric energy at wholesale in interstate commerce."²⁷ FERC has no jurisdiction over "any other sale of electric energy . . . [or] 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." States thus have exclusive jurisdiction over retail rates paid by consumers, distribution systems that connect to consumers, and power plants. FERC has exclusive authority over wholesale rates paid to those power plants and over the interstate transmission grid.²⁸

Section 205 requires utilities to file wholesale rates and rules directly affecting those rates with FERC. All rates and rules must be "just and reasonable" and not "unduly preferential."²⁹ When reviewing proposed tariffs, FERC need not conclude that the proposed revision results in the optimal or best tariff,³⁰ but only that the revised tariff will result in just and reasonable and not unduly preferential rates.³¹

Section 206 requires FERC to remedy any rate or rule directly affecting a rate that is unjust and unreasonable or "unduly discriminatory."³² To use this more proactive authority, FERC must conclude that the existing tariff results in unjust and unreasonable, or unduly discriminatory rates, and that the Commission's changes to the tariff will be just and reasonable.³³ Section 206 provides FERC with authority to identify problematic rates or rules on its own, and also allows any entity, such as a market participant or state regulator, to file a complaint alleging that rates are unjust and unreasonable.

Sections 205 and 206 apply to rates charged by "public utilities," defined by the FPA as "any person who owns or operates facilities subject to the jurisdiction of the Commission."³⁴ Because RTOs operate jurisdictional transmission facilities, FERC treats them as utilities and regulates their tariffs under these two sections. Section 205 requires FERC to review and approve all RTO market rule changes before they go into effect. FERC uses its authority under section 206 to promulgate rules that apply to

all RTOs or to all transmission-owning utilities and to issue RTO-specific orders that mandate market rule changes.

FERC regulates the bilateral contract market for wholesale power by requiring sellers to obtain FERC's permission to enter market-based contracts. To qualify for market pricing authority, applicants must demonstrate to FERC that they do not possess market power, generally defined as a seller's ability to raise market prices above the level that would prevail in a competitive market.³⁵ Government and cooperative utilities are explicitly excluded from FERC's rate regulation.

Legal Standards

Determining whether a rate is just and reasonable "involve[s] a balancing of the investor and the consumer interests."³⁶ The Supreme Court articulated this standard in 1944, when rate regulation was based on a utility's cost of service. Rates allowed a utility to recover its operating expenses, such as salaries and fuel, and included a regulated rate-of-return on capital investments. FERC's review of cost-of-service rates attempted to "protect the consumer interests against exploitation at the hands of private . . . companies"³⁷ while providing investors with a return on investment "sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital."³⁸

Although FERC has moved from regulating exclusively on a cost-of-service basis to relying in part on competitive markets to set rates, the Supreme Court has reaffirmed the relevance of the balancing test it articulated over seventy years ago.³⁹ But the Court's understanding of just and reasonable has also evolved to reflect FERC's market-based regulatory regime; it recognizes that 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.'"⁴⁰

—
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.

The FPA's prohibition against unduly discriminatory rates is historically rooted in concerns about the anticompetitive practices of monopoly utilities, such as reduced rates to preferred customers.⁴¹ Traditionally, rates were considered unduly discriminatory if they did not reflect the costs of serving those ratepayers.⁴² Historically, the inquiry has been customer-specific; a utility is prohibited from charging a price to one ratepayer and a materially different price for the same service to a different ratepayer.

As noted earlier, in the 1990s FERC broadened the scope of its undue discrimination analysis to industry-wide anticompetitive practices. After concluding that then-existing tariffs unduly discriminated against other utilities and non-utility generators, FERC required all transmission-owning utilities to file open-access transmission tariffs, to equal access to the system. Reviewing FERC's order, the D.C. Circuit concluded that the FPA's "ambiguous antidiscrimination provisions . . . giv[e] [FERC] broad authority to remedy unduly discriminatory behavior."⁴³ Several reforms instituted by FERC since that open-access order have sought to remedy additional unduly discriminatory aspects of transmission tariffs, including practices that discriminated specifically against renewable energy generators.⁴⁴

The FPA's just and reasonable and undue discrimination standards delegate wide discretion to FERC, and courts generally defer to FERC's judgments. The Supreme Court has said that courts must "afford great deference to the Commission in its rate decisions;"⁴⁵ their "limited role is to ensure that FERC engaged in reasoned decision-making—that it weighed competing views, selected a compensation formula with adequate support in the record, and intelligibly explained the reasons for making that decision."⁴⁶

The FPA's just and reasonable and undue discrimination standards delegate wide discretion to FERC, and courts generally defer to FERC's judgments.

Climate-Relevant FERC Proceedings about RTO Markets

Climate-relevant FERC proceedings about RTO markets can be categorized into three types:

1. Rulemakings
2. RTO proposed tariff changes
3. Complaints about an RTO tariff.

This section of the paper illustrates proceedings in each category that affect the mix of resources on the grid. It begins with an overview of the administrative process and a discussion of energy market price-setting methodology. It then discusses examples of each of the three types of proceedings.

Participating in a FERC Proceeding

The Commission, an RTO, or an interested party may initiate a FERC proceeding. FERC rulemakings begin with a Notice of Proposed Rulemaking (NOPR) filed by the Commission under section 206. RTO tariff changes are filed by the relevant RTO under section 205. Any entity may file a complaint under section 206 alleging that an RTO tariff results in unjust and unreasonable rates or is unduly discriminatory.

The initial filing opens a docket. Interested parties usually have thirty or sixty days to file written comments. FERC may extend the deadline and hold a technical conference or solicit additional rounds of comments on identified issues.⁴⁷ Alongside the initial filing, comments constitute a proceeding's factual record. FERC's decision in a proceeding must be based upon substantial evidence in the record.⁴⁸

As discussed above, under sections 205 and 206 FERC may finalize a rule or approve a tariff only if it determines that the rule or tariff will result in just and reasonable and not unduly discriminatory wholesale rates. Commenters supporting the initial filing will argue that the proposal meets that standard, while opponents will urge the Commission to reject the proposal because it is unjust and unreasonable and/or unduly discriminatory. Parties support their views primarily with economic and technical analysis and discussion of FERC precedent, and may also cite to relevant federal appeals court decisions. In significant proceedings, parties may buttress their comments with reports authored by economists or other experts.

Most comments are filed by industry. Frequent participants include investor-owned utilities that transact in RTO markets; associations representing municipal and cooperative utilities; independent power produc-

ers, including renewable energy companies; fuel-specific trade groups representing the interests of natural gas and oil, coal, wind, solar, or nuclear generators; the RTOs; independent RTO market monitors; large industrial and commercial consumers; demand response providers; and state public utility regulators. Public interest organizations, particularly environmental groups and consumer advocates, also participate.

In their comments, environmental advocacy organizations do not typically focus on the environmental effects of a proposed rule or tariff change. Rather, like other commenters, they engage with a proposal's economic and technical details, and argue whether it will result in just and reasonable and not unduly discriminatory wholesale rates. As discussed below, the environmental effects of market rule changes are often not obvious on the face of the proposal. Therefore, advocates must have a nuanced understanding of the proposal. The highly technical nature of market rules can create a barrier to participation and may explain why members of the public rarely file comments in proceedings about market rules. This challenge is not unique to environmental concerns; consumer advocates, state regulators, and other entities that do not transact in the market must acquire relevant expertise to understand how a proposal affects their interests.

Once FERC issues an order, any party to the proceeding has 30 days to file a rehearing request contesting specific aspects of the order. Only entities that seek rehearing may later petition a federal court to review the FERC order.⁴⁹ Challenges to FERC orders can be filed in the D.C. Circuit Court of Appeals or the home circuit of the affected utility company or RTO. Parties may also file additional rehearing and clarification requests at FERC. FERC may issue multiple rehearing and clarification orders in a proceeding.

Energy Market Price Formation

An RTO dispatches resources based on their offers in an auction, starting with the lowest bids and progressing upward until it meets consumer demand. This economic dispatch method is rooted in the economic theory that generators offer resources at their variable cost of production, or marginal cost. Under this theory, markets will then operate in a least-cost manner, with the marginal costs of the most expensive generator needed to meet demand setting the price for the entire market.⁵⁰

Any type of fuel may power the “marginal generator.”

In the PJM market, coal and natural gas resources set 80 to 90 percent of market prices.⁵¹ Because generators include fuel cost in their offers, higher coal and natural gas prices will lead to higher offer prices in the PJM market, which will translate into higher electricity market prices. Wind and solar generators, by contrast, have no fuel costs and therefore put downward pressure on electricity market prices. In March 2017 during midday hours, for example, electricity prices in the California ISO market were often at or below \$0 as solar met approximately fifty percent of demand and low-cost hydropower met much of the remaining need.⁵²

When consumer demand is at its peak, typically during a hot summer afternoon, the RTO must dispatch more expensive generators to meet system needs, raising the market price. Demand response resources, which reduce consumption in response to price signals, can mitigate these high prices by obviating the need to dispatch more expensive generators. Storage resources (such as batteries, flywheels, and pump-storage hydro) can also reduce market prices by discharging stored power during peak hours.

This orderly picture of system-wide dispatch based on generators' variable costs, which are driven by their fuel costs, is complicated by the physical realities of transmitting alternating current energy over high-voltage transmission lines. Transmission constraints limit the amount of energy able to be transmitted into a constrained area to serve local demand.⁵³ As a result, higher-cost local generation displaces lower-cost generation that is available in the region but cannot be delivered into the constrained area.

The highly technical nature of market rules can create a barrier to participation and may explain why members of the public rarely file comments in proceedings about market rules.

The RTOs' pricing scheme creates locational marginal prices (LMPs) that reflect the cost of meeting an incremental megawatt-hour of demand at each location on the grid.⁵⁴ Prices vary based on location and can change as often as every five minutes based on supply, demand, and system conditions.

The map below depicts prices in the PJM region on a June afternoon in 2012.⁵⁵ LMPs increase along the color spectrum, with the lowest prices in blue and the highest prices in red (generally increasing from west to east). Higher LMPs in orange and red areas reflect the fact that high-cost generation was needed to meet demand in those areas. Those high-cost units set the LMPs in these transmission-constrained regions.

According to the International Energy Agency, LMP is the "textbook ideal" for electricity market design because it takes all relevant generation and transmission costs into account.⁵⁶ However, when implemented by a market operator, LMPs fail to fully capture the costs of all relevant system needs and thus deviate from the theoretical ideal. FERC and the RTOs are continually examining how to improve price formation to ensure that LMPs reflect all system costs.

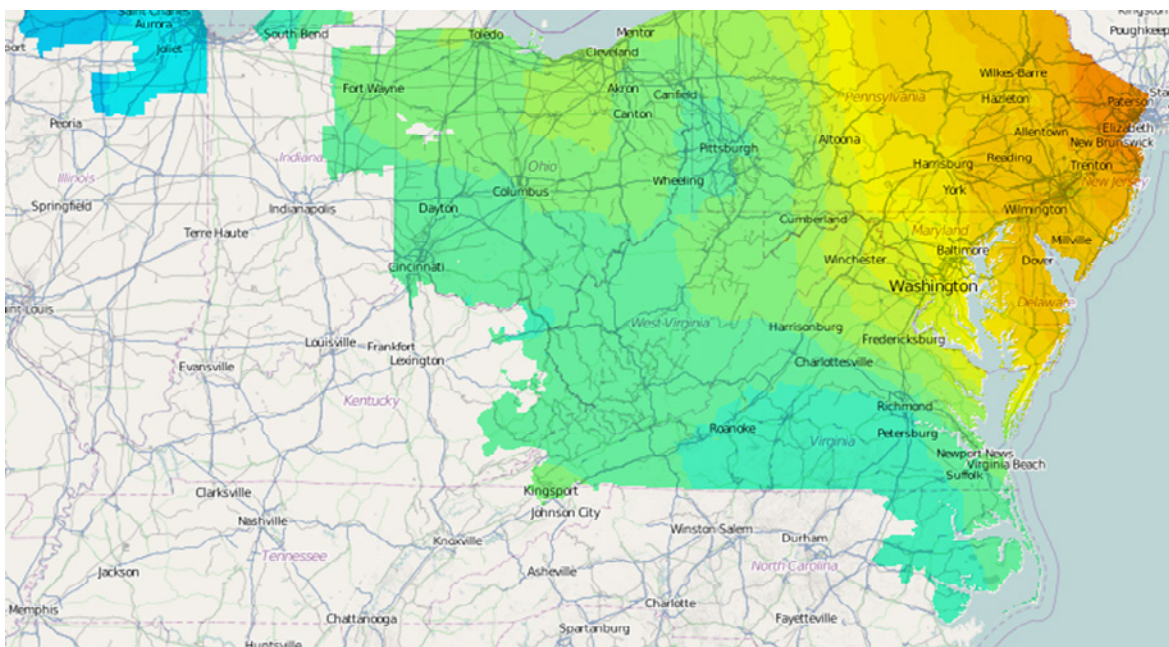
One obstacle is the RTO's market software. Due to the complexity of modelling an alternating current power system, the software makes simplifying assumptions about certain aspects of system

operations.⁵⁷ As a result, dispatch based on LMPs alone does not account for unmodeled physical constraints.⁵⁸ In order to ensure reliability, an RTO may dispatch resources that did not clear the market because it approximates that these resources are needed to account for the unmodeled constraints. Such resources will receive "uplift" payments to cover any shortfall between LMP and the resource's production costs.

In addition, an RTO's LMP-setting methodology may fail to reflect the value provided by all resources. For instance, a recent PJM paper describes the difference between flexible resources that can tailor their output to system needs and inflexible resources that must produce a minimum amount of energy regardless of demand.

When this price-setting methodology was developed, inflexible resources (particularly coal and nuclear units) were cheaper to operate than flexible natural gas-powered resources. In general, all resources could operate profitably when natural gas resources set the market-clearing price. However, a sharp and persistent decrease in natural gas prices has flipped the economics on the grid. In recent years, inflexible resources that can operate profitably for some hours of the day are incapable of shutting off during the hours when it is unprofitable to produce. These resources are providing valuable energy during all hours, but

Locational Marginal Prices in PJM for a sample hour in June 2012



their costs are not reflected in market prices. PJM is considering remedying this “discontinuity in LMP.”⁵⁹

In 2014, FERC hosted a series of technical conferences on such price formation issues and solicited comments,⁶⁰ and has since finalized one rule (discussed on page 14) and proposed two additional rules.⁶¹ While changes to RTO pricing methodologies may be warranted, any near-term changes ordered by FERC or proposed by RTOs are likely to be incremental tweaks to what are highly technical and computationally complex market rules.

Despite the practical challenges of implementing theoretically best LMPs, the LMP system is firmly entrenched in FERC-regulated markets. FERC has lauded LMPs for sending “accurate price signals” that “encourage more efficient supply and demand decisions in both the short and long run.”⁶² Critics of LMP question its central role in price formation, observing that power plant construction is typically financed based on a long-term power purchase agreement, with few new plants relying solely on RTO market revenues to recover their costs.⁶³ Moreover,

the subtle price signals associated with LMP are often overwhelmed by other factors in the marketplace, such as fuel price fluctuations, regulatory uncertainty, operational and siting issues, and – perhaps most important – market power. While the LMP construct is a useful tool to handle the complexities of transmission and generation operation on a shared system, it cannot be a panacea for policymakers concerned with achieving balanced infrastructure development and just and reasonable rates for consumers.⁶⁴

As market conditions change, FERC, RTOs, market participants, and other stakeholders will continue to evaluate energy price formation.

Rulemakings (Sec. 206)

Most FERC market rules are ostensibly resource-neutral. Still, rules can implicitly benefit particular technologies by favoring certain resource attributes and thereby push the development of the grid in particular directions. Occasionally, a rule directly benefits particular resource types and has a more obvious connection to greenhouse gas emissions. This section highlights examples of rules with direct and indirect climate impacts.

Rules That Benefit Specific Resource Types

Typically, FERC rules do not overtly favor or benefit a particular resource. Two exceptions are FERC’s Order No. 745 about compensation for demand response resources and a 2016 NOPR about energy storage and aggregations of distributed energy resources, such as rooftop solar.

With Order No. 745, FERC intended to “increase[] levels of investment in and thereby participation of demand response resources”^b in wholesale markets.⁶⁵ Building on an earlier rule that required RTOs to allow demand response resources to participate in energy markets, Order No. 745 required RTOs to pay demand response resources the same LMP that generators receive, provided certain market conditions are met. According to FERC, because demand response can keep supply and demand in balance, it provides the same value to the system operator as generation and must therefore receive the same compensation.⁶⁶

Environmental advocates and regulators were supportive of FERC’s rule. In filed comments, one organization praised demand response as “the greener path to balancing the system” and claimed the rule would “decreas[e] the price the public pays in the form of toxic air pollution, greenhouse gas emissions, and land and water use impacts caused by electricity production.”⁶⁷ Pennsylvania’s environmental regulators estimated that increased demand response could displace 1.57 million metric tons of carbon dioxide emissions from the regional grid.⁶⁸

FERC’s final rule did not tout these potential environmental benefits. Rather, FERC’s order focused on how appropriate compensation for demand response would improve wholesale markets. Generators that urged FERC to set lower prices for demand response petitioned the D.C. Circuit for review, arguing that the FPA does not provide FERC with authority to regulate demand response compensation. Although the D.C. Circuit agreed with the generators and vacated the rule, the Supreme Court reversed. It concluded that setting demand response rates is within FERC’s mandate under section 206 to ensure that any “practice . . . affecting” a wholesale rate is just and reasonable.

The Court’s decision emphasized that Order No. 745 did not usurp state authority over retail sales, as generators urged, but rather aimed to improve the wholesale market. FERC had concluded that the rule improves the competitiveness of wholesale markets by “providing more supply options, encouraging new

^b Demand response resources reduce consumption of electricity in response to an increase in the price of electric energy or to incentive payments designed to induce lower consumption of electric energy. 18 CFR 35.28(b)(4).

entry and innovation, and spurring deployment of new technologies.”⁶⁹ The Court agreed, reiterating that FERC can ensure just and reasonable wholesale rates by “enhancing competition” on the grid.⁷⁰

A November 2016 NOPR also directly benefits particular resource types and is similarly aimed at enhancing competition. The proposed rule would remove barriers that inhibit the participation of electric storage resources and distributed energy resource aggregations in RTO markets.

The NOPR observes that market rules and technical requirements in RTO tariffs were initially developed when only traditional generation resources were providing service. New technologies, therefore, may be forced to sell in the market under tariff provisions written for some other type of resource. For instance, some energy storage resources participate in the market as demand response resources because they are capable of quickly reducing the need for power from the interstate grid.

FERC found in the NOPR that existing rules and requirements for demand response fail to reflect the full range of services that storage resources can provide and thus can disadvantage storage technologies. It proposed to require RTOs to develop rules specifically for storage resources so they may participate “based on rules that take into account their unique characteristics and not based on market rules

designed for the unique characteristics of other types of resources.”⁷¹

FERC also proposed to require RTOs to develop rules for aggregators of small-scale distributed energy resources (DERs). It found that the costs of DERs “have decreased significantly, which when paired with alternative revenue streams and innovative financing solutions, is increasing these resources’ potential to compete in and deliver value to the organized wholesale electric markets.”⁷² As of August 2017, FERC had not finalized the rule,^c and the California ISO was the only market that allowed DER aggregators to participate in its energy auctions.

Technical Market Rules

Order No. 745 and the storage and DER NOPR are rare exceptions to the general principle that FERC rules are facially resource-neutral. The two most recently finalized rules as of August 2017—“Offer Caps in Markets Operated by RTOs” and “Settlement Intervals and Shortage Pricing in Markets Operated by RTOs”⁷³—typify FERC rules that apply to RTOs. Both are technical market adjustments aimed at improving market efficiency with no obvious connection to climate. Nonetheless, these and other technical rules can affect the relative competitiveness of various resources and encourage or discourage their development.

For instance, the settlement intervals and shortage



^c To promulgate a rule, FERC needs a quorum of at least three Commissioners. On February 3, 2017, former-Chairman Norman Bay resigned, leaving only two Commissioners. In August 2017, the Senate confirmed new Commissioners, restoring the quorum.

pricing rule, developed in response to FERC's 2014 price formation proceedings, aimed to remedy "price distortions" in RTO markets that FERC concluded were unjust and unreasonable.⁷⁴ FERC's goal in the rule is to facilitate "more accurate" market prices that will improve reliability by incentivizing the development and performance of more flexible resources that can react quickly to changing supply and demand on the grid.⁷⁵

FERC observed that market prices may fail to reflect the value of the service that a resource provides. For instance, when energy and reserves are in short supply, prices rise to induce resources to provide services that the RTO needs to maintain reliability.⁷⁶ While some RTOs dispatch resources every five minutes based on system needs, they pay resources based on an hourly average price. This mismatch between prices and system needs can result in prices during shortages that are too low to incentivize performance and fail to reflect the value of balancing the system at that moment. To remedy this price distortion, FERC ordered RTOs to compensate at prices calculated every five minutes rather than hourly.

Some commenters noted that the rule would benefit fast-acting resources.⁷⁷ On the other hand, an owner of nuclear power plants commented that the rule "will not improve the outlook for merchant baseload resources," such as nuclear plants, that are incapable of adjusting their output on a five-minute basis.⁷⁸

By ensuring that flexibility is appropriately compensated by the markets, FERC directly improved the economic viability of particular resources, such as energy storage, demand response, and fast-ramping natural gas turbines.⁷⁹ The rule thereby facilitates the continued growth of wind and solar.⁸⁰ Fast-acting resources provide an RTO with "operational flexibility," enhancing its ability to keep the grid in balance as the penetration of intermittent resources increases.⁸¹

RTO Proposed Tariff Changes (Sec. 205)

The process of amending an RTO tariff begins long before the RTO files proposed tariff changes at FERC. Because it regards "stakeholder input [as] an essential element of a just and reasonable" tariff,⁸² FERC requires each RTO to "have a decision-making process that is independent of control by any market participant or class of participants."⁸³ Each RTO must "ensure that its practices and procedures for decision making consider and balance the interests of [its] customers and stakeholders, and ensure that no single stakeholder group can dominate."⁸⁴

Each RTO has a unique governance structure and stakeholder process that implements these and other requirements.⁸⁵ A recent paper on PJM published by the University of Pennsylvania's Kleinman Center for Energy Policy summarizes how PJM develops tariff proposals. The tariff amendment process is initiated by a stakeholder committee that votes whether to explore a market design change. If the proposal passes, lower-level stakeholder committees then develop specific proposals, which must then be approved by a higher-level committee. The report finds that buyers in the market have more control over the initial and final votes while sellers have more control over crafting specific solutions. Ultimately, a ten-member board determines whether a stakeholder-approved proposal is filed with FERC under section 205.⁸⁶

Once an RTO files a proposed tariff amendment at FERC under section 205, FERC opens a docket. If FERC can conclude that the tariff will result in just and reasonable and not unduly discriminatory rates, based on information in the docket, it approves the filing. Otherwise, FERC may disapprove or partially approve and partially disapprove a proposal, but it may not modify the RTO's proposal.⁸⁷

Capacity Market Controversy

Capacity market rule changes enacted in New England and PJM in response to the so-called "Polar Vortex" illustrate how ostensibly resource-neutral market rules affect various fuels and technologies differently. Extreme weather in the winter of 2013-14 led to PJM generator outage rates three times higher than the historic average.⁸⁸ According to PJM, the outages highlighted a flaw in capacity market design.

By ensuring that flexibility is appropriately compensated by the markets, FERC directly improved the economic viability of particular resources, such as energy storage, demand response, and fast-ramping natural gas turbines.

Under then-effective rules, the capacity market paid resources for their commitments to be available three years in the future to produce energy or reduce demand, but the market provided no incentive for reliable performance when resources were actually needed, such as during extreme weather.⁸⁹ PJM's Capacity Performance rules (and ISO-NE's similar pay-for-performance rules), proposed after the Polar Vortex, assess penalties or bonuses based on a resource's actual availability during an emergency. The purpose is to ensure that resources that are paid for capacity commitments reliably deliver when needed.

Environmental advocates, demand response providers, and renewable energy companies protested PJM's proposal in part because the rules require that resources make annual availability commitments.⁹⁰ They argued that the annual availability requirement disadvantages resources that perform better in particular seasons: wind, for example, typically generates more power in the winter, while solar has higher output in the summer. Demand response programs may also have seasonal peaks, depending on the resources involved. They urged PJM and FERC to account for seasonal variability by allowing for seasonal rather than annual commitments. However, FERC approved PJM's annual requirement, concluding in part that it "creates the same expectations for all [resources] . . . without regard to technology type."⁹¹

Environmental advocacy organizations challenged the rule in the D.C. Circuit as unduly discriminatory, arguing that the rule "irrationally disadvantages seasonal clean energy resources and confers an unjustified structural preference on annual fuel-based resources like coal, natural gas, and nuclear."⁹²

The panel deferred to FERC's policy of assessing reliability based on annual performance and upheld the order. The panel concluded that the FPA "provides no basis to claim the Commission cannot approve uniform performance requirements simply because those requirements will be easier to satisfy for some generators than for others." While some resources would be disadvantaged, the court found that the discrimination was justified because annual resources provide a different product from seasonal resources.⁹³

Complaints about an RTO Tariff (Sec. 206)

Capacity market minimum-offer price rules (MOPR) have been the subject of multiple complaint proceedings. A MOPR aims to prevent uneconomic bidding intended to reduce the market-clearing price.

Capacity market rule changes enacted in New England and PJM in response to the so-called "Polar Vortex" illustrate how ostensibly resource-neutral market rules affect various fuels and technologies differently.

Companies that own generation assets and distribution utilities in the same RTO region are both buyers and sellers in the capacity market. An entity that is substantially "net short" on capacity—that is, an entity that buys more capacity than it sells—may have a rational economic incentive to lower the price of the capacity it must purchase. It can seek to do so by bidding its generation resources below cost. While it may lose money or earn less on its capacity sale, it will benefit from the lower market price on the buy-side.

Current MOPRs seek to prevent new resources from submitting artificially low bids that might suppress the capacity auction price. MOPRs require each new resource to offer at a bid that reflects its costs. These rules are supposed to ensure that only economic resources clear the auction.

ISO-NE's MOPR includes an exemption for renewable resources mandated by state policies. The exemption allows these resources to submit low bids that guarantee they will clear the auction. According to ISO-NE, the exemption "is a reasonable means of accommodating legitimate state policies that favor renewable resources and that are not intended to suppress market-clearing prices."⁹⁴ It recognized that if renewable resources mandated by state law do not clear the capacity auction—and therefore are not counted towards meeting the region's resource adequacy needs—ratepayers will overpay for capacity. In other words, ratepayers would pay for the renewables because they are part of the supply mix required by state law, then overpay through the capacity market for redundant resources that are not needed to meet demand.⁹⁵

Similarly, PJM exempts wind and solar from its

MOPR. When FERC approved this exemption it concluded that the technical characteristics of “wind and solar resources [make them] a poor choice if a developer’s primary purpose is to suppress capacity market prices.”⁹⁶

In 2015, FERC granted a complaint alleging the NYISO MOPR was unjust and unreasonable because it did not contain a renewables exemption. FERC directed NYISO to submit a tariff amendment that implements an exemption for intermittent renewables.⁹⁷ FERC has not ruled on the NYISO’s compliance filing.⁹⁸

MOPR controversies extend to non-renewable resources as well. Both Maryland and New Jersey required utilities to sign contracts with natural gas generators that would pay the resources the difference between the PJM capacity market price and a price approved by each state’s PUC. PJM’s MOPR exemption allowed the state-sponsored gas plants to bid uneconomically and ensured that they would clear the market. But PJM later retracted the exemption for state-sponsored resources, finding that it would distort market outcomes.

The Third Circuit upheld FERC’s approval of the retraction, rejecting New Jersey’s argument that FERC was interfering with state policy. Rather, the court concluded that “what FERC has actually done here is permit states to develop whatever capacity resources they wish . . . while approving rules that prevent the state’s choices from adversely affecting wholesale capacity rates.”⁹⁹ In a separate case, the Supreme Court later found that the FPA preempted the states’ programs.¹⁰⁰

More recently, a complaint filed by a coalition of demand response providers, environmental advocates, and various New York governmental entities challenged how the NYISO MOPR treats demand response. For a demand response resource subject to

the MOPR, the then-effective rule set a minimum bid amount that included revenue the resource earned through state-regulated retail demand response programs. According to the complainants the MOPR enabled a resource to earn revenue from retail programs and yet fail to clear the NYISO capacity auction due to its high bid, or forgo opportunities in the retail market and participate only in the NYISO market. Complainants asserted that the rule thereby reduces the effectiveness of demand response programs, interferes with New York’s energy policy objectives, increases customer costs, and intrudes on the state’s local system planning authority.

FERC granted the complaint and ordered NYISO to revise its MOPR. According to FERC, demand response resources “have limited or no incentive and ability to exercise buyer-side market power to artificially suppress” prices. Exempting demand response resources “avoids the creation of unnecessary barriers to the participation of demand response in the wholesale markets.”¹⁰¹

Two pending MOPR complaints take aim at state support for nuclear generation. In 2016, New York and Illinois required utilities to purchase Zero-Emission Credits (ZECs) created by designated in-state nuclear plants. A coalition of generators responded with federal lawsuits arguing that the programs are preempted by the FPA and violate the dormant Commerce Clause’s prohibition on favoring in-state businesses at the expense of out-of-state competitors.¹⁰² Both district courts sided with the states and dismissed the complaints.¹⁰³ Appeals are pending.

Generators also filed complaints at FERC arguing that because MOPRs apply only to new resources, they “do not address the price suppressive effect that subsidies [such as ZECs] to existing resources can have” on capacity prices. They assert that ZECs will result in unjust and unreasonable rates because they allow existing nuclear plants to submit lower bids

The Court concluded that “what FERC has actually done here is permit states to develop whatever capacity resources they wish . . . while approving rules that prevent the state’s choices from adversely affecting wholesale capacity rates.”

than they would absent ZEC revenue.¹⁰⁴ These lower bids, they argue, will distort capacity market prices, sending inaccurate price signals to investors. The complaints request that FERC order the RTOs to apply MOPRs to the ZEC-producing nuclear plants, which would force them to bid into the auction based on their costs. As of October 2017, the complaints are pending.

These and other MOPR-related proceedings led former FERC Chair Norman Bay to conclude that MOPRs are “unsound in principle and unworkable in practice.” According to Bay:

No other market in the United States is subject to the same construct in which a federal agency reviews state action and imposes an administrative price floor on supply offers from certain resources that have received state support. This places the Commission in direct and recurring conflict with the states, ignores the pervasiveness of state and federal policies that support resources in one fashion or another, and represents a significant intervention in the market that raises costs to consumers.¹⁰⁵

Future Climate-Relevant Proceedings

Integrating State Policies

Approximately thirty states have renewable portfolio standards that require utilities to procure a specified percentage of their energy needs from renewable sources.¹⁰⁶ Some states have more specific requirements, such as mandates to purchase from off-shore wind farms.¹⁰⁷ A handful of states also have long-term carbon reduction goals.¹⁰⁸ In addition, as mentioned above, two states created zero-emission credits and designated nuclear plants to generate them.

These and other state climate or clean energy policies are not subject to FERC’s jurisdiction,^d but they may affect outcomes in FERC-regulated markets. For instance, when utilities in New England procure renewable capacity to meet a state policy, they require less capacity from resources that compete in the ISO-NE capacity market. As demand shifts away from resources that rely on market revenue to resources mandated by state policies, prices in the RTO markets might fall, potentially imperiling the viability of resources that rely on RTO market revenue.

As New England market participants explained in a 2016 “problem statement,” RTO markets “are designed to meet New England’s need to maintain reliability by selecting the lowest-cost

resources The challenge is finding a means to execute states’ policy-related requirements at the lowest reasonable cost without unduly diminishing the benefits of competitive organized markets or amplifying the cost to consumers.”¹⁰⁹

In May 2017, FERC convened a conference on the interaction between RTO markets and state policies. FERC hoped the conference would “foster further discussion regarding the development of regional solutions in the Eastern RTOs that reconcile the competitive market framework with the increasing interest by states to support particular resources or resource attributes.”¹¹⁰ Regulators, RTO staff, generation company executives, and economic consultants participated.

In 2017, ISO-NE, PJM, and NYISO were working through their stakeholder processes to address the interaction of state policies and wholesale markets. In April, ISO-NE released a proposal to “coordinate the entry of (subsidized) new resources with the exit of (unsubsidized) existing capacity resources.” The reformed capacity market adds a “substitution auction” that will allow existing resources that clear the auction to trade their capacity commitments with subsidized resources that did not clear the auction.¹¹¹ The ISO’s goal is to allow new resources required by state policies to enter the market while not oversaturating the market with unneeded capacity. According to the ISO, providing a market-based mechanism for coordinated entry and retirement protects consumers by ensuring they are not paying for more capacity than the region needs.

In May and June, PJM released two proposals addressing state public policies. One proposal allows state-supported resources to receive capacity market commitments and then adjusts upward the rates paid to resources that are not supported by a state policy.¹¹² The second proposal establishes a price on carbon emissions and allows states to determine

State climate or clean energy policies are not subject to FERC’s jurisdiction, but they may affect outcomes in FERC-regulated markets.

^d Some federal court plaintiffs, however, argue that certain state policies are preempted by the FPA.

whether in-state resources will participate.¹¹³

Following New York Public Service Commission's adoption in 2016 of a fifty percent renewable target by 2030, the NYISO launched its "Integrating Public Policy Project." The project aims to determine whether market rules should be reformed to facilitate achieving the renewable target while maintaining reliability.¹¹⁴

If stakeholders in any of these RTOs agree on a market reform proposal, the RTO will file with FERC tariff changes under section 205. The merits and legality of any proposal are likely to be hotly contested. Again, to approve the proposal, FERC must conclude that the tariff will result in just and reasonable rates and not be unduly discriminatory. Opponents will assert otherwise and may also argue that FERC has no authority under the FPA to approve market rules that account for CO₂ emissions or differentiate among fuels. Proponents may counter that FERC has authority to approve rules that improve the wholesale market, even if those rules affect matters over which states retain jurisdiction.¹¹⁵

Whether or not an RTO files a proposal, market participants or other entities could file a complaint at FERC alleging rates are unjust and unreasonable because they fail to account for state policies. Fossil-fuel generators might argue that state policies suppress market prices and ask FERC to protect markets from distortionary state programs. Environmental advocates or states might urge FERC to price CO₂ emissions or create renewable energy procurement mechanisms to align markets with consumers' needs. Even absent a complaint, FERC could conclude prices are unjust and unreasonable and order an RTO to change its rules.

In California, the wholesale electricity market already incorporates the state's CO₂ cap-and-trade program. In 2012, FERC approved a California ISO tariff amendment that specifies how the ISO includes CO₂ allowance costs across generators.¹¹⁶ Two years later, FERC approved further amendments that account for the expansion of the real-time energy market into five additional states.¹¹⁷ The revision allows generators to specify whether they are selling into California, and therefore must purchase allowances and include their cost in their bids, or prefer to serve other states.

Because generators serving load outside of California do not need to purchase allowances, high-emitting resources will find it less expensive to sell to other states and lower-emitting resources will be dispatched

to serve California. California regulators argue that this neat economic picture fails to reflect the physical reality that energy from higher-emitting generation traverses into California, regardless of market bids. As of August 2017, stakeholders were discussing how the market design can more accurately price CO₂ emissions.¹¹⁸

DOE Report and Proposed Pricing Rule

In April 2017, Secretary of Energy Rick Perry issued a memo to Department of Energy (DOE) staff, requesting a study of electricity markets and reliability, with a focus on whether baseload power plants are being: 1) harmed by EPA regulations and renewable energy programs and 2) adequately compensated for the value they provide to the grid. Long before the study was released, critics slammed the memo for its unsupported assertion that "baseload power is necessary" and argued that the study would be a thinly veiled attempt to rationalize subsidies for uneconomic coal plants.¹¹⁹ In June, environmental and renewable energy groups released reports that explained the economic factors that have shifted the grid away from baseload power plants. The reports served to rebut the Perry memo's implication that renewable energy subsidies and environmental rules were the primary causes of the coal sector's decline.¹²⁰

The DOE study, released in August 2017, largely echoes the findings of previous studies published by DOE, FERC, and other experts. The study recognizes today's grid is powered less by coal, nuclear, and natural gas baseload generators that run around the clock to meet the minimum level of consumer demand. Instead, wind and solar are increasingly meeting this demand, leading grid operators to value flexible resources that can quickly react to changes in supply and demand.

While recognizing the market trend toward flexible resources, the DOE study warns that RTO markets "need further work to address grid resilience." The study explains that "market mechanisms are designed to incentivize individual resources rather than develop balanced portfolios" and RTOs must "work[] toward recognizing, defining, and compensating for reliability- and resilience-enhancing resource attributes."¹²¹

Two of the study's eight policy recommendations address ongoing FERC efforts. First, the DOE study urges FERC to "expedite its efforts . . . to improve energy price formation." Second, "FERC should study and make recommendations regarding efforts to require valuation of new and existing Essential

Reliability Services by creating fuel-neutral markets and/or regulatory mechanisms that compensate grid participants for services that are necessary to support reliable grid operations.”

As discussed above, FERC is conducting a four-year effort to assess price formation in RTO markets. As of August 2017, the only final rule from that process aims to ensure that fast-acting resources are compensated for the value they provide to the system. In terms of valuing “services that are necessary to support reliable grid operations,” RTO ancillary services markets already do so. Recent ancillary service market reform efforts also address fast-acting resources.¹²²

Nonetheless, on September 29, 2017, DOE invoked rarely used authority to initiate a FERC rulemaking.¹²³ DOE’s “Grid Resiliency Pricing Rule,” if finalized by FERC, would require RTOs to establish a “reliability and resiliency rate” that “ensures each eligible resource is fully compensated for the benefits and services it provides to grid operators . . . and that each eligible resource recovers its fully allocated costs and a fair return on equity.”¹²⁴ Eligible resources must have a 90-day fuel supply on-site, be located in an RTO region with a capacity market, and not recover costs through state-regulated retail rates.

DOE’s proposed “reliability and resiliency rate” is poorly defined, but it appears to mandate that RTOs institute cost-of-service ratemaking for eligible resources. The proposal offers no details about how this rate would interface with bid-based economic dispatch. The 90-day fuel supply requirement would allow coal-fired and nuclear units to receive this special rate and continue operating regardless of market pressures.

In comments filed shortly after the DOE issued the proposal, energy law scholar Richard Pierce opposed the proposal, summarizing that DOE is

Proposing that we identify the oldest most technologically, economically, and environmentally obsolete generating units and improve reliability by retaining them in service or, in some cases, restoring them to service, maximizing our use of those units, and maximizing the price we pay for the output of those units.¹²⁵

Other Proceedings

FERC will likely face multiple proceedings related to integrating markets and state policies and addressing the economics of baseload resources. But other climate-related dockets also will continue to appear

FERC will likely face multiple proceedings related to integrating markets and state policies and addressing the economics of baseload resources.

before FERC as a matter of course.

For example, in June 2017 a trade association for advanced energy technology companies petitioned FERC to determine whether state regulators have authority to prevent energy efficiency resources from participating in a capacity market.¹²⁶ The trade association’s request was filed in response to a then-active PJM stakeholder process. Stakeholders were exploring a tariff amendment opposed by the trade association that would provide state regulators with a mechanism for preventing in-state efficiency projects from selling into the capacity market.

Like demand response, aggregations of energy efficiency projects are paid in the capacity market for their ability to reduce peak demand. FERC’s demand response rules allow state regulators to prohibit resources from participating in FERC-regulated wholesale markets. However, the trade association seeks to preserve different treatment for energy efficiency, arguing that allowing state regulators to prohibit energy efficiency from selling into PJM would erect new barriers to participation in wholesale markets “without any reasonable jurisdictional, market design, or reliability justification.”¹²⁷ Environmental advocates are likely to side with the trade association while traditional fossil fuel generators are likely to oppose the request, as energy efficiency reduces peak demand and lowers capacity market prices.

The trade association petition highlights that when FERC decides climate-relevant issues under the FPA, FERC evaluates the issues as a market regulator. In this case, the petition asks FERC to prevent PJM from erecting any “unjust, unreasonable, and unduly discriminatory barriers to wholesale market participation.” FERC’s order may ultimately have implications for climate change mitigation, but those effects are not the focus of its analysis.

FERC's broad mandate "to encourage the orderly development of plentiful supplies of electricity . . . at reasonable prices"¹²⁸ and its specific jurisdiction under the FPA over the transmission grid and interstate wholesale sales provide it with far-reaching influence over the electric sector. FERC is likely to play an important, if indirect, role in the industry's greenhouse gas reduction efforts.

Transmission

Rates

The FPA also confers significant authority on FERC to oversee electricity transmission, although it is not as exclusive as FERC's authority over interstate natural gas transmission under the Natural Gas Act. Under sections 205 and 206 of the FPA, FERC ensures that interstate transmission rates are just and reasonable and not unduly discriminatory. In general, FERC approves transmission rates based on cost-of-service principles. The key issue in a transmission rate case is the return-on-equity (ROE).¹²⁹ Not surprisingly, transmission owners urge FERC to set a higher ROE while consumer advocates and transmission customers prefer a lower ROE. The Supreme Court has said an ROE must be "sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital."¹³⁰

FERC uses financial models to set ROE.¹³¹ In general, its ROE analysis does not consider whether a utility is replacing transmission infrastructure, building new lines to connect renewable energy or fossil-fuel powered facilities, or building transmission aimed at enhancing reliability. However, pursuant to the Energy Policy Act of 2005, FERC may award "incentives," including an ROE adder and accelerated cost recovery, based on a project's "risks and challenges."¹³² FERC understands the 2005 Act as "promot[ing] capital investment in a wide range of infrastructure investments that can have either reliability or congestion benefits."¹³³ FERC did not adopt specific incentives for projects that interconnect and deliver renewable energy.¹³⁴

Regional Planning and Cost Allocation

Under section 206, FERC can issue rules that apply to all transmission-owning utilities, regardless of whether they participate in an RTO market. Issued in 2011, pursuant to section 206 and FERC's authority under section 202 to "promote and encourage regional coordination," FERC Order 1000 requires regional transmission planning regions to adopt specified planning and cost allocation principles.

Order No. 1000 instructs that a regional planning process must consider public policies that affect transmission needs, such as state climate rules and renewable energy mandates. FERC observed that "some regions are struggling with how to adequately address transmission expansion necessary to, for example, comply with [state] renewable portfolio standards."¹³⁵ It concluded that "consideration of transmission needs driven by Public Policy Requirements [in transmission planning] could facilitate the more efficient and cost-effective achievement of those requirements" and was therefore needed to ensure that rates are just and reasonable.¹³⁶

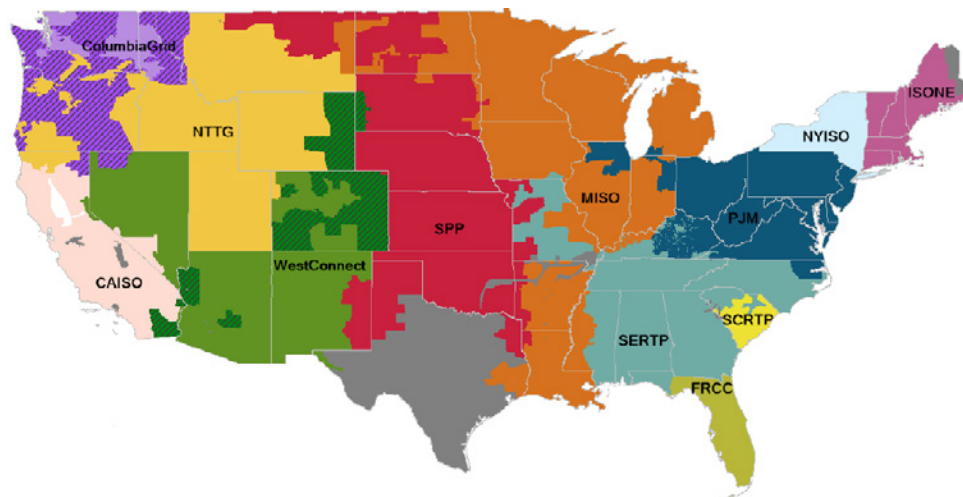
With regard to regional cost allocation, FERC had previously determined that in an interconnected regional network, new transmission infrastructure can "provide a broad range of benefits . . . that radiate from the upgraded facility, and thus are spread throughout the [] region."¹³⁷ In addition, it had concluded that identifying who pays for a facility in advance of construction "allows transmission providers, customers, and potential investors to decide, on an informed basis, whether or not to build that facility."¹³⁸ In Order No. 1000, FERC required regions to adopt six cost allocation principles, including a requirement that costs of new facilities be allocated among transmission owners "in a manner that is at least roughly commensurate with estimated benefits."¹³⁹

FERC's approval of a MISO tariff amendment illustrates how regional planning and cost sharing principles can facilitate the construction of transmission for renewable energy projects.⁶ Through a series of technical studies and stakeholder processes led by public utility commissioners,¹⁴⁰ MISO identified projects that connect the region's best sites for

Order No. 1000 instructs that a regional planning process must consider public policies that affect transmission needs, such as state climate rules and renewable energy mandates.

⁶ FERC issued its approval while it was reviewing comments on the Order No. 1000 NOPR. FERC noted that it was "mindful" of the NOPR when it evaluated the proposal.

Transmission Planning Regions



wind farms to consumers.¹⁴¹ The tariff amendment's cost-sharing principles were designed to "provide adequate incentives" for construction and "fairly allocate costs to beneficiaries." FERC approved the proposal, concluding that MISO's "methodology is an important step in facilitating investment in new transmission facilities to integrate large amounts of [wind] to further support documented energy policy mandates or law."¹⁴²

FERC's oversight of transmission planning and cost allocation does not compel this level of regional cooperation on renewable energy transmission projects. In upholding Order No. 1000, the D.C. Circuit concluded that the order merely establishes a planning process that requires utilities to consider relevant public policies. Importantly, utilities and not FERC identify the state and federal policies that might affect the transmission market.¹⁴³ FERC does not require that a regional transmission plan "address every identified transmission need driven by a public policy requirement."¹⁴⁴

Order No. 1000 also mandates interregional planning, and requires each region separately to develop a procedure to "identify and jointly evaluate" proposed interregional projects. As part of that filing, regions must "develop procedures" to "harmonize differences in the data, models, assumptions, planning horizons, and criteria used to study a proposed transmission project."¹⁴⁵ But Order No. 1000 falls short of requiring an interregional planning process, an interregion-

al planning entity, or an interregional transmission plan. Moreover, to be eligible for interregional cost allocation, a project must be selected by each affected region.

Critics argue that current frameworks unnecessarily limit interregional projects.¹⁴⁶ One market operator commented that project eligibility rules such as voltage level, cost, or mileage are attractive to RTOs because of their administrative simplicity but fail to reflect project benefits and are disconnected from market needs.¹⁴⁷ An organization representing transmission developers told FERC that rising demand for location-constrained resources such as wind and solar make interregional process improvements more urgent.¹⁴⁸

In Order No. 1000, FERC reiterated that transmission planning must consider technologies that can replace or delay the need for new transmission, such as energy efficiency and DERs, "on a comparable basis" to proposed transmission expansion.¹⁴⁹ However, FERC explicitly chose not to set rules governing which technologies should be considered or how these non-transmission alternatives should be measured against proposed transmission solutions, leaving these details to each region.¹⁵⁰

An analysis by Shelley Welton finds three overarching reasons why "transmission planning processes are unlikely to result in selection and implementation of non-transmission solutions, even where they are

demonstrably superior.”¹⁵¹ First, regional planning processes are dominated by transmission-owning utilities that have financial incentives and expertise that lead them to favor transmission over alternatives. Second, non-transmission alternatives may provide environmental and other public benefits that are difficult to value, rendering a region’s economic analysis “comparable” only when that analysis is narrowly defined. Third, FERC declined to mandate regional cost allocation for non-transmission alternatives, which “effectively renders non-transmission alternatives infeasible, by denying [them] a viable source of regional financing.”¹⁵²

Technical and Reliability Standards

Under section 206, FERC also promulgates technical rules about grid operations. Two recent examples are “Requirements for Frequency and Voltage Ride-Through Capability of Small Generating Facilities” and “Reactive Power Requirements for Non-Synchronous Generation.” While these rules have no obvious link to greenhouse gas emissions, they may affect how particular resources provide services to the grid and the relative competitiveness of various types of generators.

For example, in 2005 FERC exempted wind generators from meeting certain technical standards for interconnection to the grid because they presented an “unnecessary obstacle” to the growth of wind energy.¹⁵³ In the Reactive Power Requirements rule, FERC rescinded the exemption, concluding that technological advancements reduced the costs of meeting the standards and therefore rendered wind’s exemption unjust, unreasonable, and unduly discriminatory and preferential.¹⁵⁴

FERC’s authority over the high-voltage transmission grid also includes a duty to approve and enforce reliability standards.¹⁵⁵ Pursuant to FPA section 215, FERC has delegated these tasks to the North American Electric Reliability Corporation (NERC), an entity created by industry in 1968 at the recommendation of FERC’s predecessor in response to the nation’s largest blackout.¹⁵⁶ NERC standards define the reliability requirements for planning and operating the North American bulk power system.¹⁵⁷ In general, standards are engineering documents that address a range of operational issues.

NERC also issues reports on various industry developments and technologies. In 2016, it issued a report entitled “Potential Reliability Impacts of EPA’s Clean Power Plan” and in 2017, it published a paper about how DERs impact the high-voltage grid. A 2013

NERC report finds that integrating large amounts of intermittent renewable energy “requires significant changes to electricity system planning and operations to ensure continued reliability of the grid.”¹⁵⁸ The report offers a range of possible solutions and explores whether certain of its standards should be modified to ensure reliability.

These reports can inform industry planning and influence legal and policy debates.¹⁵⁹ FERC has no jurisdiction over these reports.

Transmission Siting

FERC has very limited authority to site electric transmission infrastructure.¹⁶⁰ In general, the developer of a new transmission line must obtain approvals from authorities in each state that the line traverses.

PURPA

The Public Utility Regulatory Policies Act of 1978 (PURPA) is one of five statutes enacted in the National Energy Act, which was enacted in response to spikes in oil and natural gas prices. Title II of PURPA directed FERC to promulgate rules requiring utilities to purchase electricity from, “qualifying cogeneration and small power production facilities.”¹⁶¹ A qualifying facility (QF) is either a renewable generator smaller than 80 megawatts or a co-generator that meets certain efficiency requirements.¹⁶² The law tasks state regulators with approving utility-specific rates that are consistent with FERC’s QF rules.

FERC’s rules set the rate for QF purchases equal to the utility’s “full avoided cost,” a price that attempts to estimate how much the utility would be paying to generate its own power or purchase power if it were not buying from the QF.¹⁶³ In upholding FERC’s rule, the Supreme Court observed that PURPA “was designed to encourage the development” of QFs in order to “reduce the demand for traditional fossil fuels.”¹⁶⁴ The Court thus rejected challengers’ argument that PURPA requires the “lowest possible rate,” and accepted FERC’s determination that full avoided cost would “provide a significant incentive” for QFs and be consistent with Congress’s purpose.¹⁶⁵

Utilities and QFs may petition FERC to enforce PURPA against state regulators that have issued an order or promulgated a rule that is inconsistent with the law. FERC rarely takes such action, particularly when the petition is about avoided cost rates.¹⁶⁶ When it declines to enforce PURPA against a state, the aggrieved QF or utility may then file a complaint in federal district court.¹⁶⁷

Although FERC typically declines to exercise its enforcement authority, it often issues declaratory orders in response to petitions. Recent orders have reiterated FERC's longstanding policy that "the establishment of a legally enforceable obligation turns on the QF's commitment, and not the utility's actions."¹⁶⁸ For instance, a utility may not condition a contract with a QF on completion of an interconnection agreement. FERC's concern is that the utility will use such a requirement as a means of delaying the "legally enforceable obligation" and thus denying the QF its statutory right to sell energy to the utility.¹⁶⁹

In addition to such contract formation barriers, recent PURPA complaints have been about a Maryland community solar program (which challengers argued paid solar projects a rate that was inconsistent with PURPA),¹⁷⁰ a Montana rule that awarded QF contracts only through a competitive solicitation,¹⁷¹ and a Connecticut rule that compensated QFs at the rate generated by the ISO-NE short-term market and did not provide an option for a long-term rate.¹⁷²

Importantly, Congress amended PURPA in 2005 to allow FERC to terminate the requirement that utilities purchase energy from QFs in regions where there are competitive markets for wholesale energy.¹⁷³ FERC has established a rebuttable presumption that utilities that are members of an RTO should be relieved of their obligation to purchase energy from qualifying facilities larger than 20 megawatts.¹⁷⁴ For smaller QFs, a utility can apply for an exemption for each QF that requests a contract.

The Supreme Court observed that PURPA "was designed to encourage the development" of QFs in order to "reduce the demand for traditional fossil fuels."

Natural Gas

Improvements in horizontal drilling and hydraulic fracturing have increased U.S. natural gas production 40 percent in ten years.¹⁷⁵ Whether natural gas helps or harms efforts to mitigate climate change is a matter of debate, and depends in part on the end use and the relative climate impact of the fuel that gas displaces.

About one-third of natural gas consumed in the United States is used to generate electricity.¹⁷⁶ Notably, an efficient natural gas generator emits less than half of the carbon dioxide of a coal plant.¹⁷⁷ Numerous studies have linked low natural gas prices and increased supply to the sharp decline in coal generation and the corresponding drop in carbon dioxide emissions from the power sector.¹⁷⁸

However, the resulting low wholesale power costs may inhibit growth of renewable energy and challenge the economic viability of carbon-free nuclear power.¹⁷⁹ Moreover, natural gas (methane) is a potent greenhouse gas, and leaks along the value chain may nullify the relative climate benefits of burning natural gas instead of coal.¹⁸⁰ For the remaining end uses of natural gas — to produce natural gas, heat homes, fuel vehicles and drive a growing domestic petrochemical industry — climate benefits are small or unclear.

Some researchers warn that natural gas infrastructure built today could “lock in” emitting energy sources long past mid-century,¹⁸¹ by which time the global economy must decarbonize substantially to reduce the risk of catastrophic climate change.¹⁸²

As the federal entity in charge of approving natural gas pipelines and other interstate infrastructure, FERC has become a focal point for the contentious “lock in” debate.¹⁸³ In addition, some advocates opposed to FERC’s pipeline approvals are motivated by their disapproval of natural gas production techniques, particularly hydraulic fracturing (although FERC does not regulate natural gas production).¹⁸⁴

Congress crafted a centralized process for approving natural gas infrastructure. FERC enjoys substantial discretion in this regime, and a court will not “substitute its judgment for that of the Commission.”¹⁸⁵ Courts also give an “extreme degree of deference” to FERC’s scientific analysis.¹⁸⁶ Therefore, opponents of natural gas infrastructure face tough odds. But novel arguments against FERC’s infrastructure approvals have emerged in recent years, and FERC’s opponents recently convinced a court that FERC must account for greenhouse gas emissions resulting from the eventual combustion of natural gas transported through a new pipeline.



The Natural Gas Act

The NGA grants FERC broad jurisdiction over the transportation and sale of natural gas in interstate commerce.¹⁸⁷ Enacted in 1938, the NGA's core provisions resemble those of the FPA enacted three years earlier.¹⁸⁸ For instance, the NGA requires all rates and rules relating to natural gas sales and transport to be "just and reasonable."¹⁸⁹ FERC sets initial rates for new pipelines as part of the public convenience and necessity determination made under NGA Section 7.¹⁹⁰ When a firm proposes to change rates, FERC reviews filings¹⁹¹ and may hold a hearing to determine the rate's lawfulness.¹⁹² Upon complaint or on its own initiative, FERC can revisit rates that may be "unjust, unreasonable, unduly discriminatory, or preferential."¹⁹³

Generally, FERC uses cost-of-service ratemaking. However, for natural gas storage,¹⁹⁴ or where a natural gas pipeline company demonstrates that it does not have market power,¹⁹⁵ FERC may approve market prices as just and reasonable. As discussed above, FERC's ratemaking under the FPA influences fuel choice and therefore affects the carbon intensity of electricity generation. Despite similarities in authority, natural gas rate-setting has not yet proved a tool for climate mitigation.

Instead, advocates have focused on FERC's infrastructure siting decisions. State and local jurisdictions retain significant roles in siting electricity transmission, as well as oil pipelines. By contrast, the NGA establishes a centralized process administered by FERC for siting natural gas infrastructure. This reflects the historical moment that gave rise to the NGA, when Congress was concerned that a concentration of market power and opposition to new pipelines were stifling natural gas production and consumption.¹⁹⁶ In a study Congress commissioned, the Federal Trade Commission noted that non-competitive practices were more of a problem for natural gas than for oil, "which may be conveniently stored without such rigid requirements as to marketing outlets for immediate consumption."¹⁹⁷

With this study in hand, Congress enacted the NGA to streamline approval for the construction of new pipelines.¹⁹⁸ Under the NGA, FERC must grant an application to construct a natural gas pipeline by "any qualified applicant" if the proposed service "is or will be required by the present or future public convenience and necessity."¹⁹⁹ Courts have interpreted transportation of natural gas to include storage; therefore, FERC permits underground natural gas storage facilities under the same provision.²⁰⁰

FERC can modify a proposed route or site, and attach terms and conditions to a pipeline approval.²⁰¹ Once FERC issues a certificate of public convenience and necessity, the certificate holder enjoys eminent domain authority over property in the pipeline right-of-way and for "compressor stations, pressure apparatus, or other stations or equipment necessary."²⁰²

The NGA also grants FERC exclusive authority over applications for the construction and operation of liquefied natural gas (LNG) terminals.²⁰³ DOE permits the export of natural gas from these facilities.²⁰⁴ FERC will approve an LNG terminal application if it finds the project "will not be inconsistent with the public interest."²⁰⁵ As with pipelines, FERC may modify the proposal and attach conditions.²⁰⁶

The NGA largely preempts state and local authority over the siting and permitting of natural gas infrastructure. However, it "does not affect the rights of States" under the Coastal Zone Management Act, the Clean Air Act, or the Clean Water Act.²⁰⁷ In addition, FERC must conduct a review pursuant to the National Environmental Policy Act (NEPA) when it makes siting decisions.²⁰⁸

Within 30 days of a FERC decision, any person, State, municipality, or state commission can seek rehearing, if they were a party to the proceeding.²⁰⁹ If rehearing is denied, any party who sought rehearing has 60 days to seek judicial review, on any issue raised in rehearing.²¹⁰ Review may be sought in the D.C. Circuit Court of Appeals or in the circuit where the natural gas company is located or headquartered.²¹¹

Opposing Infrastructure Siting

Proponents of climate mitigation have pursued four strategies to oppose certification of new natural gas pipelines:

1. Contesting that the project is required by the public interest (or is consistent with the public interest);

Proponents of climate mitigation have pursued four strategies to oppose certification of new natural gas pipelines.

2. Challenging eminent domain authority of a certificate holder;
3. Using one of the three listed environmental statutes to delay a project or mitigate its effects; and,
4. Urging consideration under NEPA of the climate change implications of a particular project.

This section of the paper provides more detail on each strategy for opposing specific projects.

On occasion, FERC issues orders that are generally applicable to its decisions on natural gas infrastructure. One example, discussed below, is a 1999 document that outlines FERC's understanding of the "public convenience and necessity" finding that is necessary to approve a project. Another is a 2015 order, when FERC enabled interstate pipelines to add a surcharge to their rates, to pay for upgrades to infrastructure to address methane leaks.²¹² Such rare opportunities to comment on FERC policy may be relevant to proponents of climate action.

Objecting to Public Interest and Need Findings

As noted, Section 7 of the NGA directs FERC to certificate pipeline proposals that are required "by the present or future public convenience and necessity."²¹³ Opponents have argued that the additional fossil fuel infrastructure is not needed and therefore is not serving the public interest.

In 1999, FERC issued guidance²¹⁴ for making a public convenience and necessity determination for new pipelines. FERC initially proposed three options:

1. Approve all compliant applications, and "let the market pick winners and losers";
2. Select a single project to serve a market, and then exclude all competitors; or
3. Select an environmentally acceptable right-of-way and let pipeline applicants compete for a certificate along that route.²¹⁵

Most comments were from industry and favored the first option. Two state PUCs submitted comments – Ohio also supported permitting all eligible pipelines²¹⁶ while Wisconsin contested that option one risked overbuilding.²¹⁷ Only Colorado Springs supported option three, selecting a pre-established right-of-way based on environmental concerns.²¹⁸

In the 1999 guidance, the Commission announced a "necessity" analysis that determines whether a project can proceed based on future rates to new shippers, without subsidies from existing customers.²¹⁹ Next, FERC determines "whether the applicant has made

efforts to eliminate or minimize any adverse effects" on existing customers, other pipelines, or landowners and communities in the proposed right-of-way.²²⁰ If "residual adverse effects" persist, FERC balances those adverse effects against evidence of public benefits.²²¹ "This is essentially an economic test."

Only when the benefits outweigh the adverse effects on economic interests will the Commission then proceed to complete the environmental analysis where other interests are considered.²²²

In recent cases, the D.C. Circuit has rejected claims that natural gas infrastructure is not "necessary," relying on the operator's representations about market demand. For instance, in 2015 a group of Maryland citizens challenged the approval of a new compressor station, contesting FERC's finding that there was a public need for this equipment.²²³ The D.C. Circuit upheld FERC's reliance on an affidavit stating that the project was "fully subscribed" and pleadings by the customers who planned to use the increased capacity.²²⁴

The citizens also argued FERC had wrongfully permitted an "overbuild" that anticipated future expansion at a terminal being converted to export natural gas.²²⁵ Again, the Court deferred to FERC and dismissed the claim.²²⁶ Where it is clearer a project will serve an LNG terminal, FERC has rejected arguments that a project is not in the public interest when it will serve export facilities.²²⁷ The Commission reasoned that since it does not have authority to approve the export of natural gas, it cannot consider export in its need analysis.

In August 2017, the D.C. Circuit rejected arguments that a pipeline did not meet the "public need" because it "serves only the profit motive of the pipeline developers."²²⁸ The Court noted that the relevant "criterion is 'market need'" and held this was demonstrated through contracts for 93% of the proposed capacity.²²⁹

Finally, the NGA provides two mechanisms for expediting approvals for a certificate holder. First, FERC relies on its Section 7(c) authority to issue "blanket" certificates.²³⁰ These certificates authorize pipeline operators to undertake some upgrades and expansions based on the initial finding of public convenience and necessary.²³¹ Second, FERC may bypass hearings and notification to "all interested persons" and fast-track a determination under a temporary certificate.²³² Temporary certificates are issued for infrastructure such as compressor stations "in cases of

emergency, to assure maintenance of adequate service or to serve particular customers.²³³ Persons seeking to object to such natural gas infrastructure would not be notified by FERC.

Challenging Eminent Domain Authority

In 1999 FERC observed that “landowners [have become] increasingly active before the Commission” and they “often object both to the taking of land and to the reduction of their land’s value due to a pipeline’s right-of-way running through the property.”²³⁴ Perhaps in response, the 1999 policy made clear that FERC would look more favorably on an applicant that has secured “all, or substantially all, of the necessary right-of-way by negotiation.”²³⁵ However,

[i]n most cases it will not be possible to acquire all the necessary right-of-way by negotiation. Under this policy, a few holdout landowners cannot veto a project, as feared by some commenters, if the applicant provides support for the benefits of its proposal that justifies the issuance of a certificate and the exercise of the corresponding eminent domain rights.²³⁶

Landowners have no due process rights to notice of agency proceedings to determine the need for condemnation.²³⁷ Therefore, states, local governments, or citizens groups that object to FERC certification may gain allies by alerting owners of property in or near a right-of-way about the certificate proceedings.

With the power of eminent domain, a natural gas company gains significant leverage in negotiations with landowners. The NGA does not require natural gas companies to engage in good faith negotiations.²³⁸ No collateral attacks on the certificate, or any of its terms and conditions, are permitted in eminent domain proceedings.²³⁹ Sometimes FERC will issue a “conditional” certificate, pending other approvals (see next section); a company can exercise eminent domain authority even under this provisional authorization.²⁴⁰

While the issues in an eminent domain proceeding are normally limited to the level of compensation,²⁴¹ some landowners have successfully challenged a condemnation that is broader than the scope of the certification; for instance, to oppose condemnation of land for future expansion.²⁴² In addition, companies may not use eminent domain to acquire rights-of-way for natural gas liquids such as propane or butane, because the NGA does not cover these products.²⁴³

In state proceedings over eminent domain authorities

for natural gas liquids pipelines, parties have successfully argued that eminent domain authority should not be granted when the purpose of the pipeline is only to serve a private interest such as servicing a single plastics production facility.²⁴⁴ While this case suggests state courts might see a difference between projects that provide fuel for electricity or residential heating, and those that service a single private enterprise, this distinction may be irrelevant for an NGA-jurisdictional pipeline. FERC’s determination of public convenience and necessity, based on its assessment of market need, may have a preemptive effect on these state claims.

In 2017 parties in Virginia filed a related argument about the constitutionality of eminent domain under the NGA. Their complaint alleges that the NGA eminent domain provision is unconstitutional, given that the statute provided no meaningful guideposts and enabled FERC to “run wild in the years since, and . . . unconstitutionally [delegate] the power of eminent domain to private parties seeking private profit.”²⁴⁵ While focused on eminent domain, this complaint also takes aim at FERC’s method of finding “public convenience and necessity.” The Virginia parties argue that FERC’s analysis is deficient because it, considers only whether the pipeline owner has found customers rather than “engaging in a comprehensive evaluation of need.”²⁴⁶ As of September 2017, this case is pending before the court in the Western District of Virginia.

Delaying Projects or Mitigating Their Effects with Federal Environmental Statutes

As noted, the NGA preempts most state and local authority but explicitly preserves states’ rights under the Coastal Zone Management Act, the Clean Air Act, and the Clean Water Act. For example, if a proposed project might result in a discharge into “waters of the United States,” then the state must certify that the discharge will comply with the Clean Water Act. In a few narrow instances, these statutory carve-outs might protect a local ordinance from preemption;

With the power of eminent domain, a natural gas company gains significant leverage in negotiations with landowners.

for instance, approval under an ordinance might be a precondition for state Clean Air Act approval under that states' Implementation Plan.²⁴⁷

A state may grant or deny approval, impose conditions, or affirmatively waive the requirement,²⁴⁸ but it may not refuse to act.²⁴⁹ States have faced litigation for approving²⁵⁰ and denying²⁵¹ permits; courts generally defer to the State. FERC may grant a conditional certificate before a State issues its environmental approvals.²⁵²

Urging Consideration of Climate Change Impacts

NEPA requires federal agencies to conduct an environmental review for any "major federal action"²⁵³ that has the potential to cause significant environmental effects. FERC conducts NEPA reviews consistent with regulations issued by the Council on Environmental Quality²⁵⁴ and FERC's supplemental regulations.²⁵⁵ In NEPA analyses, FERC considers the "benefits to the environment of natural gas consumption."²⁵⁶

Recently, climate advocates have used at least three NEPA regulatory requirements to challenge reviews of natural gas infrastructure. First, NEPA rules require FERC to consider "connected actions"²⁵⁷ in a review. In 2014, the D.C. Circuit held that FERC improperly issued multiple certifications for segmented parts of the Tennessee Gas Line, when they were clearly "physically, functionally, and financially connected and interdependent."²⁵⁸ A single review is more likely to find a significant impact and lead the Commission to set mitigating conditions or to consider alternatives to new construction. The court declined to extend this holding in 2015, deferring to FERC's finding that a compressor station project and a nearby LNG export facility project were "unrelated, and that neither depends on the other for its justification."²⁵⁹

Second, NEPA rules require FERC to consider "cumulative impacts."²⁶⁰ Challengers have argued that FERC should consider the cumulative impacts of all recently approved and proposed natural gas pipelines or LNG facilities. The D.C. Circuit has rejected this, holding FERC needs only consider cumulative impact in a particular geographic area.²⁶¹ While the Court left the door open for a future national cumulative review,²⁶² it suggested plaintiffs would need to show that a particular project would have national impacts.

—

Recently, climate advocates have used at least three NEPA regulatory requirements to challenge reviews of natural gas infrastructure.

Third, NEPA regulations require agencies to consider indirect environmental effects that "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."²⁶³ NEPA "requires a reasonably close causal relationship between the environmental effect and the alleged cause," analogous to proximate causation from tort law.²⁶⁴ Challengers have argued that FERC must consider the downstream uses of the natural gas in its environmental analysis.²⁶⁵

To determine if effects are "reasonably foreseeable," FERC must engage in "reasonable forecasting and speculation."²⁶⁶ On the one hand, the D.C. Circuit remanded FERC's NEPA review for the Southeast Market Pipelines Project, for failing to quantify the greenhouse gas emissions that would result from the burning of natural gas transported through the proposed pipeline.²⁶⁷ In response, FERC staff issued a draft supplemental analysis that quantifies these indirect emissions but concluded that the pipeline would not have a significant impact on the environment.²⁶⁸

On the other hand, the D.C. Circuit has upheld FERC's NEPA review of a proposed LNG terminal despite the Commission's failure to quantify the environmental effects of increased natural gas production as a result of export, because it was not "reasonably foreseeable" where that additional production will take place.²⁶⁹

More generally, the D.C. Circuit has concluded that FERC "is not required under NEPA to consider indirect effects of increased natural gas exports . . . including climate impacts,"²⁷⁰ because DOE licenses gas export, while FERC only licenses — and therefore, only controls — the terminal where export will take place.²⁷¹ The Court suggested challengers could raise these concerns with the DOE,²⁷² but then rejected a challenge to DOE's export approval in August 2017. There, the Court relied on a report

commissioned by DOE about the lifecycle emissions of exported gas to conclude that the Department had considered the indirect effects on U.S. natural gas production and global greenhouse gas emissions of exporting natural gas.²⁷³

Opponents of new natural gas infrastructure have also called on FERC to calculate the environmental costs of new projects using the Social Cost of Carbon.²⁷⁴ In 2016 the CEQ issued guidance directing federal agencies to build a Social Cost of Carbon into their NEPA reviews.²⁷⁵ Trump's March 28, 2017 Executive Order rescinded this guidance, and disbanded the Social Cost of Carbon working group.²⁷⁶

Nevertheless, agencies still face potential NEPA risk for failing to account for these environmental effects. For instance, in August 2017 the D.C. Circuit remanded a case to FERC for failing to explain why it did not apply the Social Cost of Carbon.²⁷⁷ In a proposed response to the court's directive, FERC staff repeated the Commission's justifications for not applying the Social Cost of Carbon for project-level NEPA reviews that it articulated in a 2015 order.²⁷⁸

Endnotes

- ¹ See U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks (1990–2015), Tbl. ES-6: U.S. Greenhouse Gas Emissions Allocated to Economic Sectors (showing total electric sector emissions); Tbl. 3-5: CO2 Emissions from Fossil Fuel Combustion by Fuel Type and Sector (showing natural gas sector emissions), <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2015>.
- ² Department of Energy Organization Act, Pub. L. 95-91, 91 Stat. 565 (Aug. 4, 1977), 42 U.S.C. § 7101 et seq.
- ³ 16 U.S.C. § 824(a); 15 U.S.C. § 717(a).
- ⁴ The FPA is littered with references to the “public interest.” FERC must consider the public interest when it evaluates major utility transactions (§ 203), security issuances (§ 204), and interconnection and wheeling requests (§§ 210, 211), and must account for the public interest in its reliability standards (§ 215), market price transparency rules (§ 220), market manipulation rules (§ 222), orders to require unregulated utilities to provide open-access transmission (§ 211A), and when it wields its limited transmission line siting authority (§ 216). These numerous references to the public interest require that FERC consider the statute’s core purposes when it makes decisions.
- ⁵ *Nat’l Ass’n for the Advancement of Colored People v. FPC*, 425 U.S. 662, 670 (1976).
- ⁶ Order No. 888, *Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Servs. by Pub. Util.*, 61 Fed. Reg. 21540, 21672 (1996) (“We are, in essence and by law, economic regulators.”).
- ⁷ *Id.* at 669 (holding that FERC does not have a “broad license to promote the general public welfare.”).
- ⁸ *Grand Council of Crees v. FERC*, 198 F.3d 950, 956 (D.C. Cir. 2000). The court’s decision explicitly leaves the door open for FERC to change its position, a move that would undoubtedly be challenged in court.
- ⁹ See, e.g., Jesse D. Jenkins and Samuel Thernstrom, Energy Innovation Reform Project, “Deep Decarbonization of the Electric Power Sector: Insights from Recent Literature.” (Mar. 2017), <http://innovationreform.org/wp-content/uploads/2017/03/EIRP-Deep-Decarb-Lit-Review-Jenkins-Thernstrom-March-2017.pdf>.
- ¹⁰ See, e.g., FERC Order No. 764, Integration of Variable Energy Resources, 139 FERC ¶ 61,246 (2012); FERC Order No. 745, Compensation for Demand Response in RTO Markets, 134 FERC ¶ 61,187; Samuel Newell, Presentation: The Future of Wholesale Electricity Market Design with the Growth of Low-Carbon Generation (June 8, 2016), http://www.brattle.com/system/publications/pdfs/000/005/359/original/The_Future_of_Wholesale_Electricity_Market_Design.pdf?1475081019 (highlighting that 3 RTOs have provided or proposed to provide new ancillary services products to support intermittent resources).
- ¹¹ RICHARD F. HIRSH, POWER LOSS: THE ORIGINS OF DEREGULATION AND RESTRUCTURING IN THE AMERICAN ELECTRIC UTILITY SYSTEM Figs. A2, A3 (1999); U.S. Energy Information Administration, Electric Power Annual 2015, Tbl. 3.1A (Net generation by energy source: Total); Tbl. 3.3.A (Net generation by energy source: Independent power producers), <https://www.eia.gov/electricity/annual/>.
- ¹² Jeffrey D. Watkiss & Douglas W. Smith, *The Energy Policy Act of 1992: A Watershed for Competition in the Wholesale Power Market*, 10 YALE J. ON REG. 447, 454 (1993).
- ¹³ James F. Fairman & John C. Scott, *Transmission, Power Pools, and Competition in the Electric Utility Industry*, 28 HASTINGS L.J. 1159, 1169–70 (1977).
- ¹⁴ Jeffrey D. Watkiss & Douglas W. Smith, *The Energy Policy Act of 1992: A Watershed for Competition in the Wholesale Power Market*, 10 YALE J. ON REG. 447, 449 (1993).
- ¹⁵ FERC Order No. 888, *Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Servs. by Pub. Util.*, 75 FERC ¶ 61,080 (1996).
- ¹⁶ Order No. 2000, 89 FERC ¶ 61,285 (1999); see also *Midwest Transmission Owners v. FERC*, 373 F.3d 1361, 1364 (D.C. Cir. 2004) (“In FERC’s view, inefficiencies in the transmission grid and lingering opportunities for transmission owners to discriminate in their own favor remained obstacles to robust competition in the wholesale electricity market.”).
- ¹⁷ For more detail on economic dispatch, see Federal Energy Regulatory Commission, Security Constrained Economic Dispatch: Definitions, Practices, and Recommendations (Jul. 31, 2006), <https://www.ferc.gov/industries/electric/indus-act/joint-boards/final-cong-rpt.pdf>.
- ¹⁸ See *Maryland Pub. Serv. Comm’n. v. PJM Interconnection, LLC*, 127 FERC ¶ 61,274 at P 15 (2009) (“The single price auction employed by PJM simulates the rates produced in a competitive market in which the same price is paid to all suppliers based on the marginal cost of the least efficient supplier necessary to serve that market.”).
- ¹⁹ Monitoring Analytics, State of the Market Report for PJM: Volume 2, Tbl. 1-8 (Mar. 9, 2017), http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2016/2016-som-pjm-volume2.pdf; PJM, Energy Price Formation and Valuing Flexibility, Fig. 1 (Jun. 15, 2017), <http://www.pjm.com/-/media/library/reports-notices/special-reports/20170615-energy-market-price-formation.ashx>; ISO-New England Internal Market Monitor, 2016 Annual Markets Report, Tbl. 1-1 (May 30, 2017), https://www.iso-ne.com/static-assets/documents/2017/05/annual_markets_report_2016.pdf; Potomac Economics, 2016 State of the Market Report, Fig. 1 (May 2017), http://www.nyiso.com/public/webdocs/markets-operations/documents/Studies_and_Reports/Reports/Market_Monitoring_Unit_Reports/2016/NYISO_2016_SOM_Report_5-10-2017.pdf.
- ²⁰ Brendan Pierpont, et al., Climate Policy Initiative, Flexibility: The Path to Low-Carbon, Low-Cost Electricity Grids (Apr. 2017), <https://climatepolicyinitiative.org/wp-content/uploads/2017/04/CPI-Flexibility-the-path-to-low-carbon-low-cost-grids-April-2017.pdf>; Erik Ela, et al., National Renewable Energy Laboratory, Evolution of Wholesale Electricity Market Design with Increasing Levels of Renewable Generation (Sept. 2014), <https://www.nrel.gov/docs/fy14osti/61765.pdf>; California Public Utilities Commission Staff, Beyond 33% Renewables: Grid Integration for a Low-Carbon Future, at p. 17 (Nov. 25, 2015), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Reports_and_White_Papers/Beyond33PercentRenewables_GridIntegrationPolicy_Final.pdf; William W. Hogan and Susan L. Pope, Priorities for the Evolution of an Energy-Only Electricity Market Design, at p. 32 (May 9, 2017), https://sites.hks.harvard.edu/fs/whogan/Hogan_Pope_ERCOT_050917.pdf (“For several years, ISOs experiencing increases in intermittent generation have been studying the possible need for new requirements for regulation, inertial response and operating reserves.”); Samuel Newell, Presentation: The Future of Wholesale Electricity Market Design with the Growth of Low-Carbon Generation (June 8, 2016), http://www.brattle.com/system/publications/pdfs/000/005/359/original/The_Future_of_Wholesale_Electricity_Market_Design.pdf?1475081019 (highlighting that 3 RTOs have provided or proposed to provide new ancillary services products to support intermittent resources).
- ²¹ See Uday Varadarajan, et al., Climate Policy Initiative, The Impacts of Policy on the Financing of Renewable Projects: A Case Study (Oct. 3, 2011), <http://climatepolicyinitiative.org/wp-content/uploads/2011/12/Policy-Impacts-on-Financing-of-Renewables.pdf>; Jurgen Weiss and Mark Sarro, The Brattle Group, The Importance of Long-Term Contracting for Facilitating Renewable Energy Project Development (May 7, 2013), http://www.brattle.com/system/publications/pdfs/000/004/927/original/The_Importance_of_Long-Term_Contracting_for_Facilitating_Renewable_Energy_Project_Development_Weiss_Sarro_May_7_2013.pdf?1380317003; see also American Public Power Association, Power Plants Are Not Built on Spec: 2014 Update, http://www.publicpower.org/files/PDFs/94_2014_Power_Plant_Study.pdf.
- ²² U.S. Energy Information Administration, July 2017 Monthly Energy Review, Tbl. 7.2a: Electricity Net Generation Total (All Sectors).
- ²³ ISO New England, Resource Mix, <https://www.iso-ne.com/about/key-stats/resource-mix>.
- ²⁴ PJM, System Mix By Fuel, <https://gats.pjm-eis.com/GATS2/PublicReports/PJMSystemMix/Filter>.
- ²⁵ U.S. Energy Information Administration, Coal Data Browser, <https://www.eia.gov/beta/coal/data/browser/>; Natural Gas Gross Withdrawals and Production, Dry Production, https://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_FPD_mmcf_a.htm.
- ²⁶ Historical data from the Energy Information Administration shows only 321 MW of coal capacity added to New England region since 1970: Indian Orchard Plant 1 (5.7 MW, 1985); AES Thames (214 MW, 1989); Rumford

- Cogenerator (102 MW, 1990). See *U.S. Energy Information Administration, Form EIA-860*, <https://www.eia.gov/electricity/data/eia860/>.
- ²⁷ 16 U.S.C. § 824(b).
- ²⁸ *Hughes v. Talen*, 136 S. Ct. 1288, 1291 (2016); *Nantahala Power & Light Co. v. Thornburg*, 476 U.S. 953, 966 (1986).
- ²⁹ 16 U.S.C. § 824d.
- ³⁰ *City of Winnfield v. FERC*, 744 F.2d 871, 875 (D.C. Cir. 1984).
- ³¹ *Wis. Pub. Power v. FERC*, 493 F.3d 239, 260 (D.C. Cir. 2007).
- ³² 16 U.S.C. § 824e.
- ³³ *FirstEnergy Serv. Co. v. FERC*, 758 F.3d 346, 353 (D.C. Cir. 2014).
- ³⁴ 16 U.S.C. § 824(e).
- ³⁵ *Morgan Stanley Capital Grp Inc. v. Pub. Util. Dist. No. 1 of Snohomish Cty.*, 554 U.S. 527, 537 (2008) (citing FERC Order No. 697, 119 FERC ¶ 61,295 at P 7 (2007)); see also FERC Order No. 697, 119 FERC ¶ 61,295 (2007).
- ³⁶ *FPC v. Hope Nat. Gas Co.*, 320 U.S. 591, 603 (1944).
- ³⁷ *Id.* at 612.
- ³⁸ *Id.* at 603.
- ³⁹ *Morgan Stanley Capital Grp Inc. v. Pub. Util. Dist. No. 1 of Snohomish Cty.*, 554 U.S. 527, 532 (2008).
- ⁴⁰ *FERC v. Elec. Power Supply Ass'n*, 136 S.Ct. 768 (2016) (quoting *Morgan Stanley Capital Grp.*, 554 U.S. at 536).
- ⁴¹ Joel Eisen, *FERC's Expansive Authority to Transform the Electric Grid*, 49 U.C. DAVIS L. REV. 1783, 1799-1802 (2016) (tracing the prohibition against undue discrimination to turn-of-the-century railroad regulation and summarizing that early cases understood discrimination to refer to unlawful practices or advantages).
- ⁴² See, e.g., *Elec. Consumers Res. Council v. FERC*, 747 F.2d 1511 (D.C. Cir. 1984); ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS: ECONOMIC PRINCIPLES 63 (1970) (“The rule that individual rates not be unduly discriminatory similarly has been defined in terms of the respective costs of the various services.”).
- ⁴³ Transmission Access Policy Grp. v. FERC, 225 F.3d 667, 684 (D.C. Cir. 2000), *aff'd* New York v. FERC, 535 U.S. 1 (2002).
- ⁴⁴ See, e.g., Order No. 764, *Integration of Variable Energy Resources*, 139 FERC ¶ 61,246 at PP 6–9 (2012); Order No. 792, *Small Generator Interconnection Agreements & Procedures*, 145 FERC ¶ 61,159 at PP 15, 21–23 (2013).
- ⁴⁵ *Morgan Stanley Capital Grp.*, 554 U.S. at 532.
- ⁴⁶ *Elec. Power Supply Ass'n*, 136 S. Ct. at 764–765.
- ⁴⁷ See, e.g., Supplemental Notice of Proposed Rulemaking and Notice of Technical Conference, FERC Docket No. RM10-17-000 (Aug. 2, 2010).
- ⁴⁸ *Sithe/Independence Power Partners, L.P. v. FERC*, 165 F.3d 944, 948 (D.C. Cir. 1999).
- ⁴⁹ 16 U.S.C. § 8251.
- ⁵⁰ FERC Docket No. AD14-14-000, Staff Analysis of Uplift in RTO Markets (Aug. 2014), <https://www.ferc.gov/legal/staff-reports/2014/08-13-14-uplift.pdf>.
- ⁵¹ Monitoring Analytics, 2016 State of the Market Report for PJM: Volume 2, Fig. 3-3 (Mar. 9, 2017), http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2016/2016-som-pjm-volume2.pdf; see also Kenneth Rose, The Impact of Fuel Costs on Electric Power Prices (June 2007), <https://www.publicpower.org/files/PDFs/ImpactofFuelCostsonElectricPowerPrices.pdf>.
- ⁵² U.S. Energy Information Administration, *Rising Solar Generation in California Coincides with Negative Wholesale Electricity Prices* (Mar. 11, 2017), <https://www.eia.gov/todayinenergy/detail.php?id=30692>; U.S. Energy Information Administration, *California Electricity Mix in 2017 Has Involved More Renewables, Less Natural Gas* (May 17, 2017), <https://www.eia.gov/todayinenergy/detail.php?id=31252>.
- ⁵³ U.S. Energy Information Administration, “Wholesale Power Price Maps Reflect Real-Time Constraints on Transmission of Electricity (Sept. 20, 2011), <https://www.eia.gov/todayinenergy/detail.php?id=3150>.
- ⁵⁴ *Sacramento Mun. Util. Dist. v. FERC*, 616 F.3d 520, 524 (D.C. Cir. 2010).
- ⁵⁵ Map downloaded from Avalon Energy Services, <http://www.avalonenergy.us/blog/?p=436>.
- ⁵⁶ International Energy Agency, “Tackling Investment Challenges in Power Generation in IEA Countries,” p. 116 (2007).
- ⁵⁷ FERC Docket No. AD14-14-000, Staff Analysis of Uplift in RTO Markets (Aug. 2014) <https://www.ferc.gov/legal/staff-reports/2014/08-13-14-uplift.pdf>.
- ⁵⁸ Testimony of Susan Pope on behalf of the Electric Power Supply Association, “Price Formation in ISOs and RTOs: Principles and Improvements,” at pp. ii, 25–34, FERC Docket No. AD14-14 (Oct. 2014); Ezra Hausman et al, Synapse Energy Economics, “LMP Markets: Market Operations, Market Power, and Value for Consumers (Feb. 5, 2006), at pp. 14–15, <https://www.publicpower.org/files/PDFs/SynapseLMPElectricityMarkets013107.pdf>.
- ⁵⁹ PJM, *Energy Price Formation and Valuing Flexibility*, FERC Docket No. RM17-3-000 (Jun. 15, 2017) <http://www.pjm.com/-/media/library/reports-notices/special-reports/20170615-energy-market-price-formation.aspx>; see also MidContinent ISO, *Presentation on Extended Locational Marginal Pricing* (Apr. 2017), <https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/Training%20Materials/200%20Level%20Training/Level%20200%20-%20Extended%20Locational%20Marginal%20Pricing%20ELMP.pdf>.
- ⁶⁰ See FERC Docket No. AD14-14.
- ⁶¹ NOPR: Fast-Start Pricing in RTO Markets, Docket No. RM17-3-000 (Dec. 15, 2016); Uplift Cost Allocation and Transparency in RTO Markets, Docket No. RM17-2-000 (Jan. 19, 2017).
- ⁶² *New England Power Pool & ISO New England, Inc.*, 102 FERC ¶ 61,248 at P 12 (2002); see also *PJM Interconnection, LLC*, 110 FERC ¶ 61,053 at P 31 (2004); see also *PJM Interconnection, Inc.*, 81 FERC 61,257, 62,253 (stating that “the LMP model will promote efficient trading and be compatible with competitive market mechanisms. . . . and also send price signals that are likely to encourage efficient location of new generating resources, dispatch of new and existing generating resources, and expansion of the transmission system”); FERC Docket No. AD14-14-000, Staff Analysis of Energy Offer Mitigation in RTO and ISO Markets (Oct. 2014), <https://www.ferc.gov/legal/staff-reports/2014/AD14-14-mitigation-rto-iso-markets.pdf> (stating that LMPs are “designed to encourage competitive, efficient outcomes through resource offers made consistent with marginal cost bidding”); see also William W. Hogan and Susan L. Pope, “Priorities for the Evolution of an Energy-Only Electricity Market Design in ERCOT,” Public Utility Commission of Texas, Project No. 40000 (May 9, 2017), https://sites.hks.harvard.edu/fs/hogan/Hogan_Pope_ERCOT_050917.pdf.
- ⁶³ American Public Power Association, “Power Plants Are Not Built on Spec: 2014 Update,” http://www.publicpower.org/files/PDFs/94_2014_Power_Plant_Study.pdf.
- ⁶⁴ Hausman, *supra* note 59.
- ⁶⁵ Order No. 745, 134 FERC ¶ 61,187 at P 59 (2011).
- ⁶⁶ Order No. 745 at PP 48, 53.
- ⁶⁷ Comment of Environmental Defense Fund, Docket No. RM10-17-000 (Oct. 13, 2010).
- ⁶⁸ Comment of the Pennsylvania Department of Environmental Protection, Docket No. RM10-17-000 (May 13, 2010).
- ⁶⁹ Order No. 745 at P 8.
- ⁷⁰ *Elec. Power Supply Ass'n*, 136 S.Ct. at 768 (quoting *Morgan Stanley Capital Grp.*, 554 U.S. at 536).
- ⁷¹ Notice of Proposed Rulemaking: Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, Docket No. RM16-23-000 at P 12 (Nov. 17, 2016).
- ⁷² *Id.* at P 129.
- ⁷³ See FERC, Major Orders and Regulations, <https://www.ferc.gov/legal/maj-ord-reg.asp>.
- ⁷⁴ FERC Order No. 825, 155 FERC ¶ 61,276 (2016).
- ⁷⁵ *Id.* at PP 19, 53–56.
- ⁷⁶ For a discussion of shortage pricing, see FERC, *Price Formation in Organized Wholesale Electricity Markets: Staff Analysis of Shortage Pricing in RTO and ISO Markets*, Docket No. AD14-14-000 (Oct. 2014).
- ⁷⁷ Comment of Potomac Economics, Docket No. RM15-24-000 (Dec. 1, 2015).
- ⁷⁸ Comment of Entergy Nuclear Power Marketing, Docket No. RM15-24-000 (Nov. 30, 2015).
- ⁷⁹ A coalition of public interest organizations commented that demand response energy efficiency, and storage resources would benefit from rule. Comment of Nine Public Interest Organizations, Docket No. RM15-24-000 (Nov. 30, 2015) (stating that the rule would “complement the increasing automation” of demand response, storage, and energy efficient).
- ⁸⁰ Order No. 825 at P 56.
- ⁸¹ Judy W. Chang, et al, The Brattle Group, *Advancing Past “Baseload” to a Flexible Grid* (Jun. 26, 2017), http://www.brattle.com/system/publications/pdfs/000/005/456/original/Advancing_Past_Baseload_to_a_Flexible_Grid.pdf?1498482432; Sonia Aggarwal and Robbie Orvis, Energy Innovation, *Grid Flexibility: Methods for Modernizing the Power Grid* (Mar. 2016), <http://energyinnovation.org/wp-content/uploads/2016/05/Grid-Flexibili->

- [ry-report.pdf](#).
- ⁸² *PJM Interconnection*, 157 FERC ¶ 61,229 at P 11 (2016).
- ⁸³ Order No. 2000, 89 FERC ¶ 61,285 at p. 152 (1999); Order No. 719, 125 FERC ¶ 61,071 at P 503 (2008).
- ⁸⁴ Order No. 719 at P 507.
- ⁸⁵ For a summary of FERC's requirements, see Christina Simeone, University of Pennsylvania Kleinman Center for Energy Policy, *PJM Governance: Can Reforms Improve Outcomes?* at p. 14 (May 19, 2017), <http://kleinmanenergy.upenn.edu/paper/pjm-governance>.
- ⁸⁶ *Id.* at p. 9–11, 13.
- ⁸⁷ *NRG Power Marketing, LLC v. FERC*, 862 F.3d 108 (D.C. Cir. 2017).
- ⁸⁸ *PJM Interconnection*, 151 FERC ¶ 61,208 at P 27 (2015).
- ⁸⁹ *Id.* at P 42.
- ⁹⁰ *PJM Interconnection*, Order on Rehearing, 155 FERC ¶ 61,157 at P 59 (2016).
- ⁹¹ *PJM Interconnection*, 151 FERC ¶ 61,208 at P 99 (2015).
- ⁹² Final Joint Opening Brief of Petitioners, Advanced Energy Mgmt. Alliance v. FERC, Docket No. 16-1234 (D.C. Cir. Jan. 10, 2017).
- ⁹³ *Advanced Energy Management Alliance v. FERC*, 2017 WL 2636455 (D.C. Cir. 2017).
- ⁹⁴ ISO-NE Filing, Docket No. ER14-1639-000 (Apr. 1, 2014).
- ⁹⁵ *ISO-NE*, 155 FERC ¶ 61,023 at PP 23–29 (2016).
- ⁹⁶ *PJM Interconnection*, 135 FERC ¶ 61,022 at P 153 (2011).
- ⁹⁷ *New York Public Services Commission, et al. v. New York Independent System Operator, Inc.*, 153 FERC ¶ 61,022 at P 51 (2015).
- ⁹⁸ See FERC Docket ER16-1404.
- ⁹⁹ *N.J. Bd. of Pub. Utils. v. FERC*, 744 F.3d 74, 95–98 (3rd Cir. 2014).
- ¹⁰⁰ *Hughes v. Talen*, 136 S.Ct. 1288 (2016).
- ¹⁰¹ *New York Public Services Commission, et al. v. New York Independent System Operator, Inc.*, 158 FERC ¶ 61,137 at (2017).
- ¹⁰² See <https://statepowerproject.org/new-york/> and <https://statepowerproject.org/illinois/>.
- ¹⁰³ *Coalition for Competitive Electricity, et al. v. Zibelman*, 2017 WL 3172866 (S.D.N.Y. 2017); *Electric Power Supply Association, et al. v. Star*, 2017 WL 3008289 (N.D.Ill. 2017).
- ¹⁰⁴ *Electric Power Supply Association et al., Motion to Amend, and Amendment to, Complaint; Docket No. EL16-49-000* (Jan. 9, 2017); see also *Electric Power Supply Association, Request for Expedited Action*, Docket No. EL13-62-002 (Jan. 9, 2017).
- ¹⁰⁵ *New York Public Services Commission, et al. v. New York Independent System Operator, Inc.*, 158 FERC ¶ 61,137 (2017) (Bay concurrence).
- ¹⁰⁶ Database of State Incentives for Renewable Energy, *Renewable Portfolio Standards* (July 2017), <http://www.dsireusa.org/resources/detailed-summary-maps/>.
- ¹⁰⁷ See, e.g., MASS. GEN. LAWS ch 188, § 12C (2016).
- ¹⁰⁸ See, e.g., *Kain v. Dept. of Env't Prot.*, 474 Mass. 278 (2016) (concluding that the Global Warming Solutions Act, which requires economy-wide 80% CO₂ reductions by 2050, requires state regulators to set emission limits to achieve the Act's target).
- ¹⁰⁹ NESCOE, POLICIES AND MARKETS PROBLEM STATEMENT I (May 17, 2016), http://www.nepool.com/uploads/IMAP_20160517_Problem_Statement.pdf.
- ¹¹⁰ Notice of Technical Conference, Docket No. AD17-11-000.
- ¹¹¹ ISO-NE, Discussion Paper for Competitive Auctions with Subsidized Policy Resources (Apr. 24, 2017), https://www.iso-ne.com/static-assets/documents/2017/04/caspr_discussion_paper_april_14_2017.pdf.
- ¹¹² PJM, Capacity Market Repricing Proposal (June 12, 2017), <http://pjm.com/-/media/library/reports-notices/special-reports/20170502-capacity-market-repricing-proposal.ashx>.
- ¹¹³ PJM, Advancing Zero-Emissions Objectives through PJM's Energy Markets (May 2, 2017), <http://pjm.com/-/media/library/reports-notices/special-reports/20170502-advancing-zero-emission-objectives-through-pjms-energy-markets.ashx>.
- ¹¹⁴ Nicole Bouchez, NYISO, Integrating Public Policy Project: Market Impact Assessment (May 19, 2017), http://www.nyiso.com/public/webdocs/markets_operations/committees/environmental_advisory_council/meeting_materials/2017-05-19/EAC_Market_Impact_Integrating_Public_Policy_Bouchez.pdf.
- ¹¹⁵ See *EPSA*, 136 S.Ct. at 776 (“the Commission's justifications for regulating demand response are all about, and only about, improving the wholesale market”); *id.* (noting that it is “of no legal consequence” that when FERC “takes virtually any action respecting wholesale transactions—it has some effect, in either the short or the long term” on matters within state jurisdiction).
- ¹¹⁶ *Cal. Indep. Sys. Operator Corp.*, 141 FERC ¶ 61,237 at P 29 (2012). The ISO explained in its transmittal letter it performs economic dispatch based on resources' bids and various cost data. Transmittal Letter, FERC Docket No. ER13-219 (Oct. 29, 2012).
- ¹¹⁷ *Cal. Indep. Sys. Operator Corp.*, 147 FERC ¶ 61,231 (2014).
- ¹¹⁸ California ISO, Regional Integration and EIM Greenhouse Gas Compliance, <http://www.caiso.com/informed/Pages/StakeholderProcesses/RegionalIntegrationEIMGreenhouseGasCompliance.aspx>.
- ¹¹⁹ Rick Perry Memorandum to the Chief of Staff (Apr. 14, 2017), https://s3.amazonaws.com/dive_static/paychek/energy_memo.pdf; Kevin Steinberger and Miles Farmer, Natural Resources Defense Council, “Debunking Three Myths About Baseload” (Jul. 10, 2017), <https://www.nrdc.org/experts/kevin-steinberger/debunking-three-myths-about-baseload>. Mark Hand, ThinkProgress, “Rick Perry Called Out for ‘Thinly Disguised’ Attempt to Undermine Renewable Energy” (May 1, 2017), <https://thinkprogress.org/senators-attack-doe-grid-study-6d09434fa84a/> (noting that U.S. Senators sent a letter to Perry criticizing the memo); Robert Walton, UtilityDive, “GOP Sen. Grassley Questions DOE Baseload Review in Letter to Perry” (May 18, 2017), <http://www.utilitydive.com/news/gop-sen-grassley-questions-doe-baseload-review-in-letter-to-perry/443003/>.
- ¹²⁰ Judy W. Chang, et al., Advancing Past ‘Baseload’ to a Flexible Grid (Jun. 26, 2017), http://www.brattle.com/system/publications/pdfs/000/005/456/original/Advancing_Past_Baseload_to_a_Flexible_Grid.pdf?1498482432; Paul Hibbard, et al., Electricity Markets, Reliability and the Evolving U.S. Power System (Jun. 2017), http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/ag_markets_reliability_final_june_2017.pdf.
- ¹²¹ Department of Energy, Staff Report to the Secretary of Energy on Electricity Markets and Reliability (Aug. 2017), https://energy.gov/sites/prod/files/2017/08/f36/Staff%20Report%20on%20Electricity%20Markets%20and%20Reliability_0.pdf.
- ¹²² See *supra*, note 20.
- ¹²³ 42 U.S.C. § 7173; FERC Order No. 30 (May 17, 1979) (noting that the rule was proposed by the Economic Regulatory Administration of DOE).
- ¹²⁴ Proposed Grid Resiliency Pricing Rule, FERC Docket No. RM18-1 (Sep. 29, 2017).
- ¹²⁵ Motion of Richard J. Pierce in Opposition to Proposal, FERC Docket No. R18-1 (Oct. 5, 2017).
- ¹²⁶ The petition was filed under FERC's procedural rules that allow any person to petition for “a declaratory order . . . to terminate a controversy or remove uncertainty.” 18 C.F.R. § 385.207. A declaratory order “represents a binding statement of policy.” Obtaining Guidance on Regulatory Requirements, 123 FERC ¶ 61,157 at P 21 (2008). However, one federal appeals court has downplayed their significance, concluding that a declaratory order is “akin to an informal guidance letter.” *Exelon Wind 1, L.L.C. v. Nelson*, 766 F.3d 380, 391–92 (5th Cir. 2014). Regardless of its precise legal effect, FERC's declaratory orders influence market participants and the industry's development.
- ¹²⁷ Advanced Energy Economy, Petition for Declaratory Order, Docket No. EL17-75 at p. 3 (Jun. 2, 2017).
- ¹²⁸ *Nat'l Ass'n for the Advancement of Colored People* 425 U.S. at 670.
- ¹²⁹ *Emera Maine v. FERC*, 854 F.3d 9 (D.C. Cir. 2017).
- ¹³⁰ *Hope*, 320 U.S. at 603.
- ¹³¹ *Emera Maine*, 854 F.3d at 17.
- ¹³² 16 U.S.C. § 824s; Order No. 679, 116 FERC ¶ 61,057 (2006); Policy Statement, 141 FERC ¶ 61,129 (2012).
- ¹³³ Order No. 697 at P 42.
- ¹³⁴ *Id.* at P 52.
- ¹³⁵ Order No. 1000, *Transmission Planning and Cost Allocation by Transmission Owning and Operating Pub. Util.*, 136 FERC ¶ 61,051 at P 82 (2011).
- ¹³⁶ *Id.* at P 83.
- ¹³⁷ *PJM Interconnection, LLC*, 142 FERC ¶ 61,216 at 67 (2013).
- ¹³⁸ Order No. 890-A, 121 FERC ¶ 61,297 at P 251 (2007).
- ¹³⁹ Order No. 1000 at P 622.
- ¹⁴⁰ *Midwest Indep. Transmission Sys. Operator, Inc.*, 133 FERC ¶ 61,221 at PP 18–25, 33 (2010).
- ¹⁴¹ *Id.* at P 118; *Illinois Commerce Comm'n. v. FERC*, 721 F.3d 764, 771 (7th Cir. 2013).
- ¹⁴² *Midwest Indep. Transmission Sys. Operator, Inc.*, 133 FERC ¶ 61,221 at P 3.
- ¹⁴³ *S.C. Pub. Serv. Auth. v. FERC*, 762 F.3d 41, 89 (D.C. Cir. 2014).
- ¹⁴⁴ *ISO-New England*, 150 FERC ¶ 61,209 at P 126 (2015).
- ¹⁴⁵ FERC Order No. 1000 at PP 435, 437.
- ¹⁴⁶ American Electric Power, “Getting Effective Transmission Built on the MISO-SPP Seam,” (Mar. 2016), <https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/Workshops%20and%20>

- [Special%20Meetings/2016/IPSAC/20160309%20MISO%20SPP%20IP-SAC/20160309%20MISO-SPP%20IPSAC%20Item%2002%20Annual%20Issues%20AEP.pdf](#); Southwest Power Pool, Inc., Pre-Technical Conference Comments, FERC Docket No. AD16-18-000 (May 31, 2016) (noting that five years after FERC finalized Order No. 1000, no interregional projects have been developed).
- ¹⁴⁷ *Id.*
- ¹⁴⁸ WIRES, Pre-Technical Conference Comments, FERC Docket No. AD16-18-000 (May 31, 2016).
- ¹⁴⁹ Order No. 1000 at P 148.
- ¹⁵⁰ *Id.* at P 155.
- ¹⁵¹ Shelley Welton, *Non-Transmission Alternatives*, 39 HARVARD ENV'T L REV. 457, 513 (2015).
- ¹⁵² *Id.* at 498.
- ¹⁵³ Order No. 661, 111 FERC ¶ 61,353 at PP 11, 50, 98 124 (2005).
- ¹⁵⁴ Order No. 827, 155 FERC ¶ 61,277 at P 24 (2016).
- ¹⁵⁵ 16 U.S.C. § 824o.
- ¹⁵⁶ NERC, "History of NERC," <http://www.nerc.com/AboutNERC/Documents/History%20AUG13.pdf>.
- ¹⁵⁷ NERC, "Standards," <http://www.nerc.com/pa/Stand/Pages/default.aspx>.
- ¹⁵⁸ NERC and CAISO, "Maintaining Bulk Power System Reliability While Integrating Variable Energy Resources – CAISO Approach" (Nov. 2013), <http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC-CAISO-VG-Assessment-Final.pdf>.
- ¹⁵⁹ See, e.g. Reply Brief of Petitioners on Procedural and Record-Based Issues, *West Virginia, et al. v. EPA*, D.C. Cir. Case No. 15-1363 (Apr. 15, 2016) (arguing that the EPA "did not respond to concerns expressed by NERC" about new infrastructure that would be necessary to meet the rule's targets).
- ¹⁶⁰ *Piedmont Environmental Council v. FERC*, 558 F.3d 304 (4th Cir. 2009).
- ¹⁶¹ 16 U.S.C. § 824a—3. These provisions of PURPA are codified in the US Code as part of the Federal Power Act.
- ¹⁶² 18 C.F.R. §§ 292.203–205.
- ¹⁶³ FERC Order No. 69; 45 Fed. Reg. 12,214 (Feb. 25, 1980); 16 U.S.C. § 824a—3(b), (d).
- ¹⁶⁴ *American Paper Institute, et al. v. American Electric Power*, 461 U.S. 401, 404–05 (1983).
- ¹⁶⁵ *Id.* at 415.
- ¹⁶⁶ *California Public Utilities Commission*, 133 FERC ¶ 61,059 at P 24 (2010) (stating that it is "reluctant to second guess the state commission's determinations").
- ¹⁶⁷ 16 U.S.C. § 824a—3(h).
- ¹⁶⁸ *FLS Energy*, 157 FERC ¶ 61,211 at P 24 (2016) (citing *JD Wind I*, 129 FERC ¶ 61,148, at P 25 (2009), *reh'g denied*, 130 FERC ¶ 61,127 (2010); *Merrick v. Diageo Americas Supply, Inc.*, 805 F.3d 685 (6th Cir. 2015); see also *Little v. Louisville Gas & Electric Co.*, 805 F.3d 695, 698 (6th Cir. 2015)).
- ¹⁶⁹ *FLS Energy*, 157 FERC ¶ 61,211 at PP 20, 23 (2016).
- ¹⁷⁰ *Southern Maryland Electric Cooperative*, 157 FERC ¶ 61,118 (2016) (dismissing the complaint for procedural reasons).
- ¹⁷¹ *Hydrodynamics Inc.*, 146 FERC ¶ 61,193, at P 32 (2014) (stating that a utility or state is forbidden from using a competitive solicitation as the sole mechanism for obtaining a long-term contract);
- ¹⁷² *Windham Solar LLC and Allico Finance Limited*, 157 FERC ¶ 61,134 (stating that "a legally enforceable obligation should be long enough to allow QFs reasonable opportunities to attract capital from potential investors").
- ¹⁷³ 16 U.S.C. § 824a—3(m).
- ¹⁷⁴ 18 C.F.R. § 292.309; *Public Service Co. of New Hampshire*, 131 FERC ¶ 61,027 at P 18 (2010). Prior to PURPA's enactment in 1978, non-utility generators would have had to negotiate with utilities to connect to the grid and sell power. Utilities would have been unlikely to welcome to the competition. By 2005, open access transmission and regional wholesale markets made it far easier for new entrants to connect and sell power. Congress therefore allowed utilities to petition for exemptions from PURPA.
- ¹⁷⁵ U.S. Energy Information Administration ("EIA"), U.S. Natural Gas Gross Withdrawals, <https://www.eia.gov/dnav/ng/hist/n9010us2A.htm> (showing a 38% increase in 2016 from 2006 production). Unconventional oil production has likewise grown. EIA, U.S. Field Production of Oil, <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPUS1&f=M> (showing a 64% increase in the same time period). However, we do not focus on oil because FERC does not permit the infrastructure for this commodity. *But see* Department of Energy Organization Act, Section 306, Pub. L. 95-91 (Aug. 4, 1977), 91 Stat. 581, 42 U.S.C. § 7155 (authorizing FERC to oversee rates and services of interstate transportation of oil by pipeline).
- ¹⁷⁶ See EIA, Natural Gas Consumption by End Use, https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm.
- ¹⁷⁷ See, e.g., de Gouw, J. A., Parrish, D. D., Frost, G. J., and Trainer, M. Reduced Emissions of CO₂, NO_x, and SO₂ from U.S. Power Plants Owning to Switch from Coal to Natural Gas with Combined Cycle Technology, *EARTH'S FUTURE* (February 2014).
- ¹⁷⁸ *Id.*; see also Trevor Houser et al., Columbia University Center on Global Energy Policy, Can Coal Make a Comeback? (Apr. 2017) (estimating that "natural gas is responsible for 48.9% of the decline in coal production nationwide"); EIA, Natural Gas Expected to Surpass Coal in Mix of Fuel Used for U.S. Power Generation in 2016 (March 16, 2016) <https://www.eia.gov/todayinenergy/detail.php?id=25392>; Walter J. Culver et al., *Coal's Decline: Driven by Policy or Technology?*, *THE ELECTRICITY JOURNAL* (2016).
- ¹⁷⁹ David Biello, *Fact or Fiction? Natural Gas Will Reduce Global Warming Pollution*, *SCIENTIFIC AMERICAN* (Aug. 3, 2015); Darren Sweeney, Moody's: Fall in Natural Gas Prices May Lead to Large-Scale Plant Retirements, *SNL MarketWeek* (Apr. 8, 2016), <https://www.snl.com/InteractiveX/Article.aspx?cid=A-36007486-11568>; Staff Report to the Secretary on Electricity Markets and Reliability, U.S. Dept of Energy (Aug. 2017), https://energy.gov/sites/prod/files/2017/08/f36/Staff%20Report%20on%20Electricity%20Markets%20and%20Reliability_0.pdf
- ¹⁸⁰ Ramon Alvarez et al., *Greater Focus Needed on Methane Leakage from Natural Gas Infrastructure*, *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES* 109(17): 6435–6440.
- ¹⁸¹ See, e.g., Steven Weissman, Center for Sustainable Energy, Natural Gas as a Bridge Fuel: Measuring the Bridge (Mar. 2016) (noting that "phasing out natural gas use . . . will become increasingly difficult as the nation encourages more and more investment in natural gas development and infrastructure"), https://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/Natural_Gas_Bridge_Fuel.pdf.
- ¹⁸² Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report, Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the IPCC (Core Writing Team, Rajendra K. Pachauri, and Leo Meyer, eds.).
- ¹⁸³ John Siciliano, "Activists Take the Fracking Fight to Feds' Homes," *WASHINGTON EXAMINER* (May 17, 2016) (quoting then-FERC Commissioner Tony Clark explaining that FERC protesters are concerned about natural gas production and exploration).
- ¹⁸⁴ *Id.*
- ¹⁸⁵ *Nat'l Comm'n for the New River v. FERC*, 373 F.3d 1323, 1327 (D.C. Cir. 2004).
- ¹⁸⁶ *Washington Gas Light Co. v. FERC*, 532 F.3d 928, 930 (D.C. Cir. 2008)
- ¹⁸⁷ 15 U.S.C. § 717.
- ¹⁸⁸ Because the core provisions of the FPA and Natural Gas Act "are in all material respects substantially identical," *FPC v. Sierra Pac. Power Co.*, 350 U.S. 348, 353 (1956), the Supreme Court has "an established practice of citing interchangeable decisions interpreting the pertinent sections of the two statutes." *Arkansas La. Gas Co. v. Hall*, 453 U.S. 571, 576 n. 7 (1981).
- ¹⁸⁹ NGA Section 4(a), 15 U.S.C. § 717b-1(a) (cf FPA, Section 205(a), 16 U.S.C. § 824c(a)).
- ¹⁹⁰ 15 U.S.C. § 717e.
- ¹⁹¹ NGA Section 4(c), (d), 15 U.S.C. § 717b-1(c), (d).
- ¹⁹² NGA Section 4(e), 15 U.S.C. § 717b-1(e).
- ¹⁹³ 15 U.S.C. § 717d.
- ¹⁹⁴ 15 U.S.C. § 717b-1(f).
- ¹⁹⁵ 18 C.F.R. Pt. 284, Subpt. M.
- ¹⁹⁶ Utility Corporations: Final Report of the Federal Trade Comm'n to the Senate of the United States, Pursuant to Senate Resolution No. 83, 70th Congress, 1st Session, on Economic, Corporate, Operating, and Financial Phases of the Natural-Gas Producing, Pipe-Line, and Utility Industries, with Conclusions and Recommendations, No. 84-A, <https://babel.hathitrust.org/cgi/pt?id=ien.35556021351598;view=1up;seq=5> (1936). The report found that five holding companies owned 81.04% of the trunk (major) pipelines, and 4 of those companies owned 55.75% of all natural gas pipelines in the United States. *Id.*, at 27-28.
- ¹⁹⁷ *Id.*, at 3.
- ¹⁹⁸ 15 U.S.C. § 717 et seq.
- ¹⁹⁹ 15 U.S.C. § 717(f).
- ²⁰⁰ *Schneidewind v. ANR Pipeline Co.*, 485 U.S. 293 (1988).
- ²⁰¹ *Id.*
- ²⁰² 15 U.S.C. § 717(f)(h).
- ²⁰³ 15 U.S.C. § 717b(e)(1); *Sierra Club v. FERC*, 827 F.3d 36, 40-41 (D.C. Cir. 2015) ("Freeport") (explaining statutory scheme and the DOE's delegation of authority to FERC).

- ²⁰⁴ 15 U.S.C. § 717b(a); *see also* *Sierra Club ("Freeport")*, 827 F.3d at 40–41.
- ²⁰⁵ 15 U.S.C. § 717b(a); *see also* *Sierra Club ("Freeport")*, 827 F.3d at 40–41.
- ²⁰⁶ 15 U.S.C. § 717b(a).
- ²⁰⁷ 15 U.S.C. § 717b(d).
- ²⁰⁸ *See* 15 U.S.C. § 717b-1(a) (directing FERC to write rules describing the NEPA pre-filing process for applicants); 15 U.S.C. § 717n (describing the inter-agency coordination that FERC should direct for action on applications).
- ²⁰⁹ 15 U.S.C. § 717r(a).
- ²¹⁰ 15 U.S.C. § 717r(b). For instance, the D.C. Circuit rejected challenges to FERC letters approving “pre-construction” activities for the holder of a conditional certificate, because the challengers had not sought rehearing on the letter (though they did on the certificate). *Delaware Riverkeeper & Maya Van Rossum v. FERC*, 857 F.3d 388 (D.C. Cir. 2017).
- ²¹¹ 15 U.S.C. § 717r(b).
- ²¹² *Cost Recovery Mechanisms for Modernization of Natural Gas Facilities*, 151 FERC ¶ 61,047 (2015).
- ²¹³ 15 U.S.C. § 717f(c)(1).
- ²¹⁴ *Certification of New Interstate Natural Gas Pipeline Facilities*, 88 FERC ¶ 61,227 (1999).
- ²¹⁵ *Id.* at 3.
- ²¹⁶ *Id.*, at 3–4.
- ²¹⁷ *Id.*, at 4.
- ²¹⁸ *Id.*, at 5.
- ²¹⁹ *Id.*, at 18.
- ²²⁰ *Id.*
- ²²¹ *Id.*, at 19.
- ²²² *Id.* The referenced environmental analysis is the one required by NEPA.
- ²²³ *Meyersville Citizens for a Rural Community, Inc. v. FERC*, 783 F.3d 1301 (D.C. Cir. 2015).
- ²²⁴ *Id.* at 1310–11.
- ²²⁵ *Id.* at 1311–12.
- ²²⁶ *Id.* at 1315.
- ²²⁷ *See, e.g.*, *Rover Pipeline, LLC, et al*, 158 FERC ¶ 61,109 at P 49 and n.43 (2017).
- ²²⁸ *Sierra Club v. FERC ("Southeast Market Pipelines Project")*, 867 F.3d 1357 (D.C. Cir. 2017).
- ²²⁹ *Id.* at 34.
- ²³⁰ 15 U.S.C. § 717f; “Blanket Certificates,” FERC website, <https://www.ferc.gov/industries/gas/indus-act/blank-cert.asp>.
- ²³¹ *Id.*
- ²³² 15 U.S.C. § 717f(c)(1)(B).
- ²³³ *Id.*
- ²³⁴ 1999 Statement of Policy, at 15.
- ²³⁵ *Id.*, at 26.
- ²³⁶ *Id.*, at 27.
- ²³⁷ *See, e.g.*, *Tennessee Gas Pipeline v. 104 Acres of Land*, 749 F. Supp. 427, 430 (D.R.I. 1990).
- ²³⁸ *Maritimes & Northeast Pipeline, LLC v. Decoulos*, 146 Fed. Appx. 495, 497-98 (1st Cir. 2005).
- ²³⁹ *See, e.g.*, *Tennessee Gas Pipeline*, 749 F. Supp. 429; *Maritime & Northeast Pipeline*, 146 Fed. Appx. 495.
- ²⁴⁰ *Gunpowder Riverkeeper v. FERC*, 807 F.3d 267 (D.C. Cir. 2015) (citing 15 U.S.C. § 717f(h); *Columbia Gas Transmission, LLC v. 0.85 Acres More or Less in Harford Cty., MD*, 2014 WL 4471541 (D. Md. Sept. 8, 2014)).
- ²⁴¹ *Maritime & Northeast Pipeline*, 146 Fed. Appx. at 498.
- ²⁴² *See, e.g.*, *Tennessee Gas Pipeline*, 740 F. Supp. at 431–32.
- ²⁴³ *See Bluegrass Pipeline Co., LLC v. Kentuckians United to Restrain Eminent Domain, Inc.*, 478 S.W.3d 386 (Ky. App. 2015).
- ²⁴⁴ *Kinder Morgan Utopia, LLC v. PDB Farms of Wood County, LLC et al.*, Case No. 2016CV0220 (Court of Common Pleas, Wood County, Ohio Oct. 12, 2016); *see also* *Bluegrass Pipeline Co., LLC*, 478 S.W.3d 386.
- ²⁴⁵ *Berkley et al. v. Mountain Valley Pipeline and FERC, Compl.* (W.D. Va. July 27, 2017), https://www.gentrylocke.com/wp-content/uploads/2017/07/GentryLocke_FERC-Complaint.pdf, at 2.
- ²⁴⁶ *Id.*, at 7–8.
- ²⁴⁷ *Dominion Transmission v. Summers*, 723 F.3d 238, 244–45 (D.C. Cir. 2013) (described in *Meyersville Citizens*, 783 F.3d at 1318).
- ²⁴⁸ 33 U.S.C. § 1341(a)(1).
- ²⁴⁹ *Dominion Transmission*, 723 F.3d 238; *see also* Declaratory Order Finding Waiver under § 401 of the Clean Water Act, 160 FERC ¶ 61,065 (2017) (finding that by failing to act within the statutory timeline, New York waived its authority to issue or deny a permit and influence the outcome of the pipeline project).
- ²⁵⁰ *See, e.g., id.*; *see also* *Delaware Riverkeeper v. Sec'y Pa. Dep't of Env'tl Protection*, 833 F.3d 360, 385–88 (3d Cir. 2016).
- ²⁵¹ *Constitution Pipeline Co. v. New York State Dep't of Env'tl Conservation*, 868 F.3d 87 (2d. Cir. 2017).
- ²⁵² *See, e.g., Delaware Riverkeeper & Maya Van Rossum*, 857 F.3d 388.
- ²⁵³ NEPA, 42 U.S.C. § 4321 et seq.; *see also* 40 C.F.R. § 1508.18 (defining “major federal action”).
- ²⁵⁴ 40 C.F.R. §§1500-1508.
- ²⁵⁵ FERC Order No. 486, 52 Fed. Reg. 47,897 (Dec. 17, 1987); 18 C.F.R. § 380.1.
- ²⁵⁶ FERC Order Clarifying Statement of Policy, *supra* note 219, at 19.
- ²⁵⁷ 40 C.F.R. § 1508.25.
- ²⁵⁸ *See Delaware Riverkeeper Network v. FERC*, 753 F.3d 1304 (D.C. Cir. 2014).
- ²⁵⁹ *Meyersville Citizens for a Rural Community* 783 F.3d at 1326–27.
- ²⁶⁰ 40 C.F.R. § 1508.7.
- ²⁶¹ *See Sierra Club ("Freeport")*, 827 F.3d at 50.
- ²⁶² *Id.* (citing *Grand Canyon Trust v. FAA*, 290 F.3d 339, 345 (D.C. Cir. 2002)).
- ²⁶³ 40 C.F.R. § 1508.8.
- ²⁶⁴ *Sierra Club ("Freeport")*, 827 F.3d at 47 (quoting *Dep't of Transp. v. Public Citizen*, 541 U.S. 752, 767 (2004)).
- ²⁶⁵ *See, e.g., Petitioner's Opening Brief, Sierra Club et al. v. FERC*, D.C. Cir. Docket No. 16-1329 (Dec. 9, 2016).
- ²⁶⁶ *Sierra Club v. Dep't of Energy ("Freeport Export")*, 867 F.3d 189, 198 (D. C. Cir. 2017).
- ²⁶⁷ *See Sierra Club ("Southeast Market Pipelines Project")*, 867 F.3d 1357. That “gas will be burned” in power plants “is not just ‘reasonably foreseeable,’ it is the project’s entire purpose.” *Id.* at 1372. FERC had already estimated the throughput of natural gas, making quantification of emissions relatively simple. *Id.* at 1374.
- ²⁶⁸ *Southeast Market Pipelines Project, Draft Supplemental Environmental Impact Statement, Docket Nos. CP14-554-002; CP15-16-003; CP15-17-002* (Sept. 27, 2017).
- ²⁶⁹ *See, Sierra Club ("Freeport Export")*, 867 F.3d at 199.
- ²⁷⁰ *EarthReports, Inc. v. FERC*, 828 F.3d 949 (D.C. Cir. 2016); *see also* *Sierra Club ("Freeport")*, 827 F.3d at 47; *Sierra Club v. FERC ("Sabine Pass")*, 827 F.3d 59 (D.C. Cir. 2016); *Sierra Club ("Freeport Export")*, 867 F.3d 189.
- ²⁷¹ *Sierra Club ("Freeport")*, 827 F.3d 36; *Sierra Club ("Sabine Pass")*, 827 F.3d 59; *see also* *Dep't of Transportation v. Public Citizen*, 541 U.S. 752 (2004).
- ²⁷² *EarthReports*, 828 F.3d 949.
- ²⁷³ *Sierra Club ("Freeport Export")*, at 195.
- ²⁷⁴ In 2008, the Ninth Circuit found that vehicle efficiency standards were arbitrary and capricious because the Department of Transportation had failed to account for the environmental impact of increased greenhouse emissions under those standards. *See* *Center for Biological Diversity v. NHTSA*, 538 F.3d 1172 (9th Cir. 2008).
- ²⁷⁵ Memorandum from Christina Goldfuss, CEQ Re: Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews (Aug. 1, 2016), https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_gbg_guidance.pdf.
- ²⁷⁶ Presidential Executive Order on Promoting Energy Independence and Economic Growth (Mar. 28, 2017), <https://www.whitehouse.gov/the-press-office/2017/03/28/presidential-executive-order-promoting-energy-independence-and-economy-1>.
- ²⁷⁷ *Sierra Club ("Southeast Market Pipelines Project")*, 867 F.3d at 1375.
- ²⁷⁸ *See* *Southeast Market Pipelines Project, Draft Supplemental Environmental Impact Statement, Docket Nos. CP14-554-002; CP15-16-003; CP15-17-002* (Sept. 27, 2017) (echoing 151 FERC ¶ 61,095 at P 54 (2015)).

Many thanks to Dan Watkiss, Danny Cullenward, Justin Gundlach, Michael Panfil, Carolyn Elefant, and Shelley Welton for their comments on earlier drafts.