Carbon Restructuring: A Grassroots Strategy to Combat Climate Change

MATT ELGIN*

ABSTRACT

There is no debate that climate change is here, and that humans are the primary cause of this phenomenon. Left unchecked, climate change could lead to catastrophic consequences for humanity, including the loss of major cities, worldwide famine, natural disasters of increased frequency and magnitude, the mass extinction of plants and animals, and the breakdown of world order. We are already witnessing some of the effects today. In order to prevent the worst impacts on our society, combatting climate change must be the world's top priority for the foreseeable future. Despite the severity of the problem, our leaders seem unwilling or unable to enact the kinds of bold, sweeping programs that the scientific community—and dare I say commonsense—argue are necessary.

Given this lethargy from the federal government, this Article offers an alternative strategy to reduce the United States' contribution to climate change through a bottom-up grassroots approach that would reduce the country's greenhouse gas emissions, expand the renewable energy footprint, and lay the foundation for sweeping national reform once the perils of climate change can no longer be ignored. This Article identifies and analyzes common themes from the successful strategies used to restructure aspects of the natural gas and electricity sectors to create a blueprint that stakeholders and regulatory agencies can use to restructure the energy industry towards a zero-carbon electricity grid without the need for top-down national leadership. Relying on the precedent of restructuring efforts from the electricity and natural gas sectors, this Article identifies the following process for restructuring: 1) identifying a problem, 2) engaging in test litigation, 3) increasing pressure through individual adjudicatory efforts and agency and legislative action through experimental policy positions in limited circumstances, and 4) creating national policy reform through federal agencies or Congress. This Article will explain these past restructuring events, identify common themes to construct a blueprint to address energy policy issues, and then argue for its application to reduce the

* Matt Elgin is an associate at Williams & Connolly. Prior to private practice he clerked on the United States Court of Appeals for the Eleventh Circuit and the Eastern District of Pennsylvania. He attended The George Washington University Law School. He is also a graduate of Imperial College London Business School and Vassar College. Matt would like to thank Dean Emily Hammond, Katie Bukrinsky, Daniel Brookins, Ariella Lvov, Maya Rajaratnam, his wife Eliza, and his parents Stephen and Mary Beth for their insight and support through this process.

energy industry's carbon emissions—what this Article refers to as carbon restructuring. This strategy is particularly relevant today, as it advocates for a ground-up or grassroots approach to reform, rather than a top-down federal approach. This approach appears to be the most likely strategy to succeed in continuing to fight the effects of climate change, given the current political landscape at the federal level. Even in the current political climate, there is still hope for the fight against climate change.

TABLE OF CONTENTS

Introduction 54
I. The United States Electricity Sector 59
II. Proposed Regional Carbon Adders 65
III. History of Restructuring 70
A. Restructuring the Electricity Sector. 70
B. Restructuring the Natural Gas Sector 74
C. Lessons from the Clean Power Plan 79
IV. A Solution: A Grassroots Carbon Restructuring Movement 80
A. The Jumping Off Point: Identifying the Problem 81
B. Baby Steps: Initial Precedent Setting Adjudication 81
C. The Tipping Point: Increased Pressure from Courts and Agencies. . 84
D. The Final Act: National Reform 86
Conclusion 87

INTRODUCTION

Anthropogenic climate change is one of the most daunting challenges the world faces today.[1] As human activity continues to emit carbon dioxide and other greenhouse gases that trap more and more heat in the atmosphere, the effects of global warming and ocean acidification continue to worsen.[2] From unseasonal droughts to massive flash floods to depletion of fish stocks, these conditions have

1. Intergovernmental Panel on Climate Change (IPCC), Climate Change 2021 - The Physical Science Basis - Summary for Policymakers (2021), https://perma.cc/VSY3-LMLR; Felix Mormmon, *Clean Energy Federalism*, 67 Fla. L. Rev. 1621, 1623 (2015) (citing IPCC, Climate Change 2013 - The Physical Science Basis 13 (2013) ("Human influence on the climate system is clear. This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system.")); *see also* Elizabeth Kolbert, The Sixth Extinction: an Unnatural History (2014) (providing a succinct and detailed summary of the effects of climate change and humans' role in it).

2. *See* IPCC, *supra* note 1, at 5; Mormmon, *supra* note 1, at 1623 (citing IPCC, Climate Change 2013 - The Physical Science Basis 13 (2013) (reporting increases in the frequency and intensity of heat waves, heavy precipitations, and other extreme weather and climate events)).

caused millions of deaths and trillions of dollars in economic losses.[3] We can see the impacts of climate change all around us.[4]

Carbon dioxide and other greenhouse gas emissions are the main cause of climate change.[5] The use of fossil fuels to generate electricity is a key contributor of greenhouse gas emissions.[6] The EPA estimates that 25% of greenhouse gas emissions come from generating electric power, second only to transportation at 27%.[7] And approximately 60% of the United States' electricity comes from burning fossil fuels, predominately coal and natural gas.[8] Therefore, any strategy for tackling climate change must emphasize the electricity sector and reducing its dependence on fossil fuels.

In order to successfully combat the worsening effects of climate change, the United States, as a leading emitter of carbon dioxide and other greenhouse gases,[9] must transition away from carbon-emitting sources of electricity as quickly as possible in the face of political and societal resistance. Focusing on this energy transition is crucial to the success of mitigating the worst impacts of climate change because the electricity sector is the second largest source of greenhouse gas emissions in the United States.[10] The United States can achieve this end through a process this Article refers to as *carbon restructuring*. Carbon restructuring is a strategy to transition the electricity sector away from high carbon emitting forms of electricity generation to low carbon or carbon-zero electricity generation

---

3. *See* IPCC, *supra* note 1, at 7-8; Mormmon, *supra* note 1, at 1623 (citing *Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes*, World Meteorological Org. (July 11, 2014), https://perma.cc/M8Z8-BVER (reporting that weather- and climate-related disasters have caused $2.4 trillion in economic losses and nearly two million deaths globally from 1970–2012).

4. A vast field of study has demonstrated the impacts of climate change that our world is already experiencing. For at least the past five years the National Academies of Science, Engineering, and Medicine has concluded it can confidently attribute several of the most extreme weather events the world is currently experiencing directly to climate change. *See* Climate Change 2021 - The Physical Science Basis - Summary for Policymakers, IPCC, *supra* note 1, at 7-8; *See* Mormmon, *supra* note 1, at 1623. A quarter of the Earth's ice-free land is currently experiencing degradation or desertification. IPCC, Climate Change and Land - Summary for Policymakers (2020), https://perma.cc/YP54-4EHL. Since 1961, areas in drought have increased by 1% a year, and now approximately 500 million people live in areas impacted by drought. *Id.* Warmer ocean temperatures, which are also attributed to climate change, provide more energy for tropical storms, thereby increasing the frequency and power of hurricanes and typhoons and destabilizing coastal communities around the world. Amanda MacMillan, *Global Warming 101*, Natural Resources Defense Center, Mar. 11, 2016, https://perma.cc/2ZL5-SDXQ. Sea levels continue to rise: coastal communities can now expect a once-in-a-century sea level event to occur annually. IPCC, Special Report on the Ocean and Cryosphere in a changing climate - Summary for Policymakers (2019), https://perma.cc/7XDP-RBE5; Changing weather patterns will also have adverse impacts on agricultural production, as farms face new pests, heatwaves, flooding, and storms, which will in turn put a strain on global food supplies. *See generally* MacMillan, *supra* note 4; Climate Change and Land, IPCC, *supra* note 4, at 9-10, 14,18.

5. European Commission, *Causes of Climate Change* (Apr. 7, 2017), https://perma.cc/7E5R-4HSD.

6. *Id.*

7. *Sources of Greenhouse Gas Emissions*, EPA (Aug. 5, 2022), https://perma.cc/SC58-MHML.

8. *Id.*

9. MacMillan, *supra* note 4.

10. *See* Mormmon, *supra* note 1, at 1623.

by reducing market inefficiencies and employing the gradual building of force and momentum through litigation and policy initiatives first at the local and state levels, and then ultimately at the federal level. It is, in essence, a path to reshape the electricity sector using tried and true methods from earlier structural reforms. Small initial gains can pave the way for ultimate national reform.

Currently, wholesale electricity markets, where power is bought and sold, are competitive bidding markets where power generators send bids to regional operators of the price per megawatt hour (Mwh) at which they are willing to sell their power on the grid.[11] This price usually corresponds with their short-run marginal cost of producing the electricity.[12] As explained below, under current economic conditions, high carbon emitting power generators are able to bid at lower prices than low or no carbon emitting generators due to their lower marginal costs of producing electricity.[13] Critics of the current wholesale market structure argue that its bidding system does not reflect the actual cost of producing electricity.[14] Under this system, high carbon emitting power generators are able to bid at artificially low numbers because their price does not include the cost the carbon emissions created during the production process have on society; a variation on the tragedy of the commons problem.[15] These costs include climate change, extreme weather, and pollution as described above.[16]

---

11. Joel B. Eisen et al., Energy, Economics and the Environment: Cases and Materials 651-52 (4th ed. 2015).

12. *See Market for Electricity*, PJM, https://perma.cc/47K3-WZ8 (last visited Nov. 28, 2022); Kathryne Cleary & Karen Palmer, *US Electricity Markets 101*, RFF (Mar. 3, 2020) https://perma.cc/R9D6-37E2; David Bielen, et al., *The Future of Power Markets in a Low Marginal Cost World* 1-3, 8 (Resources for the Future, Working Paper, 2017); Emily Hammond & Richard J. Pierce, Jr., *The Clean Power Plan: Testing the Limits of Administrative Law and the Electric Grid*, 7 Geo. Wash. J. of Energy & Env't. L. 1, 17 (2016) (noting wholesale markets' lack of incentivization for new construction "because they are based on short-run marginal costs but often include price caps").

13. *Infra* Section I.

14. *See e.g.*, Audie Cornish, et al., *Raising the price of fossil fuels to reflect the true social cost*, NPR (Oct. 11, 2021), https://perma.cc/2XRB-ADY4 : David Kocieniewski & Naureen S. Malik, *The Power Grid Is Just Another Casino for Energy Traders*, Bloomberg BusinessWeek (Nov. 5, 2021 at 5:00 AM EDT) https://perma.cc/4BDF-7JMT.

15. Eisen et al., *supra* note 11, at 509–10. The tragedy of the commons "is an economics problem in which every individual has an incentive to consume a resource, but at the expense of every other individual— with no way to exclude anyone from consuming." Michael J. Boyle, *Tragedy of The Commons*, Investopedia (Oct. 23, 2020), https://perma.cc/MTU9-JPY8. In the classic example there is a communal grazing area for a group of shepherds. Each shepherd has the personal incentive to graze his sheep in the field as much as possible, as it is free grass, and the sheep need to eat. But if every shepherd follows their own self-interest, demand will soon outstrip supply, and the grass will quickly be consumed. Thus, the common resource is destroyed through self-interested over consumption and a lack of accountability over who will reinvest in the resource's replenishment. In the case of energy prices, the markets are set up to take on the lowest cost energy: high carbon emitting energy. Everyone wants the lowest price of energy possible, but in such a structure there is no accounting for the additional damages and costs associated with fossil fuels. The system will continue to rely on the low face value price of natural gas, coal, and oil as long as the markets do not reflect the added costs to the environment and society of burning these fuels. Instead, the cost of carbon is externalized onto society.

16. *See* Mormmon, *supra* note 1, at 1623, 1640.

Despite the current state of affairs, there is reason to be hopeful—or more accurately, there is precedent stakeholders can use to help get past these roadblocks. The challenge of calculating the true cost of carbon emissions and providing a level playing field for low carbon emitting alternatives is not the first time that the United States' energy industry has confronted structural inefficiencies. The industry's past successes in adapting to address these inefficiencies in the natural gas and electricity markets can serve as guidance towards a successful carbon restructuring strategy. In the past, when there were market inefficiencies in the energy sector, various individual, state, and federal actors worked together to remedy the inefficiencies. This process is known as *restructuring*.[17]

The electricity and natural gas sectors have both undergone restructuring in the past. When the processes and procedures of past restructuring in the electricity and natural gas sectors are analyzed, common themes emerge as to how practitioners and stakeholders were able to successfully reform one of the most complex systems in the United States: the energy industry. These common themes create a blueprint for bottom-up restructuring that, as this Article proposes, industry participants, stakeholders, and practitioners can use to identify the next steps to move towards a carbon-free energy grid.

The first step will be for the regional markets or individual states to identify the problem and adopt a mechanism to incorporate carbon emissions into the cost of electricity, which is referred to as a carbon adder. The next step will involve individual adjudication and state action, predominately through state police powers. This will lay the foundation for a national carbon restructuring policy. Through this process, the United States can significantly reduce its carbon emissions. It will not be easy, but like a pebble starting an avalanche, small initial local and regional gains can lead to national reform.

A sense of frustration and hopelessness pervades environmentalists and clean energy advocates at the moment.[18] There is good cause for these concerns. The head of the EPA during the Trump Administration did not believe climate change is driven by human activity[19] and actively worked to dismantle the EPA throughout his career, filing fourteen lawsuits against the agency he eventually was slotted to lead during his time as Oklahoma Attorney General.[20] During his first day in office, President Trump removed any reference to climate change from the

17. *See* Margaret Jess, *Restructuring Energy Industries: Lessons from Natural Gas*, Natural Gas Monthly, May 1997, at vii-x.

18. *See* Jennifer Hassan, *Greta Thunberg Says World Leaders' Talk on Climate Change Is 'Blah Blah Blah'*, The Washington Post (Sept. 29, 2021 at 10:07 AM), https://perma.cc/QZG7-QNB5.

19. Nathan Rott, *EPA Head Scott Pruitt Doubts Basic Consensus on Climate Change*, NPR (Mar. 9, 2017), https://perma.cc/GH5S-DFG8.

20. *See Pruitt v. EPA: 14 Challenges of EPA Rules by the Oklahoma Attorney General* (Jan. 14, 2017), https://perma.cc/2DAH-NQV3.

White House website[21] and, less than a week later, he told the EPA to do the same.[22] Further, President Trump signed an executive order intending to dismantle many of the Obama Administration's climate change policies while propping up the coal and natural gas industries.[23]

While overt hostility to policies addressing climate change has ended in the Biden Administration, President Biden is by no means leading the charge towards a sustainable future. For example, in early November 2021, he "pleaded with OPEC" to produce more oil in the wake of surging energy prices.[24] Even when President Biden tries to enact change, he faces resistance in Congress. The now-highly-visible Senator Joe Manchin of West Virginia appears intent on taking a carving knife to any spending plan that earmarks funds to address climate change or move the United States' energy grid to relying on renewable energy.[25] Regulators have been long on talk but short on action in their move towards renewable energy.[26] Given these obstacles and the apparent lack of political will in Washington to enact meaningful change at the federal level, it seems unlikely that the Biden Administration will be the answer to the problem; or at least not the lone answer.

Despite these setbacks, there is reason to believe these obstacles are surmountable. Environmental groups, state legislatures, private companies, and concerned citizens do not need the federal government to continue to fight climate change and expand the renewable energy footprint. This Article proposes a strategy to do just that: a bottom-up approach focusing on local, state, and regional carbon restructuring in order to build momentum towards national reform. By focusing on bottom-up change, this approach allows the clean energy sector and environmentalists to continue reducing carbon emissions and increasing the renewable energy footprint over the next five to ten years without significant federal support, which will lay the groundwork for rapid national policy enactments once the federal government and the political environment are more favorable to such

---

21. Andrew Griffin, *Every Mention of Global Warming and Climate Change Deleted from the White House Website as Donald Trump Arrives*, The Independent (Jan. 20, 2017, 6:20 PM) https://perma.cc/4C9U-PWAX.

22. Valerie Volcovici, *Trump Administration Tells EPA to Cut Climate Page from Website*, Reuters (Jan. 25, 2017, 12:31 PM), https://perma.cc/4S4A-XF8Q.

23. Dan Merica, *Trump Dramatically Changes US Approach to Climate Change*, CNN (Mar. 29, 2017, 5:01 AM), https://perma.cc/CW4J-CBDN; Emily Hammond, *President Trump's Executive Order on "Energy Independence," Annotated by an Environmental Law Expert*, Vox (Mar. 29, 2017), https://perma.cc/T2MY-LVCK.

24. Robert Rapier, *The Double Irony of Asking OPEC to Increase Oil Production*, Forbes, (Nov. 6, 2021 at 10:54 AM), https://perma.cc/7TG9-YQXT.

25. Coral Davenport, *Key to Biden's Climate Agenda Likely to Be Cut Because of Manchin Opposition*, NY Times, (Oct. 15, 2021), https://perma.cc/NSS7-Z5Q7.

26. *See, e.g.*, *Markets*, ISO-NE (last visited Dec. 13, 2021), https://perma.cc/9683-HTL3; *Initial PJM Carbon Pricing Study Results Presented*, PJM (Jan. 21, 2020 https://perma.cc/DWB4-6TXD; Samuel Whillans, *FERS's Carbon Blind Spot*, The Regulatory Review (Sept. 8, 2020) https://perma.cc/24XV-A6NN.

changes. Once those national policies are in place and the energy industry complies with those changes by converting to renewable energy, there will be no turning back.[27] The energy industry in the United States will finally be free of fossil fuels and the costs of carbon emissions. This in turn will be a major step towards combatting climate change, cutting the country's carbon emissions by twenty five percent.[28]

To that end, this Article proceeds in four sections. Section I describes the United States' electricity grid, its history, and the law that governs it. Section II then provides an in-depth discussion of PJM and ISO-NE's proposed carbon adders, which could provide a promising first step in remedying the current market failures within the electricity sector. Section III analyses the past restructuring of the electricity and natural gas sectors and identifies the strategies used in each restructuring. Finally, Section IV combines the common themes from each past restructuring into a general blueprint for restructuring and provides guidance on how to successfully implement this strategy for carbon restructuring. In concluding, this Article argues that this blueprint could be an effective method for reducing carbon emissions, despite the federal government's apparent ambivalence towards climate change, by advocating for a bottom-up grassroots approach to carbon restructuring.

I. THE UNITED STATES ELECTRICITY SECTOR

Before this Article can delve into the specifics of its proposed solution, a little background on the structure of the complex—read, Byzantine—United States' electricity grid is necessary. Utilities have a long history within the common law.[29] Traditionally, in England and America, governments have designated certain services, such as ferries, bridges, gas, and electricity as public utilities.[30] In return for a monopoly on the service, the public utility was required to keep the price for the service within a reasonable range that allowed citizens to use the service while still providing the utility with a reasonable rate of return.[31]

But in the last fifty years, the United States has transitioned away from the common law model towards a competitive market system.[32] In this market

27. As the country shifts to 100% renewable energy under a major national policy, renewable energy will become cheaper, and necessary infrastructure will be put in place. At that point, even if there is a regime change that desires a return to fossil fuels it will be too late. The energy grid will be converted, and converting back to fossil fuels would costs billions of dollars and many years, fossil fuels would be more costly, and such a transition would likely face significant public backlash; something like "why did we just spend all of this money to convert to renewables to have you tear it all down?", as well as political backlash from any congresspeople that have benefited from job creation the transition to renewables has created.

28. *Sources of Greenhouse Gas Emissions*, EPA (Aug. 5, 2022), https://perma.cc/CQV5-BFDC.

29. Eisen et al., *supra* note 11, at 38.

30. *Id.*

31. *Id.* at 59; *Markets*, ISO-NE, (last visited Dec. 13, 2021) https://perma.cc/9683-HTL3.

32. Eisen et al., *supra* note 11, at 643.

system, producers compete in a bidding system, ensuring a low cost of energy to consumers and reducing the negative impacts of monopoly. As part of this modernization, the electricity grid became divided into regions.[33] Since the transition away from monopolistic utilities and towards competitive power generation and distribution, many of these regions are now overseen by Regional Transmission Organizations (RTO) and Independent System Operators (ISO), which in turn are overseen by the Federal Energy Regulatory Commission (FERC).[34] These RTOs and ISOs are responsible for operating the power grid (keeping the power supply and demand balanced at all times); running the region's wholesale electricity markets; ensuring the reliability, security, and maintenance of the system; and planning to ensure the continued viability of the regional system into the future.[35] In its role as the regulator of this system, FERC must approve any policies the RTOs and ISOs enact for their regions.[36]

In the United States, different aspects of the energy sector are regulated by states and the federal government. FERC is the federal agency responsible for regulating the aspects of the energy sector over which the federal government has jurisdiction.[37] In an overly simplified sense, FERC regulates the transmission and wholesale sale of electricity in interstate commerce.[38] FERC's authority to regulate these aspects of the energy sector comes from the Federal Power Act (FPA),[39] which is mainly premised on the Constitution's Commerce Clause.[40] The states have jurisdiction over every other aspect of the energy sector that does not relate to interstate commerce. The areas of state control can be divided into two general groups: transmission in intrastate commerce and sale or resale in intrastate commerce.[41]

FERC's authority has dramatically expanded since Congress passed the FPA in 1935, which granted its predecessor, the Federal Power Commission, jurisdiction over wholesale sales of electricity in interstate commerce.[42] In the 1927 case *Public Utilities Commission of Rhode Island v. Attleboro Steam & Elec. Co.*,[43] the Supreme Court determined that a state would violate the Dormant Commerce Clause if the state were to affect electricity rates in another state by selling electricity to that other state or setting prices of electricity in the other state.[44] In that

33. *See* FERC, *RTOs and ISOs*, (Apr. 15, 2021), https://perma.cc/E2Q7-UTGR.
34. *Id.*
35. *See Id.*; Eisen et al., *supra* note 11, at 652; ISO-NE, *What We Do* (last visited Dec. 13, 2021), https://perma.cc/D9WY-XBNU.
36. *See* FERC, *RTOs and ISOs*, *supra* note 19.
37. *See* Eisen et al., *supra* note 11, at 83.
38. *See* Federal Power Act (FPA) §201, 16 U.S.C. §§ 791(a) et. seq.
39. *Id.*
40. *See* U.S. Const. Art. I, § 8, cl. 3.
41. *See* Eisen et al., *supra* note 11, at 83.
42. *See* FPA §201.
43. Pub. Utils. Comm'n of Rhode Island v. Attleboro Steam & Elec. Co., 273 U.S. 83 (1927).
44. *Id.* at 90.

case, a Rhode Island power plant had a contract to supply the neighboring town with electricity.[45] The only problem: the town was in Massachusetts.[46] As a regulated industry, the utility had to appeal to the state's public utilities commission (PUC) to increase its rates.[47] After Massachusetts' PUC refused to increase the rates the Rhode Island utility could charge the town, the utility appealed to the Rhode Island PUC, which approved the rate increase.[48] The Court held that Rhode Island's actions affected the electricity rates of another state, Massachusetts,[49] and that violated the Dormant Commerce Clause. Only the federal government through FERC could regulate these interstate rates.[50]

With that general principle set, the Supreme Court in *Federal Power Commission of Rhode Island v. Florida Power and Light Co.*[51] dramatically expanded the scope of what constituted a wholesale sale in interstate commerce in 1972. The Court reasoned that due to the uncontrollable and unpredictable nature of electrons, if a state is connected to the regional or interstate power grid or transmission network, then FERC has jurisdiction over virtually all electricity sales within the state because it is impossible to know whether an electron in a wholesale sale actually crossed state lines.[52]

Then in 2002, the Supreme Court in *New York v. FERC* held that the phrase "transmission in interstate commerce"[53] in the FPA included control over power transmission in all but the final local retail transmission lines.[54] Finally, the Court in *Southern California Edison* determined that FERC's power is plenary, and is not just meant to fill the gaps where states do not have jurisdiction.[55] The result of this line of cases is that the federal government, through FERC, has immense power and broad jurisdiction in the energy sector overall wholesale sales: including any sale of electricity in a state if the state is connected to transmission lines that travel across the state's borders. Also, FERC has jurisdiction over all transmission lines except for the final low voltage lines that connect individual homes and businesses.

Despite FERC's prominent role, states still have a fair amount of power when it comes to regulating the energy sector. The states, through PUCs or similarly named agencies, have jurisdiction over intrastate transmission and retail sales of electricity.[56] Additionally, states can regulate aspects of the energy sector over

45. *Id.* at 84-89.
46. *Id.*
47. *Id.*
48. *Id.*
49. *Id.* at 89-90.
50. *Id.* at 90.
51. Fed. Power Comm'n v. Fla. Power & Light Co., 404 U.S. 453 (1972).
52. *Id.* at 456.
53. FPA § 201.
54. New York v. FERC, 535 U.S. 1, 16 (2002).
55. S. Cal. Edison v. San Diego Gas & Elec. Co.; 70 F.E.R.C. ¶ 61, 215 (1995).
56. *See* Eisen et al., *supra* note 11, at 83.

which FERC has jurisdiction if those laws do not specifically target or conflict with an activity over which FERC has jurisdiction.[57]

FERC is responsible for setting rates for electricity over which it has jurisdiction. These rates must be "just and reasonable."[58] FERC has the authority to remedy a situation where rates set by a utility are not just and reasonable.[59] This standard provides FERC with significant discretion in setting rates. If a rate is challenged, a court will consider a variety of factors to determine whether the rate is just and reasonable, including if the rate: (1) maintains the power company's financial integrity; (2) compensates investors; (3) enables the power company to attract capital; (4) is not confiscatory or exploitative;[60] (5) provides a return on investment similar to that in competitive markets; and (6) does not create special profits.[61]

To help it achieve this mandate, FERC has created regional operators of wholesale markets, known as RTOs[62] and ISOs.[63] These RTOs and ISOs are responsible for running wholesale spot markets. Spot markets establish the market price for wholesale electricity within a region.[64] This price is established by finding the equilibrium price of energy supply and demand.[65] Power generators will submit a bid price at which they are willing to sell their power to the market, usually corresponding with their marginal cost of producing the electricity.[66] Marginal cost is the "change in total production cost that comes from making or producing one additional unit,"[67] in this case the cost to produce one additional Mwh. A power generator will typically not bid below the price it costs to generate the additional power the grid demands. The RTO/ISO starts with the lowest bid price for power and then continues moving to more expensive bids until demand is fully met.[68] Once demand is met, every producer that is selected to sell its power will receive the highest bid needed to meet the demand for that day.[69]

---

57. *See* Oneok Inc. v. Learjet Inc., 575 U.S. 373, 376, 384-86 (2015) (holding state law antitrust claims can be enforced in wholesale power markets when the practices at issue are not specifically aimed at subjects within FERC jurisdiction); *see also* Hughes v. Talen Energy Mktg., 578 U.S. 150, 163-65 (2016) (invalidating Maryland's attempt to encourage new in-state generation by adjusting interstate wholesale rates because this activity directly intrudes on FERC's jurisdiction).

58. *See* FPA § 205.

59. *See* FPA § 206.

60. *See* Fed. Power Comm'n v. Hope Nat. Gas Co., 320 U.S. 591 (1944).

61. Bluefield Waterworks & Improvement Co. v. Pub. Serv. Comm'n of W. Va., 262 U.S. 679, 690-93 (1923).

62. FERC Order No. 2000, 18 C.F.R. §35.

63. FERC Order No. 888, 18 C.F.R. §§ 35, 385.

64. Eisen et al., *supra* note 11, at 652.

65. *Id.*

66. *See supra* note 12.

67. Alicia Tuovila, *Marginal Cost Meaning, Formula, and Examples*, Investopedia (Aug. 1, 2022), https://perma.cc/6P5Q-JJ5E.

68. Eisen et al., *supra* note 11, at 652.

69. *See Market for Electricity supra* note 12.

An example may be instructive.[70] Suppose there is demand for 1000 megawatts (MW) of power in a region on a given day. Wind Farm A can supply 200 MW and is willing to take any price for this power because it cannot turn the wind off, so the power must be sold at whatever price it can get. Therefore, Wind Farm A will bid its 200 MW at $0.00/Mwh. At that bid, it will guarantee the RTO/ISO accepts its bid, and it will receive whatever the highest bid price is for the day. Nuclear Plant A has 300 MW and will also bid this capacity at $0.00/Mwh because it cannot turn off its nuclear reaction. That takes care of 500 MW of supply. Natural Gas Plant A can bid 200 MW at $3.00/Mwh. Hydropower Dam A can supply 100 MW at $3.50/Mwh. Coal Plant A can bid 100 MW at $4.00/Mwh. Natural Gas Plant B can bid 200 MW at $4.50/Mwh. Coal Plant B can bid 200 MW at $6.00/Mwh. Remember that the RTO/ISO will accept the bids in order of lowest price until it matches demand with supply; in this case 1000 MW. In this example, the RTO/ISO will accept the bids of Wind Farm A (200 MW), Nuclear Plant A (300 MW), Natural Gas Plant A (200 MW), Hydropower Dam A (100 MW), Coal Plant A (100 MW), and Natural Gas Plant B (100 MW of its 200 MW) in that order. This satisfies the demanded electricity of 1000 MW. Every producer will receive the highest bid needed to satisfy this demand, which means every producer selected will receive $4.50/Mwh for its electricity, which is what Natural Gas Plant B bid. This is known as the clearing price.[71]

There are a few interesting points to highlight in this example. First, renewables and other power generators that cannot turn on and off at will deflate the clearing price. If Wind Farm A was not online, the clearing price would have been $6.00/MW, because Coal Plant B would be needed to satisfy the 1000 MW demand. Second, renewables reduce the market clearing price for wholesale markets because price corresponds with marginal cost, which is tied to fuel costs. Because renewables have no fuel costs, they have low marginal costs and thus low bid prices.[72] Third, implicit in the bid price of the carbon-emitting generators are the unaccounted costs of pollution and GHG emissions, and the effects these have on society.[73] Society is forced to bear these costs, which allows carbon-emitting generators to bid at artificially low prices, causing these carbon-emitting

70. Or, as this example relies on numbers and economic theories, it could prove disastrous for the mathematically disinclined that tend to dominate the ranks of lawyers. If you find yourself in these ranks, dear reader, the author apologizes, and humbly suggests you move ahead to Section II. There are fewer numbers there.

71. *See* Cleary & Palmer, *supra* note 12; *How Resources Are Selected and Prices Are Set in the Wholesale Energy Markets*, ISO-NE, https://perma.cc/5S99-AWNN (last visited Nov. 28, 2022); Paul R. Gribik, et al., *Market-Clearing Electricity Prices and Energy Uplift*, Harv. Elec. Pol'y Grp., Dec. 31, 2007, at 3-10, available at https://perma.cc/98BF-7XHM.

72. Eisen et al., *supra* note 20, at 698.

73. Steven Weismann & Romany Webb, *Addressing Climate Change Without Legislation: How the Federal Energy Regulatory Commission Can Use Its Existing Legal Authority to Reduce Greenhouse Gas Emissions and Increase Clean Energy Use,* BERKELEY ENERGY & CLIMATE INITIATIVE 2–5 (2014), https://perma.cc/2HGZ-FZ9U.

sources of energy to be more frequently chosen to generate.[74] If the RTO/ISOs could include the costs associated with pollution—and more importantly for this Article's purpose, carbon—in the bid price, then the dispatch order could dramatically change.

For example, if the RTO could impose a carbon adder of $2.00/ton of carbon produced while generating a MW of electricity, the dispatch order would dramatically change.[75] In the above example, both coal plants emit two tons of carbon dioxide per MW produced, and both natural gas facilities emit one ton of carbon dioxide per MW. With this carbon adder in place, Natural Gas Plant A's bid price becomes $5.00/Mwh, Natural Gas Plant B's price becomes $6.50/Mwh, Coal Plant A's bid price becomes $8.00/Mwh, and Coal Plant B's bid price becomes $10.00/Mwh. Now, the RTO/ISO will accept the bids from Wind Farm A (200 MW), Nuclear Plant A (300 MW), Hydropower DAM A (100 MW), Natural Gas Plant A (200 MW), and Natural Gas Plant B (200 MW), to satisfy demand at a market clearing price of $6.50/Mwh. The carbon adder has achieved its goal, which is to bring lower carbon-emitting generators online earlier and leave the highest carbon emitters—in this case, Coal Plants A and B—offline until needed as a last resort.

The astute reader will notice an unintended consequence of this policy: the overall price of energy increased by $2.00/Mwh. These prices will ultimately be passed on to the consumer. It is not difficult to see why this strategy has not gained much traction with regulators and politicians. Although the price of energy may rise, the reality is those prices are already being passed on to consumers in the form of pollution and the impacts of global warming. It will take political will and hard choices for stakeholders to implement these sorts of policy changes. Doing so is essential to allow market forces to price out high carbon-emitting sources of electricity.

Traditionally, FERC has only considered economic factors in its just and reasonable calculus. However, Joel Eisen has persuasively argued that FERC has the authority to directly consider environmental matters in its calculation of whether rates are just and reasonable.[76] Other scholars have endorsed this approach.[77] Three RTO/ISOs, PJM Interconnect, the ISO-New England (ISO-NE), and the New York ISO have proposed carbon adders to more accurately price energy based on the negative externalities associated with carbon emissions made during the generation of electricity.[78] Some states have incorporated externalities into

---

74. *Id.* at 6; *see also* Joel B. Eisen, *FERC's Expansive Authority to Transform the Electric Grid*, 49 U.C. Davis L. Rev. 1783, 1834-35 (2016).

75. Gavin Bade, *Is a Carbon Price the Best Way to Implement the EPA's Clean Power Plan?*, Utility Dive (Apr. 29, 2015), https://perma.cc/7ZGV-XDKA.

76. Eisen, *supra* note 75 at 1788, 1838-40; Whillans, *supra* note 47.

77. Whillans, *supra* note 47; Weissman & Webb, *supra* note 74.

78. Bade, *supra* note 75; *Integrating Public Policy & Markets in New England*, NEPOOL (Aug. 11, 2016), https://perma.cc/AU28-VR97; Press Release, New York ISO, Siena Poll Shows Broad Support

decisions about which plants to build and into decisions about which plants to dispatch in the power markets.[79] This is the basic structure of the energy industry today.

II. PROPOSED REGIONAL CARBON ADDERS

Proposed regional carbon adders identify the problem created by the current state of the electricity sector and, if implemented, could serve as a test balloon for initial litigation, as those policies would inevitably be challenged by fossil fuel groups. A brief discussion is necessary to anchor the reader in what could be the promising first step towards restructuring and where those efforts currently stand.

Some experts believe that FERC could take the lead on reducing carbon emissions with carbon adders that would price carbon into the bid prices on the wholesale market.[80] Because fossil fuel generators do not pay the environmental costs their carbon emissions create, they enjoy a competitive advantage over renewable energy producers in that they do not bear the full cost of producing their power.[81] FERC could remove this advantage by including a carbon adder, which would reflect the cost of climate and other environmental damages caused by carbon emissions, in wholesale electricity rates. Quantifying the price of these damages in the carbon adder could take a number of forms, but identifying the exact formula for this quantification is beyond the scope of this Article.[82]

---

for NYISO's Carbon Pricing Proposal (Sept. 28, 2020), https://perma.cc/6KDB-EX2Y; Robert Walton, *New York Grid Operator Floats Carbon Pricing Proposal*, Utility Dive, May 1, 2018, https://perma.cc/2SSQ-WDJX.

79. Emily Hammond & David B. Spence, *The Regulatory Contract in the Marketplace*, 69 Vand. L. Rev. 141, 198 (2016) (noting that the wholesale markets were a "stark departure from historical practice" and not contemplated in 1935).

80. Weismann & Webb, *supra* note 74, at 3 ("Relying on its current legal authority, FERC could . . . [p]romote greater use of clean energy sources. FERC can reduce fossil fuel generation by including a carbon adder, reflecting the cost of climate and other environmental damage caused by electricity generation's carbon dioxide emissions, in wholesale electricity rates."); *see also id.* at 6–7 ("[T]he EPA's recently-released proposed rules for carbon emissions from existing power plants allow for creative approaches to emission reductions. A carbon adder as applied to wholesale markets would be consistent with the proposed rules, and those rules provide additional support for the legality of such a strategy."). Some scholars believe an even broader full social cost adder could be implemented by FERC. *See, e.g.*, Stephen Bernow et al., *Full-Cost Dispatch: Incorporating Environmental Externalities in Electric System Operation*, 4 Elec. J. 20 (1991) (advocating full social cost dispatch, while acknowledging difficult implementation problems); Hammond & Spence, *supra* note 80, at 47 ("In any of the wholesale markets, one could conceivably interject social costs into the dispatch system as well, through the use of adders in the dispatch process. The idea behind social cost dispatch is to modify current SCED rules by adding to each source's bid cost an estimate of that facility's marginal social costs (that is, estimated marginal value of its external costs). This is conceptually straightforward, but extremely complex in practice. In theory, such adders would be equivalent to the imposition of optimal emissions tax, imposed only on electric generators. The adder would, like the tax, force firms to internalize an optimal amount of external costs.").

81. Eisen et al., *supra* note 11, at 509–10.

82. Some proposals for adders include "a sliding-scale percentage reduction to the per-unit ($/ kW-month or $/MW-day) clearing price could be established based on the average, annualized carbon

The basic idea of a carbon adder is that the RTO or ISO determines a price per Mwh that reflects the cost of carbon per Mwh. This could be calculated by determining the overall damage carbon emissions have on a region (within a reasonable estimate determined by the RTO/ISO or FERC) and dividing it by the number of Mwh of electricity demanded.[83] The resulting number would be the price per Mwh of carbon to be imposed as a carbon adder. By providing a more accurate price of the environmental costs of different generation sources, this could encourage increased use of lower carbon-emitting sources.[84] The now more expensive high carbon-emitting sources would come online less, as their bids would often be too high to meet demand.[85] Through a carbon adder the individual RTO/ISO or FERC could set a price—the adder—for each ton of carbon dioxide emitted during generation and include that adder in wholesale electricity rates.[86]

The rationale underpinning the carbon adder is that it accurately prices carbon externalities while preserving the current economic dispatch model for generators.[87] Currently, generators bid in wholesale markets based on their marginal cost of generating electricity. Plants with lower marginal costs for generating electricity run more often, whereas more expensive plants are only accepted when prices are higher due to increased demand—typically during peak hours or severe weather events. Without a price on carbon, high carbon-emitting generators like coal plants can bid into the wholesale markets at low prices and therefore are more often able to sell their power than generators with higher marginal costs, but lower carbon emissions, like natural gas plants. A price on carbon would move the highest carbon-emitting plants behind lower carbon-emitting sources, meaning high carbon sources would run less, resulting in lower carbon dioxide emissions, while still preserving the current framework of the wholesale market model.[88]

Three RTOs/ISOs have announced they are considering implementing a carbon adder,[89] and FERC has hosted a technical conference to discuss these

---

footprint of fossil-fuel resources, whereas a price adder above the clearing price could be established for zero-emitting resources." Meg Gottstein & Lisa Schwartz, *Roadmap 2050: A Practical Guide to a Prosperous Low Carbon Europe*, Regulatory Assistance Project, May 2010, at 23, https://perma.cc/X9J6-HZP6.

83. This is an oversimplified example of how to calculate a carbon adder, and is not a proposal of PJM, ISO-NE, or ISO-NY.

84. Weismann & Webb, *supra* note 74.

85. *See* example *supra* Section I: The United States Electricity Grid.

86. *See supra* Section I: The United States Electricity Grid.

87. Bade, *supra* note 75.

88. Bade, *supra* note 75; *see also* Weismann & Webb, *supra* note 74, at 5 ("To ensure a level playing field in the generation market, FERC could include a carbon adder, reflecting the cost of environmental damage caused by electricity generation's carbon dioxide emissions, in wholesale electricity rates.").

89. *Markets*, ISO-NE, https://perma.cc/9683-HTL3, (last visited Dec. 13, 2021); *Initial PJM Carbon Pricing Study Results Presented*, PJM (Jan. 21, 2020), https://perma.cc/DWB4-6TXD; Press Release, New York ISO, Siena Poll Shows Broad Support for NYISO's Carbon Pricing Proposal (Sept. 28, 2020), https://perma.cc/6KDB-EX2Y.

issues.[90] In November 2014, PJM released a report[91] that found a regional approach to reducing carbon emissions based on a carbon price would be 30% less expensive than if states handled this problem alone.[92] The report concluded that total compliance costs through regional collaboration among PJM states would be an estimated $35 billion in 2020, while an individual state approach would cost approximately $45 billion.[93] Through a regional approach, states would agree to add a price on carbon in their State Implementation Plans under the Clean Air Act,[94] which would then affect wholesale bid prices.[95] A regional carbon adder could also minimize price variability in the wholesale region because shared resources would create one carbon price for PJM generation. Acting alone, coal-intensive states like Indiana and West Virginia could have significantly higher carbon prices than neighboring states like Maryland and Virginia.[96]

In March 2015, PJM released a revised report[97] that again found that an adder would be cheaper and easier to implement than having states implement their own carbon prices or choose an entirely different strategy. Without a price on carbon, states would have to cap emissions from each individual power plant to comply with current emissions goals, an inefficient process that could result in serious reliability issues according to Ohio PUC Commissioner Asim Haque.[98]

ISO-New England is also considering a carbon adder. It has initiated a study to determine the best approach to instituting a price on carbon.[99] States could direct these utilities to use the proceeds to offset customer costs or for other purposes, such as the Low Income Home Energy Assistance Program (LIHEAP).[100] Incorporating a carbon adder would require a change to the ISO tariff and FERC approval under its just and reasonable standard, but it would not require any state or federal legislative action.[101]

The New York ISO is the third ISO considering a carbon price.[102] Under its proposal, "all internal suppliers would be subject to carbon charges equal to the

---

90. FERC, Technical Conference regarding Carbon Pricing in Organized Wholesale Electricity Markets, Docket No. AD20-14-000, available at https://perma.cc/3ZMS-5WNG.

91. *See* Herman K. Tarbish, *Regional Approach Can Make Complying with EPA Rules 30% Cheaper*, Utility Drive (Nov. 30, 2014), https://perma.cc/QG7R-DKXK.

92. *Id.*

93. *Id.*

94. *Id.*

95. *Id.*

96. *Id.*

97. Bade, *supra* note 75.

98. Bade, *supra* note 75.

99. Todd Schatzki, et al., *Pathways Study: Evaluation of Pathways to a Future Grid*, ISO-NE at 1-22 (Apr. 2022), https://perma.cc/BT8P-FFFH.

100. *Integrating Markets and Public Policy*, *supra* note 78.

101. Jerry Elmer & David Ismay, *IMAPP: Initial Solution Proposals Follow-up Questions*, Conservation Law Foundation (Aug. 26, 2016), https://perma.cc/PK9W-3M2T.

102. Walton, supra note 78.

product of their point-of-production carbon emissions and the applicable per-unit carbon price."[103] The proposal did not set a target carbon price, but a study conducted in relation to the proposal found that a $40/ton carbon adder would be reasonable.[104] The proposal noted that "Because the carbon charges on suppliers would increase the variable costs of carbon-emitting generation dispatched by the NYISO, it would raise the energy market clearing price whenever carbon emitting resources are on the margin. . . . All suppliers, including clean energy resources, would receive the higher energy price, net of any carbon charges due on their emissions."[105]

There are also proposals for carbon adders and other carbon reduction mechanisms and policies at the state level.[106] Edison Electric Institute commented, "[S]tates could choose to require in-state resources to include a carbon adder predetermined by EPA when bidding resources into the market."[107] "This would alter the dispatch of units to better reflect their CO2 emissions and provide a mechanism for continued emission reductions from existing units in a way that both respect[s] system requirements and ensured reliable operation of the portions of the grid administered by the RTOs."[108] Nine states have begun collaborating to try to create a coalition solution to this issue, but have faced resistance[109] Vermont's governor is reportedly opposed to a carbon adder, and even dismissed requests to study the idea, whereas voters in Washington rejected implementing a carbon adder in 2016.[110] Carbon adders at either the state or regional level could be an effective first step towards carbon restructuring, but both face hurdles.

PJM published the initial results from a study it did on its carbon adder proposal on January 14, 2020.[111] Although it found the results promising, it ultimately concluded that "PJM is not proposing to establish a carbon price or policy."[112] New York's ISO admitted its plans to introduce a carbon adder were

---

103. *Id.*

104. *Id.*

105. *Id.*

106. *See, e.g.*, Hammond & Spence, *supra* note 80, at 197; Katherine A. Trisolini, *All Hands On Deck: Local Governments and the Potential for Bidirectional Climate Regulation*, 62 Stan. L. Rev. 669, 743–44 (2011) (demonstrating importance of local government efforts); Robert Walton, *Lawmakers from 9 states vow to put a price on carbon*, Utility Dive, Feb. 1, 2018, https://perma.cc/4D5S-A6GB; *cf.* Cary Coglianese & Jocelyn D'Ambrosio, *Response, Policymaking Under Pressure: The Perils of Incremental Responses to Climate Change*, 40 Conn. L. Rev. 1411, 1429 (2008) (contending subnational efforts undermine effectiveness of national efforts).

107. *Comments of the Edison Electric Institute on Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units*, Edison Electric Inst., 166 (Dec. 1, 2014), https://perma.cc/N9KT-G9ES.

108. *Id.*

109. Robert Walton, *Lawmakers from 9 states vow to put a price on carbon*, Utility Dive, Feb. 1, 2018, https://perma.cc/4D5S-A6GB.

110. *Id.*

111. *Initial PJM Carbon Pricing Study Results Presented*, PJM (Jan. 21, 2020), https://perma.cc/DWB4-6TXD.

112. *Id.*

in a "holding pattern," and is merely "looking to incorporate the social cost of carbon into its markets."[113] A report created for ISO-NE noted that "[a]n effective multi-sector price on carbon can help guide the region through a challenging transformation."[114] But although the "key considerations associated with the introduction of a multi-sector carbon price are well understood," and a carbon adder would "efficiently" help New England reach its greenhouse gas reduction goals, so far ISO-NE has not implemented such a policy.[115] In 2019 it did start an alternative bidding system to allow higher cost renewables to bring their power online where they would otherwise not be price competitive.[116] But ISO-NE conceded this is a "second-best solution for reducing (or eliminating) carbon from the power sector."[117] Instead, it appears to be passing the metaphorical buck and deferring to individual state action to achieve these policy goals.[118] It will be imperative to overcome this lethargy and advance these proposals in the coming years. Ratcheting up political pressure will likely be necessary to move the process forward.

An explicit price on carbon will help the energy sector address its role in climate change.[119] A carbon adder would provide a financial incentive to existing fossil fuel generators to increase their plant efficiency to minimize their carbon emissions and thus the size of their carbon adder fees.[120] To the extent such increased efficiencies are, or become, technically infeasible, a carbon adder would still be useful, because it would help reduce carbon emissions by creating a new revenue stream and incentive for the construction and interconnection of low carbon emitting power generators.[121] A carbon adder would be "the simplest, easiest, and most efficient way to rapidly reduce [greenhouse gas] emissions in the electricity sector" while "enabling consumers to pay accurate, competitive prices without the risk of paying for stranded costs."[122] The implementation of

---

113. Robert Walton, *New York ISO carbon pricing proposal 'in a holding pattern,' says grid chief*, Utility Dive (Jan. 23, 2020), https://perma.cc/CKF3-XZUA; *Carbon Pricing in Wholesale Energy Markets: Frequently Asked Questions*, New York ISO (Apr. 16, 2020), https://perma.cc/4RHX-S8AN.

114. Joseph Cavicchi, *Carbon Pricing for New England*, ISO-NE, 5 (Sept. 17, 2020), https://perma.cc/E5F9-LQBA.

115. *Id.* at 9.

116. *Markets*, ISO-NE, https://perma.cc/9683-HTL3 (last visited Nov. 30, 2022).

117. *Id.*

118. *Id.* ("Pricing carbon within the competitive market structure is the simplest, easiest, and most efficient way to rapidly reduce GHG emissions in the electricity sector. Moreover, placing a realistic price on carbon would enable consumers to pay accurate, competitive prices without the risk of paying for stranded costs. However, New England state policymakers and other stakeholders responsible for putting this approach into motion have not pursued a carbon-pricing option that effectively reflects decarbonization goals, neither economywide nor in the electricity sector.").

119. *See* Michael J. Kormos, *Technical Conference on Environmental Regulations and Electric Reliability, Wholesale Electricity Markets, and Energy Infrastructure*, FERC, 3 (Feb. 19, 2015), https://perma.cc/4KMU-9TKZ.

120. Bade, *supra* note 75.

121. Elmer & Ismay, *supra* note 101.

122. *Markets*, ISO-NE, https://perma.cc/9683-HTL3 (last visited Nov. 30, 2022).

carbon adders is the first step in the process of carbon restructuring. Advocates and stakeholders interested in addressing the structural issues contributing to climate change should focus on this step. It is crucial that carbon adders gain traction at the state and RTO/ISO levels.

III. HISTORY OF RESTRUCTURING

Since the 1970s, FERC has steadily restructured sectors of the energy industry to make the industry more competitive, allow the industry to more efficiently meet the country's energy demands and provide just and reasonable energy prices. This Section focuses on identifying common themes in the restructuring of the electricity sector and the natural gas sector in order to develop a blueprint for a path forward towards carbon restructuring.

A. RESTRUCTURING THE ELECTRICITY SECTOR

The electricity sector provides an example of how to successfully restructure part of the energy industry. The sector was traditionally dominated by vertically integrated[123] state-sanctioned monopolies within a defined territory.[124] But there were problems with this system. Utilities are required to have enough capacity to meet peak demand.[125] However, hour-to-hour demand is usually well below peak demand.[126] In the traditional decentralized system, each isolated utility had to build and maintain its own power reserve capabilities to be able to safely meet peak demand when it was needed.[127] This created a glut of reserve capacity, which was an inefficient allocation of resources.[128] The cost of these inefficiencies was ultimately passed onto the utilities' customers through higher rates.[129]

Responding to this problem, FERC reasoned that if these utilities were interconnected into a grid that allowed a utility to draw on the reserves of another area when it was experiencing peak demand, it could more efficiently allocate resources and reduce the need to build and maintain more reserve capacity than was

123. Vertical integration refers to a company controlling multiple levels of the production and distribution of a product. *See* Adam Hayes, *Vertical Integration*, Investopedia (Aug. 26, 2022), https://perma.cc/7KEA-LVMX. For example, a company that manufactures jewelry buys gold mines and a truck company. In this context, the utility controls the generation of power from power plants as well as the distribution of power along transmission lines. Traditionally, states have allowed for this and restricted competitors from competing in the utilities' defined market areas. *See* Eisen et al., *supra* note 11, at 66.

124. Eisen et al., *supra* note 11, at 74.

125. Gainesville Utils. v. Fla. Power Corp., 402 U.S. 515, 518 (1971); Eisen et al., *supra* note 11, at 86-87.

126. *Baseload Power*, Energy Education, https://perma.cc/JN58-QDC7 (last visited Nov. 28, 2022).

127. *See Gainesville Utils.*, 402 U.S. at 518.

128. *See* Eisen et al., *supra* note 11, at 59, 643; *see also* Gregory C. Jantz, Note and Comment, *Incentives for Electric Generation Infrastructure Development*, 2 Tex. J. Oil, Gas, & Energy L. 373, 373–77 (2007) (describing the country's electricity market before the 1990s).

129. *See id.*; *Markets*, ISO-NE, (last visited Nov. 28, 2022) https://perma.cc/9683-HTL3.

necessary.[130] And so FERC established RTOs and ISOs, which took some autonomy and influence away from utilities in the name of creating a more efficient system that could provide more just and reasonable rates to customers.[131] The RTOs and ISOs could coordinate a region's power grid and allocate electricity where it was needed with minimal redundancies.

There were other problems with the traditional system as well. The utilities had little motivation to reduce costs under the traditional ratemaking model.[132] The structure of the ratemaking formula used under the traditional model incentivized increasing expenditures to receive the highest possible rate.[133] What's more, regulators and advocacy groups relied on the utilities to disclose information in ratemaking hearings, which created information asymmetry.[134] Utilities also controlled the transmission lines, which meant that even if an independent power generator were to come online, it would have no way to transmit its power to end users, because the utility would not allow a competitor to use its transmission lines.[135] In summary, the traditional approach to electricity generation and transmission was characterized by high transaction costs, information asymmetry, bottlenecks, and perverse incentives, all of which created a system with unnecessarily high electric rates in both the wholesale and retail markets.[136] To address these issues, FERC and other stakeholders began chipping away at utilities' monopolistic hold on the electricity sector to make power generation and transmission competitive and cost effective.

The restructuring of electricity generation and transmission began slowly, with individual lawsuits challenging utilities' refusal to transfer independently generated power over their transmission lines; a process known as wheeling.[137] In *Otter Tail Power v. United States*,[138] the Supreme Court held that a traditional utility was required to "wheel" a municipality's independently produced power, but the utility could charge just and reasonable rates for that wheeling service.[139] After the decision, states authorized the creation and operation of "qualified

130. *See RTOs and ISOs*, FERC (May 3, 2022), https://perma.cc/BTT6-Q3H8.

131. *See supra* Section I: The United States Electricity Grid.

132. David B. Spence, *The Politics of Electricity Restructuring: Theory vs. Practice*, 40 Wake Forest L. Rev. 417, 422 (2005).

133. The traditional ratemaking formula was R=B*r+O, where R is the utility's revenue requirement, B is the utility's rate base (capital investment), r is the rate of return the utility needs on its rate base in order to compensate investors, and O is the utility's operating expenses. For an in-depth discussion of the traditional ratemaking model, *see* Eisen et al., *supra* note 11, at 28-29.

134. Spence, *supra* note 132, at 421.

135. Eisen et al., *supra* note 11, at 651.

136. Spence, *supra* note 132, at 421.

137. *See, e.g.*, Otter Tail Power v. United States, 410 U.S. 366 (1973); *Gainesville Utils.*, 402 U.S. at 516-517; *see also* Eisen, et al., *supra* note 20, at 526.

138. *Otter Tail Power*, 410 U.S. 366.

139. *Id.* at 380–81 (holding FERC was to determine the justness and reasonableness of those rates); *see also Gainesville Utils.*, 402 U.S. at 516-517 (coming to a similar holding in a case involving a Florida utility).

facilities" (QFs) through the use of the states' police powers. QFs are typically small generators, such as renewable energy sources or municipality-owned generators, rather than large utilities; they need access to transmission lines to transport their electricity. This expanded independent generation and made power generation more competitive.[140]

Seeing the positive impacts these approaches were yielding, Congress began expanding FERC's authority to mandate wholesale transmission wheeling to promote competition and lower rates.[141] Congress passed the Public Utility Regulatory Policies Act ("PURPA") in 1978.[142] PURPA expanded FERC's authority to *order* utilities to wheel power generated by QFs.[143] This was the first federal statutory crack in the utilities' monopolistic fortress guarding generation and transmission, or as Richard Hirsh called it "the process by which the traditional structure of the utility system disintegrated."[144] PURPA authorized independently owned generators to operate, and, just as importantly, it required utilities to allow these QFs to transport their power along the utilities' transmission lines.[145] Congress went further. The Energy Policy Act of 1992 expanded this authority, allowing FERC to order wheeling if it finds the situation to be just and reasonable on a case-by-case basis.[146] Congress hoped this statute would increase competition in the electricity transmission sector.[147]

Taking the baton from the states and Congress, FERC issued Order 888 in 1996,[148] which required all transmission lines over which FERC had jurisdiction[149] to wheel power from independent generators, with very limited exceptions.[150] FERC relied on its remedial powers in §§ 205–06 of the FPA as justification for Order 888, arguing that the utilities were creating rates that were not just and reasonable by refusing to wheel independently generated power from QFs.[151] FERC's interpretation over its jurisdiction of transmission of power was confirmed when the Supreme Court upheld Order 888 in *New York v. FERC*.[152] However, FERC's authority over transmission was checked by the Fifth Circuit in *Florida Power & Light Co. v. FERC*,[153] which held that FERC could not

140. *See PURPA Qualifying Facilities*, FERC (June 11, 2021), https://perma.cc/7JK2-GK2M.
141. *Id.* at 530-33.
142. 16 U.S.C. §§ 2601-2645.
143. *Id.*; Eisen et al., *supra* note 11, at 530–33.
144. Richard F. Hirsh, Power Loss: The Origins of Deregulation and Restructuring in the American Electric Utility System 119 (1999).
145. Eisen et al., *supra* note 20, at 631.
146. 42 U.S.C. §§ 13201-13574, 16 U.S.C. §824k; Eisen et al., *supra* note 11, at 531, 641.
147. Eisen et al., *supra* note 11, at 531.
148. *Id.* at 642; FERC Order No. 888, 18 C.F.R. §§ 35, 385.
149. FERC's jurisdiction extends to all transmission of electricity per § 201 of the FPA. *See generally Otter Tail Power*, 410 U.S. at 366; New York v. FERC, 535 U.S. 1, 2 (2002).
150. Eisen et al., *supra* note 11, at 531; FERC Order No. 888, 18 C.F.R. §§ 35, 385.
151. *See* FERC Order No. 888, 18 C.F.R. §§ 35, 385.
152. New York v. FERC, 535 U.S. 1, 2.
153. Fla. Power & Light Co. v. FERC, 660 F.2d 668, 677–79 (5th Cir. 1981).

compel the wheeling of integrated utilities. As a result, FERC could only compel wheeling over interstate transmission, or transmission of utilities that have voluntarily separated their generation and transmission roles. The upshot of these cases and Order 888 was an increased role for FERC in the regulation of generation and transmission, and the opening of the transmission system for more generators.

As a result of the increased competition of electricity generation and the equal access requirements to transmission lines, there was little incentive for utilities to invest in new transmission lines. In the past, a utility could build a transmission line and then add that to its customers' rates through the traditional ratemaking formula. In a world where the price of generation was now determined by the free market, utilities could no longer afford to do this and then have third-party generators use that transmission infrastructure for free. In an attempt to address this unforeseen consequence, FERC agreed to take over control of regional transmission grids where regions asked for FERC to step in. FERC did this through Order 888[154] and Order 2000,[155] which created Independent System Operators ("ISO") and Regional Transmission Organizations ("RTO") respectively: independent organizations reporting to FERC that are responsible for the reliability and security of the region's transmission system.[156] Through this process, FERC created the regional wholesale markets that electricity generators bid into to sell their electricity.[157] By 2000, these basic elements of the modern electricity system were in place.

FERC expanded its authority in the transmission space with Order 1000 in 2011,[158] which mandated transmission planning and standardized cost allocation, even in regions that did not have an RTO or ISO.[159] FERC, however, was careful to clarify that its purpose was not to favor renewables; "[b]ecause we are not mandating the consideration of any particular transmission need driven by a Public Policy Requirement, we disagree with [commenters] that say we are favoring renewable energy resources over other types of resources."[160] Nevertheless, most observers seem to agree that the effect of Order 1000 was greater renewables integration.[161]

---

154. FERC Order No. 888, 18 C.F.R. §§ 35, 385; Eisen et al., *supra* note 11, at 642.

155. FERC Order No. 2000, 18 C.F.R. §35; Eisen et al., *supra* note 11, at 546.

156. *Id*. at 683-793.

157. Two of these regional wholesale markets are ISO-New England and PJM Interconnect.

158. Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, 76 Fed. Reg. 49,842 (Aug. 11, 2011); *see also* FERC, *Order No. 1000 – Transmission Planning and Cost Allocation* (Nov. 9, 2021), https://perma.cc/M7E5-QVEP.

159. Hammond & Spence, *supra* note 79, at 200.

160. Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, 76 Fed. Reg. at 49,878.

161. *E.g*., Christopher J. Bateman & James T.B. Tripp, *Toward Greener FERC Regulation of the Power Industry*, 38 Harv. Env't L. Rev. 275, 307 (2014); Hammond & Spence, *supra* note 79, at 200.

There is some appeal to approaches that set overarching rules rather than singling out a particular source of generation. But those approaches will nonetheless create the perception of the government picking winners and losers. To the extent that such changes make the markets operate more efficiently, federal and state regulators should be indifferent to impacts on certain fuel sources.[162] However, politics does not operate in this sort of world. The EPA's Clean Power Plan, for example, is meant to apply broadly, but it has generated significant opposition from many different groups that perceive a disadvantage.[163] This in turn led to President Trump's ultimately doomed attempt to revitalize the coal industry, following the Obama administration's perceived attempts to dismantle it.[164] The ultimate impact of politics on these sorts of energy policy decisions can be hard to foresee.

Some themes emerge upon review of the electricity system's restructuring process. First, states and individuals identified a problem that restricted their access to just and reasonably priced electricity. In response, individual adjudication set precedent for FERC and the states to make changes to this sector.[165] Next, states began to use their police powers to make changes to areas of the electricity sector under their control.[166] Congress then reinforced these activities through the passage of carefully limited legislation that would impact the entire nation.[167] Given this groundswell of support, FERC utilized these pieces of legislation and court opinions to approve a number of sweeping orders that completed the restructuring of the electricity sector nationwide.[168] These orders were upheld in federal court, cementing their validity and upholding the new structure of this sector.[169] A similar pattern can be seen in the restructuring of the natural gas sector.

B. RESTRUCTURING THE NATURAL GAS SECTOR

The natural gas sector provides another example of a successful restructuring strategy.[170] The need to deregulate the natural gas sector was the result of, as one commentator noted, "a pair of unfortunate public policy errors made by Congress

---

162. *See* Hammond & Spence, *supra* note 80, at 200.

163. *Id.* at 196 n.292.

164. *See* Eric Lipton, *'The Coal Industry Is Back,' Trump Proclaimed. It Wasn't.*, N.Y. Times (Oct. 18, 2020), https://perma.cc/AW5Z-3FDA.

165. *See, e.g.*, Otter Tail Power v. United States, 410 U.S. 366 (1973).

166. In this case, approving the construction and operation of independent generators.

167. Public Utility Regulatory Policies Act (PURPA), 16 U.S.C. § 2601; Energy Policy Act of 1992, 42 U.S.C. § 13201.

168. FERC Order No. 888, 18 C.F.R. §§ 35, 385; Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, 76 Fed. Reg. at 49,842; FERC Order No. 2000, 18 C.F.R. §35.

169. *See, e.g.*, New York v. FERC, 535 U.S. 1, 2 (2002).

170. Richard J. Pierce, Jr., *The Evolution of Natural Gas Regulatory Policy*, 10 Nat. Res. & Env't 53, 53 (1995) ("Deregulation of the market for natural gas surely ranks as one of the most significant accomplishments in natural resource law.").

in 1938 and by the U.S. Supreme Court in 1954."[171] During the early twentieth century, natural gas was not vertically integrated in the way electric utilities were. Rather, there were many producers of natural gas but only a few companies controlled the pipelines to transport that gas. This created high barriers to entry and large economies of scale.[172] In 1935 the Federal Trade Commission found that these pipelines were overcharging for the transportation of natural gas and determined the pipelines constituted a natural monopoly.[173] In response, Congress passed the Natural Gas Act ("NGA")[174] in 1938, which adopted a public utility cost of service ratemaking model, allowing the pipelines to maintain their monopoly power.[175]

After World War II, the price of natural gas skyrocketed as new markets on the East Coast opened up to suppliers and long-term fixed price contracts expired.[176] In the 1954 *Phillips Petroleum Co. v. Wisconsin*[177] decision, the Supreme Court held that the NGA required the Federal Power Commission (FPC)—the predecessor of FERC—to regulate the price of natural gas sold by independent gas producers at the wellhead into interstate commerce.[178] After this decision, natural gas producers became subject to FPC (and later FERC) cost-of-service-ratemaking for any gas the producers sold to an interstate pipeline.[179] This created two markets for natural gas: an interstate market and an intrastate market.

By 1978, natural gas producers were no longer willing to sell their gas on the interstate market, with its federally mandated low prices, preferring to sell into the unregulated intrastate markets at significantly higher prices.[180] Put differently, gas was available to customers in states that produced natural gas, but nowhere else.[181] This led to critical natural gas shortages in states without their own natural gas resources.[182] Because interstate buyers could not compete on price, they offered take-or-pay contracts, where the buyer agreed to either take all the natural

171. *Id.*

172. Eisen et al., *supra* note 11, at 546.

173. *Id.*

174. 15 U.S.C. § 717.

175. *Id.* § 717(b) (providing jurisdiction to FERC over "the transportation of natural gas in interstate commerce, to the sale in interstate commerce of natural gas for resale for ultimate public consumption for domestic, commercial, industrial, or any other use, and to natural-gas companies engaged in such transportation or sale . . . but shall not apply to any other transportation or sale of natural gas or to the local distribution of natural gas or to the facilities used for such distribution or to the production or gathering of natural gas."); *see* Eisen, et al., *supra* note 11, at 545–46.

176. Eisen et al., *supra* note 11, at 546–47.

177. Phillips Petroleum Co. v. Wisconsin, 347 U.S. 672 (1954).

178. *See id.* at 685 ("Regulation of the sales in interstate commerce for resale made by a so-called independent natural-gas producer is not essentially different from regulation of such sales when made by an affiliate of an interstate pipeline company.").

179. Eisen et al., *supra* note 11, at 548.

180. *Id.* at 549.

181. *Id.*

182. *The History of Regulation*, NaturalGas.org (Sept. 20, 2013), https://perma.cc/BU5Q-M47H; Pierce, Jr., *supra* note 170, at 54.

gas a well-produced, or pay for the gas anyway for a long period of time.[183] Through these contracts, buyers in states without natural gas hoped to incentivize producers to sell on the lower priced interstate market in return for guarantees of long term revenues backed by contracts.

In response to these problems, Congress enacted the Natural Gas Policy Act of 1978 ("NGPA").[184] Congress intended for the NGPA to deregulate the wellhead gas market.[185] However, the NGPA distinguished between the old natural gas take-or-pay contracts, which the NGPA imposed price ceilings on, and the new natural gas that could be sold in the now deregulated interstate market without any price ceiling.[186] Underlying the NGPA was an assumption that market forces are relatively weak and require many years to yield beneficial results.[187] Thus, Congress assumed the quantity of gas demanded and supplied would shift slowly in response to changes in the price of gas.[188] It expected the statutory ceiling prices to remain below the market price of gas for the entire period in which the NGPA authorized gradual replacement of ceiling prices with prices determined by market forces.[189] Congress also believed the shortage would persist for many years.[190] Congress was wrong on all counts.

Instead, as the price of gas increased, more producers agreed to take-or-pay contracts, operating under the assumption that demand would remain high for the foreseeable future.[191] These unregulated high natural gas prices eventually reached a point where demand decreased. The pipelines had long-term obligations to buy natural gas at high prices through take-or-pay contracts, but had no one to sell the gas to.[192] As a result, the take-or-pay natural gas was left in the ground, but pipelines still had to pay huge fees for their failure to take the gas, which forced many pipelines into bankruptcy.[193] Producers that had not signed long term take-or-pay contracts were ready and willing to supply natural gas at cheaper prices. But those producers could not get the pipelines to buy their natural gas because the pipelines were required to sell the natural gas they agreed to buy from the take-or-pay producers first, so they were not going to buy even more gas, even if it was at a lower price.[194] Demand dwindled, plunging the market price of natural gas, which led to producers not being able to sell their gas,

183. Eisen et al., *supra* note 11, at 551-53.
184. *See* 15 U.S.C. § 3301.
185. Eisen et al., *supra* note 11, at 549.
186. *See* 15 U.S.C. § 3301; *see also* Eisen et al., *supra* note 11, at 549; *Natural Gas Policy Act of 1978*, Ballotpedia, https://perma.cc/NT3G-X45V (last visited Nov. 28, 2022).
187. Eisen et al., *supra* note 11, at 549.
188. Pierce, Jr., *supra* note 170, at 55.
189. *Id.*
190. *Id.*
191. *Id.*
192. *Id.*
193. *Id.*
194. *Id.*

and pipelines and producers going bankrupt.[195] By the mid-1980s, the natural gas industry was in crisis.

FERC finally began to undo these disastrous policy decisions between 1985 and 1992. In 1985 FERC issued Order 436.[196] According to one well-respected scholar in this space, Order 436 "used regulatory sticks and carrots to coerce interstate pipelines into agreeing to become equal access."[197] Under the Order, pipelines that agreed to transport natural gas owned by third parties had to transport it on the same terms as the pipelines transported their own natural gas.[198] Then in 1986 FERC issued Order 451, which changed the ceiling price rules so producers and pipelines could adjust their prices to be compatible with real market prices.[199] The new equal access to pipelines and flexible pricing policies reduced pipelines' monopoly power and allowed large customers and companies that distributed gas in a local market to buy directly from the producers.[200] This increased competition and lowered prices, which in turn increased demand for a now-affordable fuel source.[201] FERC followed these successes up with Order 500 in 1987,[202] which allowed pipelines to buyout take-or-pay contracts at discounted rates and split the costs between the pipelines, producers, and customers;[203] finally taking the weights off the necks of the drowning gas companies.

By 1989 FERC's efforts had produced sufficient results to convince Congress to enact the Natural Gas Wellhead Decontrol Act ("NGWDA").[204] The NGWDA provided statutory approval for FERC's actions deregulating the natural gas sector, eliminated wellhead price ceilings by January 1, 1993, and encouraged FERC to take further actions to make the natural gas sector more competitive.[205] In response to Congress' mandate, FERC issued Order 636 in 1992, amending Order 500.[206] This Order completely deregulated the natural gas sector.[207] It required interstate pipelines to sell their natural gas, transportation, and storage services separately. It also required pipelines to provide equal access to all natural gas producers at the same price.[208]

---

195. *Id.*

196. FERC Order No. 436, 18 C.F.R. pts. 2, 157, 250, 284, 375, and 381 (1985).

197. Pierce, Jr., *supra* note 170, at 55 (internal quotations omitted).

198. *Id.*

199. FERC Order No. 451.

200. Pierce, Jr., *supra* note 170, at 55.

201. *Id.*

202. FERC Order No. 500, 18 C.F.R. pts. 2 and 284 (1987); United States Energy Information Association, *FERC Order 500: Take-or-Pay Cost Recovery* (1987) (last visited Oct. 23, 2022), https://perma.cc/57GC-LKTS.

203. United States Energy Information Association, *FERC Order 500: Take-or-Pay Cost Recovery* (1987) (last visited Oct. 23, 2022), https://perma.cc/57GC-LKTS.

204. *See* 15 U.S.C. § 3301.

205. Pierce, Jr., *supra* note 170, at 84–85.

206. *Id.*; *see* FERC Order No. 636.

207. *See* 15 U.S.C. § 3301; Pierce, Jr., *supra* note 170, at 84–85.

208. *See* 15 U.S.C. § 3301; Pierce, Jr., *supra* note 170, at 84–85.

Today, market participants in the natural gas sector have become significantly more efficient and innovative. Gas is being found, produced, stored, and transported at much lower rates.[209] The restructured natural gas sector has also spurred the development of a robust interconnected pipeline network.[210] These changes have, in short, been an "extraordinary success" and allowed the natural gas industry to "perform[] extremely well" during periods of high demand, such as unusually cold winters.[211]

The restructuring of the natural gas sector provides an excellent example of FERC's sweeping power to change a sector that has created rates that are not just or reasonable. States and private companies illuminated a serious problem—that natural gas prices and supply were not providing Americans with proper access to natural gas at just and reasonable rates, leading to the inability of critical infrastructure like hospitals and schools to heat themselves during the winter. In response, FERC began implementing probing and experimental orders, such as Order 436, allowing for voluntary open access pipelines.[212] Once this strategy proved successful, FERC issued further orders addressing other problems in the industry, such as Orders 451[213] and 500[214], which tackled price ceilings and take-or-pay contracts. Liking what it saw, Congress validated these actions and provided FERC with further mandates in the natural gas sector by passing NGWDA.[215] This ultimately led to a sweeping national order that required mandatory open-access pipelines and an end to the vertical integration of production and transportation of natural gas through Order 636.[216]

There are several parallels between the restructuring of the electricity sector and natural gas sector. Individual litigation and private action identified a problem. In cases like *Otter Tail* and the market failures of the natural gas industry before the 1980s, litigation and private action identified a problem. That precedent allowed regulators to develop experimental policy initiatives, like the QFs in the electricity sector and FERC Orders 436, 451, and 500 in the natural gas sector. Then, seeing the success of those initiatives, Congress passed legislation providing FERC with the tools it needed to build on those policies. In the electricity sector, this showed itself through PURPA and the Energy Policy Act of 1992, allowing FERC to issue Rules 888, 1000, and 2000. In the natural gas sector, this manifested in the NGWDA and the issuing of Rule 636. In sum, state and individual stakeholder action led to experimental steps by FERC, which led to Congressional action, which in turn led to further activity by FERC. This

209. Pierce, Jr., *supra* note 170, at 84–85.
210. *Id.*
211. *Id.*
212. FERC Order No. 436, 18 C.F.R. pts. 2, 157, 250, 284, 375, and 381 (1985).
213. FERC Order No. 451.
214. FERC Order No. 500, 18 C.F.R. pts. 2 and 284 (1987).
215. 15 U.S.C. § 3301.
216. *See* FERC Order No. 636.

feedback loop acts like a pebble dropped high in the mountains that starts an avalanche.

C. LESSONS FROM THE CLEAN POWER PLAN

The Clean Power Plan's failure also provides lessons on carbon restructuring (as well as a cautionary tale). While the Obama Administration's ambitious attempts to pass the Clean Power Plan (CPP) were laudable, Republican control of Congress and the White House ensured it would fail.[217] The EPA's attempt to curb carbon emissions through the CPP faced considerable opposition, particularly from Republican lawmakers and the fossil fuel industry.[218] In a letter written to FERC, three Republican congresspeople—including Alaska Senator Lisa Murkowski, chairman of the Energy and Natural Resources Committee—argued that the EPA "lacks the mission and the expertise to determine what is necessary to maintain the reliability of the nation's electric grid."[219]

The CPP attempted to reduce greenhouse gas emissions from the electricity sector by pressuring states to use lower carbon-emitting sources of electricity, for example, nuclear, natural gas, and renewables, instead of coal.[220] This would have inserted environmental considerations into power dispatch decisions.[221] But Republican appointees to FERC, as well as other prominent critics, were adamantly opposed to the CPP because it would have begun a transition to an environmental dispatch model, which opponents of such a plan argue is outside of FERC's authority to set just and reasonable rates.[222]

Ultimately, the CPP was not to be. The EPA repealed the CPP in June 2019 and replaced it with the Affordable Clean Energy rule.[223] The CPP provides a cautionary tale of how not to reform the energy sector. Rather than using the proven strategy that successfully restructured the electricity and natural gas sectors

---

217. *See* Tom DiChristopher, *Trump is Killing Obama's Clean Power Plan. The Hard Part Comes Next*, CNBC (May 1, 2017), https://perma.cc/B57G-CJAC; Hammond, *President Trump's Executive Order on "Energy Independence," Annotated by an Environmental Law Expert*, *supra* note 23.

218. *See* Bobby Magill, *The Suit Against the Clean Power Plan, Explained*, Climate Central (Apr. 12, 2016), https://perma.cc/GTZ5-WFXN.

219. Letter from Sen. Fred Upton, Sen. Ed Whitfield & Sen. Lisa Murkowski to Fed. Energy Regul. Comm'n (Nov. 24, 2014) https://perma.cc/43JQ-NRF2.

220. *See* Standards for Performance for Greenhouse Gas Emissions for New Power Stationary Sources: Electric Generating Units, 79 Fed. Reg. 1430 (proposed Jan. 8, 2014); *See* Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34830 (proposed June 18, 2014).

221. Hammond & Spence, *supra* note 79, at 214.

222. *See FERC Perspective: Questions Concerning EPA's Proposed Clean Power Plan and Other Grid Reliability Challenges Before Subcomm. on Energy & Power of the Comm. on Energy & Commerce*, 113th Cong., 116-126 (2014) (statement of Philip D. Moeller, Comm'r, FERC) (also arguing that environmental dispatch is unworkable); *see also* William W. Hogan, *Electricity Market Design: Environmental Dispatch* (Dec. 4, 2014) (Harv. Elec. Pol'y Grp. Working Paper).

223. *Electric Utility Generating Units: Repealing the Clean Power Plan*, EPA (last visited Dec. 14, 2021), https://perma.cc/H6VP-YWH4.

in the past, through bottom-up work, involving states, stakeholders, Congress, and FERC, the Obama Administration attempted to force massive changes to the energy industry through an EPA rule. No role for FERC; no role for Congress; no role for the states; no role for private stakeholders. Just a new rule that would, in theory, completely change the power dispatch model and pricing scheme. Is there any wonder it faced such stiff opposition?

IV. A SOLUTION: A GRASSROOTS CARBON RESTRUCTURING MOVEMENT

The United States, and the world, needs to move away from carbon-emitting sources of energy in order to stave off the worst effects of climate change. We need to start now. While regulation and action at the state level offer one avenue for the United States to reduce its carbon emissions, a coordinated federal effort would have significant advantages. The proposed carbon adders in the PJM Interconnect, ISO-New York, and ISO-New England could be the first step towards restructuring the electricity sector to a low—and eventually no—carbon emitting electricity grid. These proposed carbon adders are similar to the first steps taken towards restructuring the electric and natural gas industries in that the RTOs/ISOs identified a problem that needs to be addressed and implemented test balloon policies to address the issue. The carbon adder proposals recognize that the current pricing model does not accurately reflect the full cost of fossil fuel produced electricity, creating unjust and unreasonable rates. Similarly, participants in the electricity sector recognized that monopolistic utilities were creating unjust and unreasonable electricity rates and recommended competitive markets.[224] In the natural gas sector, a complex web of regulations led to natural gas shortages that required action.[225]

From here, there are two possible paths forward: (1) sweeping regulatory change led by FERC, or (2) gradual chipping away at carbon-emitting power producers, which this Article refers to as the "death by a thousand cuts" approach. Given the lack of political will at the federal level, the second approach is the most realistic and most likely to succeed in the short term. This death by a thousand cuts approach allows the clean energy sector and environmentalists to continue reducing carbon emissions over the next five to ten years without significant federal support and will lay the groundwork for major national policy enactment once the regulatory and political environments are more favorable to such changes. It also does not risk the same fate as the CPP.

The stage is not yet set for a national policy of carbon restructuring. A strong foundation must first be laid. Stakeholders can use the blueprint established by the restructuring of the electricity and natural gas industry to achieve carbon restructuring at the regional level. Carbon restructuring is currently at Step 1:

224. *See supra* Section III.A: *Restructuring the Electricity Sector*.
225. *See supra* Section III.B: *Restructuring the Natural Gas Sector*.

identifying the problem and implementing test balloon policies—here the carbon adders. From there, individual precedent-setting adjudication and community action in Step 2 can lead to a tipping point of further lawsuits and state and federal agency action in Step 3. By the time these steps have been carefully followed, a strong foundation will be in place, which a future administration can use to pursue the final act of restructuring at Step 4: sweeping federal legislation or a major FERC order.

A. THE JUMPING OFF POINT: IDENTIFYING THE PROBLEM

Restructuring starts with identifying a problem. In the restructuring of the electricity sector, the first step involved identifying a problem in the market that created unjust and unreasonable electricity rates due to the utilities' monopoly power and control of transmission lines.[226] In the natural gas sector, the problem was the complex web of regulations that led to a natural gas shortage and identifying the associated market failures.[227] Here, the problem is that fossil fuel power generators do not have to factor in the full costs associated with the generation of fossil fuels because the wholesale markets do not price the cost of carbon emissions. This means that fossil fuels are being subsidized by ratepayers, hindering the development of less expensive and cleaner renewable sources of energy. PJM, ISO-New York, and ISO-NE have brought this problem to light with their proposed carbon adders. Those test balloons are currently being buffeted in a turbulent atmosphere.

B. BABY STEPS: INITIAL PRECEDENT SETTING ADJUDICATION

The next step in the restructuring process is individual adjudication challenging specific and limited aspects of the problem. Examples from cases involving the electricity and natural gas sectors are illustrative. In *Otter Tail Power* a small town challenged a single utility's refusal to wheel (i.e., transport) third party electricity along the utility's transmission lines.[228] The utility made the traditional argument that it needed to maintain its monopoly (i.e., the status quo) in order to maintain its profitability.[229] The Supreme Court was not convinced by this argument, and the utility was required to wheel independently generated power.[230] This set an important precedent that future challengers could rely upon and gave many states the legal footing they needed to establish QFs as an alternative to the utility monopolies.

The natural gas sector, meanwhile, provides a cautionary tale of how individual adjudication can have negative consequences, at least in the short term.

---

226. *See supra* Section III.A: *Restructuring the Electricity Sector*.
227. *See supra* Section III.B: *Restructuring the Natural Gas Sector*.
228. *Otter Tail Power*, 410 U.S. 366, 366 (1973).
229. *See id*. at 380.
230. *See id*. at 380-81.

Phillips Petroleum Co. v. Wisconsin demonstrated that courts do not always have the expert knowledge to understand the implications of their decisions within the energy industry. In *Phillips*, the Court's decision actually *created*—or at the least exacerbated—the problems in the natural gas sector by requiring FERC to set rates for interstate pipelines.[231] As this Article discusses in detail above,[232] this decision created a system that led to gas shortages, price spikes, and bankruptcy of pipelines and other industry participants for almost three decades before Congress intervened.[233] Despite the problems *Phillips* created, it still achieved the overarching goal of this step; it forced further and more sweeping action. However, *Phillips* highlights a potential risk of pursuing litigation in the courts at this early stage. Things could get worse before they get better.

Here, individual stakeholders and states could utilize the strategy used in natural gas and electricity by bringing lawsuits against FERC and the RTOs and ISOs. These suits could challenge the regulators' failure to make rates just and reasonable by allowing the wholesale markets to not include the price of carbon in the price of electricity in the bidding process, the effects such failures have on citizens, and other issues. For example, individuals could bring suits challenging whether carbon pricing is an economic consideration or whether FERC and its RTOs and ISOs can consider non-economic costs.[234] Scholars have argued that FERC can include the social cost of carbon.[235] In the example discussed above in Section I,[236] Wind Farm A could bring a lawsuit against FERC for its failure to properly account for the cost of carbon in the wholesale markets. This would be at least arguably within FERC's scope of review, as it creates an unjust and unreasonable rate.[237] Additionally, Wind Farm A would have standing, as FERC's failure has a direct economic impact on the wind farm. At least one such case has already been brought.[238] Lawsuits that are brought repeatedly, even if they fail, bring attention to the need to change a law. This is the strategy of climate change litigation more generally and could work well in the energy sector.

The problem with litigation in the courts is that if a court rules against advocates for carbon restructuring it could set the carbon restructuring movement back years, similar to the situation in *Phillips*.[239] Advocates of carbon restructuring would

---

231. Phillips Petroleum Co. v. Wisconsin, 347 U.S. 672, 683-684 (1954).

232. *See supra* Section III.B. *Restructuring the Natural Gas Sector*.

233. Pierce, Jr., *supra* note 170, at 53–55.

234. Eisen, *supra* note 74, at 1843.

235. *Id.* (providing detailed analysis of a number of cases that upholds this and similar principles of FERC action).

236. *See supra* Section I: The United States Electricity Grid.

237. *See* Eisen, *supra* note 74 (discussing FERC's expansive authority to interpret what makes rates just and reasonable, including considering environmental costs).

238. *See* Juliana v. United States, 217 F.Supp.3d 1224, 1248 (D. Or. 2016). In *Juliana* a district court judge ruled that plaintiffs had standing to pursue a claim against the federal government for its failure to adequately address climate change. This case was reversed on appeal in *Juliana v. United States*, 947 F.3d 1159 (9th Cir. 2020).

239. *Phillips*, 347 U.S. 672; Pierce, Jr., *supra* note 175, at 53.

then have to rely on Congress to overturn the court's decision *through legislation*. This would also likely take years in the current political environment.

Therefore, a safer approach would be to pursue agency adjudications within FERC. Under this approach, the RTO or ISO would adopt a carbon adder, and then have that decision reviewed by FERC. Upon review, FERC must determine whether it—and by extension, the RTO/ISO—has the power to consider non-economic costs in setting rates. The traditional reading of FERC's empowering statute is that it can only consider economic costs in policymaking decisions.[240] However, some scholars have argued that the costs of carbon are in fact economic, and therefore RTO/ISOs could avoid this issue altogether by stressing the economic impact of greenhouse gas emissions.[241] This seems reasonable given the extensive literature and economic models demonstrating how a failure to price carbon has an economic impact on rates, generators, and consumers.

If FERC agreed with this interpretation, the carbon adders would have the regulatory gloss and legal protection of a final rule of an agency. Fossil fuel interest groups would almost certainly challenge this decision in court. A court would likely have to apply either the deferential *Chevron* or equally deferential arbitrary and capricious standard to determine whether the agency's decision in the adjudication was permissible, and would therefore review a favorable finding of fact for the agency.[242] Relying on agency decision making and reinforcement through subsequent litigation could achieve the same results as initial test litigation. This approach would limit the risk of an adverse holding by litigating the matter before experts at FERC rather than a generalist judge, and with deferential standards of review by courts would after FERC's (hopefully) favorable decision.[243] Agency adjudication could then also tee-up court litigation, with a favorable position for the agency. Therefore, the first baby steps of adjudication should occur within the agency and then move into the courts, with the purpose of setting precedents that other individuals, state, and federal agencies can expand on later. These baby steps set the stage for the tipping point.

---

240. *See* FPA § 201, 16 U.S.C. §§ 791 et. Seq.; *See generally* Grand Council of the Creees (of Quebec) v. FERC, 198 F.3d 950 (D.C. Cir. 2000); *see also* Eisen et al., *supra* note 11, at 508–511.

241. *See generally* Eisen, *supra* note 74.

242. *See* Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837, 865 (1984); 5 U.S.C. § 706(2)(A) ("The reviewing court shall hold unlawful and set aside agency actions, findings, and conclusions found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law[.]"). Depending on the exact procedural posture and facts of the case, a court may also review FERC's adjudicatory decision under other tests, all of which are deferential to FERC's decision. *See, e.g.*, Skidmore v. Swift & Co., 323 U.S. 134 (1944); Barnhart v. Walton, 535 U.S. 212 (2002); Motor Vehicle Mfrs Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29 (1983).

243. *See, e.g.*, FERC v. Electric Power Supply Assoc. et al., 577 U.S. 260 (2016) (deferring to FERC's decision under arbitrary and capricious standard of review). *But see* Michigan v. EPA, 576 U.S. 743 (2015) (holding that although the language of the statute was ambiguous, it does not support EPA's interpretation, and therefore EPA's interpretation was arbitrary and capricious).

C. THE TIPPING POINT: INCREASED PRESSURE FROM COURTS AND AGENCIES

The next step towards carbon restructuring will involve continued pressure from individuals through adjudication and lobbying efforts in conjunction with actions by states. In the electricity sector, once the court in *Otter Tail* ruled that wheeling could be allowed under certain circumstances, the principle was established and a flurry of other lawsuits were filed, challenging other utilities' refusal to wheel power.[244] This began to erode utilities' traditional monopoly power over transmission. The traditional utility model was further weakened by states' use of their police powers granting independent power generators the right to operate within areas that were traditionally part of a utility's territory.[245] In natural gas, FERC began implementing limited experimental orders like Order 436—allowing *voluntary* open access pipelines—to determine whether certain policies had a positive effect on the sector and prices.[246] These actions began to chip away at the traditional structures, which were ultimately to blame for the market inefficiencies. As the momentum grew, established parties opposed to such changes could do very little, even though there had been no major federal action up to this point.

In the context of carbon restructuring, states can begin to use their powers to add prices to carbon where possible. One way to do this would be through a mechanism similar to PJM's proposed carbon adder, where RTOs/ISOs require states to impose a carbon adder on power plants as part of their State Implementation Plan requirements under the Clean Air Act.[247] This approach seems unlikely to succeed today, however, as it relied on the CPP, which did not come into force.[248] Alternatively, states that are not connected to RTO/ISOs could include their own carbon adders in ratemaking decisions. This could avoid several of the issues of the ISO-NE carbon adder proposal, as states already have this power under the Clean Air Act. State agencies would face less risk of challenges to setting such rates under the claim that FERC cannot consider non-economic factors in setting just and reasonable rates. Even though there is a good argument that FERC, as the supervising authority, does have this power, such a state-focused approach would be more in line with the historic trends of restructuring in the electricity sector.[249] Furthermore, this approach would not expose the restructuring movement to unnecessary risk too early from opposing forces as occurred in the natural gas sector with the *Phillips* decision.[250]

---

244. *See supra* Section III.B: *Restructuring the Electricity Sector*.

245. *See id.*

246. *See supra* Section III.B: *Restructuring the Natural Gas Sector*.

247. *See supra* Section III: History of Restructuring.

248. *See* Tom DiChristopher, *Trump is Killing Obama's Clean Power Plan. The Hard Part Comes Next*, CNBC (May 1, 2017), https://perma.cc/B57G-CJAC; Hammond, *President Trump's Executive Order on "Energy Independence," Annotated by an Environmental Law Expert*, *supra* note 23.

249. *See supra* Section III.A: *Restructuring the Electricity Sector* (states using their police power to allow QFs to connect to the grid and opening up electricity generation to competition).

250. *See* Phillips Petroleum Co. v. Wisconsin, 347 U.S. 672 (1954).

In conjunction with state action, industry participants can begin to put more pressure on representatives and consumers. The nuclear and renewable sectors have considerable power in this regard.[251] This pressure will force state and federal representatives to pursue even further action in carbon restructuring. This is similar to *Phillips*, where natural gas industry participants and consumers increased pressure and awareness on their representatives to show how nonsensical the post-*Phillips* industry structure had become and how important legislative reform was.[252] This led to the initial tentative legislative actions to reform the natural gas sector with Orders 436 and the Natural Gas Wellhead Decontrol Act, before the sweeping national Order 636 completely restructured the natural gas sector.[253]

Concerned individuals can also advocate for carbon restructuring. In Iowa for example, local activists and grassroots leaders were able to stop the construction of new coal plants and convince the major energy company in the region, MidAmerican, to reduce its energy production from coal by 50%.[254] Similarly, community groups in New York have reduced the cost of solar panel installations by combining several small projects into larger projects and have increased pressure on local representatives to move away from fossil fuels.[255] Activism in Alaska spurred the federal government to suspend oil and gas leases in the Arctic National Wildlife Refuge in June 2021.[256] It is worth noting that there will be powerful groups like oil and coal companies that oppose these sorts of actions, and will assert their own pressure on politicians and regulators. However, with the increased momentum created by adjudication in agencies and the courts, and increased consumer awareness of the importance of carbon restructuring—or climate change more generally—it is possible proponents of carbon restructuring will be able to assert more pressure on these representatives than their opponents. This step lays the foundation for the final step: sweeping national policies that cement carbon restructuring as the order of the day.

---

251. OpenSecrets.org, *Nuclear Energy Institute* (Dec. 14, 2021), https://perma.cc/QM92-7LCS. (nuclear industry spent $2.3 million on lobbying efforts in 2020); OpenSecrets.org, *Alternative Energy Production and Services* (Dec. 14, 2021 https://perma.cc/X5MX-QEQU (renewable energy industry made $13.2 million in federal contributions in 2020). *Compare* OpenSecrets.org, *National Rifle Assn* (last visited Dec. 14, 2021), https://perma.cc/5G6D-L98A (National Rifle Association spent $2.2 million on lobbying efforts in 2020).

252. *Phillips*, 347 U.S. 672.

253. Pierce, Jr., *supra* note 175, at 53–55.

254. Mary Anne Hitt, *The Untold Grassroots History of Iowa's Clean Energy Transformation*, Sierra Club (Apr. 28, 2016), https://perma.cc/4T7Y-MAHY.

255. *See* Amy Zimmer, *How Grassroots Efforts Are Making Solar Energy Affordable*, DNAInfo.com (May 13, 2015), https://perma.cc/D873-S5VL.

256. *How Grassroots Environmental Activism Has Changed the Course of History*, Goldman Environmental Prize (Sept. 1, 2021) https://perma.cc/EE8Y-RF5V.

D. THE FINAL ACT: NATIONAL REFORM

These actions will lay the foundation for a national carbon restructuring policy, which is ultimately necessary to ensure that the entire electricity sector stops using fossil fuels. Only national reform can force the entire electricity sector to wean itself off fossil fuels for generation. Individual state and regional action can only go so far. In the electricity sector, *Otter Tail* and state action paved the way for Congress to pass PURPA, which created further independent power generators across the country, and eventually Order 888 by FERC, which mandated wheeling, and required functional unbundling of the parts of a utility's business—e.g., generation, transmission, and distribution—of all utilities over which FERC had jurisdiction.[257] This effectively restructured the electricity sector on a national level. Given the gradual process through which this occurred, and the establishment of a strong foundation of precedent, FERC's actions, which would have seemed extreme a decade or two earlier, were ratified by the Supreme Court in *New York v. FERC*.[258]

In natural gas, the success of experimental FERC orders like Order 436,[259] 451[260], and 500,[261] set the stage for Order 636, which required mandatory open access pipelines and the functional unbundling of natural gas companies' production, transmission, and distribution services.[262] This finished a decade of work that restructured the natural gas sector. Order 636 was upheld by the courts in *United Distribution Cos. v. FERC*[263] and *Amoco Production Co. v. Natural Gas Pipeline Co. of America*.[264]

The stage is not yet set for a national policy of carbon restructuring. The dismal failure of the CPP makes that clear. However, a strong foundation must be in place once the political climate and power balance have shifted, so that national reform can be quickly implemented either through congressional or agency action. It was national reform that finally ended the monopolistic nature of the electricity sector and corrected the market failures in the natural gas sector. But that national reform could not be implemented without the foundation developed through Steps 1 through 3. Building this foundation to allow for rapid implementation of national reform is critical because only national reform will ultimately ensure the electricity sector as a whole stops relying on fossil fuels for generation. The effects of climate change are only getting worse. Therefore, actors with agency must act now to build the strong foundation necessary for national reform.

---

257. *See supra* Section III.A: *Restructuring the Electricity Sector*.
258. New York v. FERC, 535 U.S. 1 (2002).
259. Allowing voluntary open access to gas pipelines.
260. Adjusting prices in the interstate markets to more accurately reflect supply and demand.
261. Determining a procedure to buy out the disastrous take or pay contracts.
262. *See* FERC Order 636; *see* Eisen et al., *supra* note 11, at 549-50.
263. *United Distribution Co. v. FERC*, 88 F.3d 1105 (D.C. Cir. 1996).
264. *Amoco Production Co. v. Natural Gas Pipeline Co. of Am.*, 82 F.E.R.C. P 61038 (F.E.R.C. 1998).

We must take these initial steps now so that Congress and FERC can build on them later. We must move slowly now to move fast in the future.

Proponents of carbon restructuring can use the blueprint this Article has identified from an analysis of common themes from the restructuring of the natural gas and electricity sectors to achieve carbon restructuring. The movement towards carbon restructuring is currently at Step 1: identifying the problem. From here, individual precedent setting adjudication at the agency and court level at Step 2 can lead to a tipping point of further lawsuits and state and federal agency and legislative action influenced by increased pressure from adjudications and stakeholders and consumers at Step 3. By the time these steps have been carefully completed, a strong foundation will be built upon which a future administration can use to pressure FERC and Congress to pursue the final act of restructuring through a sweeping national order or through a statutory mandate.

CONCLUSION

The United States can achieve carbon restructuring and by doing so avoid the worst of the effects of climate change. Even without a supportive federal government, there are several initial steps that can and must be taken to pave the way for national restructuring. Carbon adders are the first cracks in the chokehold the fossil fuel industry has on the energy sector. Even without federal support, the energy industry and concerned stakeholders can begin to move towards carbon restructuring in the immediate future and continue to work towards solving one of the greatest challenges humanity faces in the twenty first century. These grassroots efforts will prove vital as worse and worse impacts of climate change begin to manifest. Our society will need to move quickly to implement national reform, and for that to occur, a strong foundation must be in place. Without it, the tempests of the coming century will wash away whatever slipshod structure is hastily erected to weather the storm.