FRAMING ENERGY RESILIENCE

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"[T]he questions we ask shape the answers we get."
—*Martin Rein & Donald Schön*[1]

"*You have brains in your head. You have feet in your shoes. You can steer yourself any direction you choose.*"
—*Dr. Seuss*[2]

Abstract

The climate is rapidly changing. As the planet warms, extreme weather events such as hurricanes will occur more often, at greater intensity, and for longer periods of time. Such events pose significant risks to the nation's energy system, which relies on physical infrastructure. Faced with this reality, policy actors have urged energy companies to make their systems more resilient to withstand extreme events. On the surface, resilience would appear to be one policy goal on which everyone involved in the climate change debate could agree. All sides want to avoid power outages and fuel shortages. But the apparent policy consensus masks the tension between ensuring a continuous energy supply and enabling further climate change. Making energy pipeline networks more resilient, for example, will continue the nation's dependency on fossil fuels and ultimately create more extreme events—leading to the need for further investment in the infrastructure that worsens the risks.

This essay uses an interdisciplinary approach based in public policy theory—policy frame analysis—to explore the concept of resilience and its implications. According to this theory, policy actors construct and negotiate a policy problem through framing, a process of selecting and synthesizing information to create an "interpretive schema" that provides meaning and structure to the policy issue. A policy frame analysis of resilience reveals that federal and state actors have framed the policy problem as protecting the nation's energy supply from external threats. By using this frame, the policy actors have focused attention on the

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1. Martin Rein & Donald Schön, *Problem Setting in Policy Research,* USING SOCIAL RESEARCH IN PUBLIC POLICY MAKING 236 (C.H. Weiss ed., 1977).
2. THEODOR SEUSS GEISEL, OH THE PLACES YOU'LL GO 2 (1990).

negative effects of climate change while downplaying the energy sector's responsibility for it. The essay concludes by reframing the policy problem to focus on protecting people and the environment.

I. INTRODUCTION

Climate change—the pressing environmental issue of our time—poses significant risks to the energy system. Extreme weather events such as hurricanes already create havoc, and the negative effects will only grow worse as the earth continues to warm. In response to dire warnings from scientists, policymakers have called for a more resilient energy infrastructure that will withstand or quickly recover from extreme events. Resilience is the rare climate policy goal that unites government, industry, and environmentalists. But delve underneath the surface consensus, and the concept is less clear. How can an energy system be resilient if it relies on the burning of fossil fuels, accelerating climate change and causing ever-increasing stress on infrastructure? The answer is particularly important for fuel transportation systems—such as oil and natural gas pipeline networks—because the infrastructure delivers fossil fuels for ultimate use. To understand the meaning of resilience and its policy implications, this essay draws on public policy theory to analyze policy actors' framing of the policy problem.[3]

II. CLIMATE CHANGE AND ENERGY SYSTEMS

As the world continues to emit greenhouse gases into the air—largely by burning fossil fuels for energy—the climate is rapidly changing.[4] Global temperatures have increased 1.8°F since the beginning of the twentieth century.[5] The past few decades have

3. *See* Maarten Hajer & David Laws, *Ordering through Discourse, in* 3 THE OXFORD HANDBOOK OF PUBLIC POLICY 257 (Robert E. Goodin et al. eds., 2008).

4. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: MITIGATION OF CLIMATE CHANGE 125 (Ottmar Edenhofer et al eds., 2014) (stating that the energy sector is the largest source of greenhouse gas emissions, 34% of the total).

5. U.S. GLOBAL CHANGE RES. PROGRAM, CLIMATE SCIENCE SPECIAL REPORT 10 (2017), https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf [hereinafter CLIMATE SCIENCE SPECIAL REPORT].

been warmer than any other period in modern history,[6] and warming has only accelerated in this century: eighteen of the nineteen warmest years in the planet's history have occurred since 2001.[7] Even if the world stabilizes its emissions of greenhouse gases, temperatures in the United States will rise 2.5°F by 2050.[8] This warming will cause extreme weather events to occur more often, at greater intensity, and for longer periods of time.[9] In the next few decades, there will be more heat waves reaching very high maximum temperatures.[10] More hurricanes and "atmospheric rivers" will form, delivering large amounts of rain and high winds to coastal areas.[11] Inland, there will be more intense rain events that may lead to increased flooding.[12] Warmer temperatures and less rainfall in the West will produce more large wildfires,[13] leading to landslides in mountain areas as stripped soils flow down slopes after rainstorms.[14] If the world fails to take action and greenhouse gas emissions grow, these events will only become more severe.[15]

Extreme weather events pose significant risks to the nation's energy system, which relies on physical infrastructure to extract and process energy resources, transport and store fuel, and generate and transport electricity.[16] In heat waves, power plants and electricity transmission and distribution lines perform less efficiently, even as the demand for electricity to power air

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6. *Id.* at 10, 13 (stating that "average temperatures in recent decades over much of the world have been much higher, and have risen faster during this time period than at any time in the past 1,700 years or more, the time period for which the global distribution of surface temperatures can be reconstructed").

7. *See* "John Schwartz and Nadja Popovich, *It's Official: 2018 Was the Fourth-Warmest Year on Record,* N.Y. Times, Feb. 6, 2019, https://www.nytimes.com/interactive/2019/02/06/climate/fourth-hottest-year.html.

8. CLIMATE SCIENCE SPECIAL REPORT, *supra* note 5, at 11.

9. *Id.* at 47.

10. *Id.* at 197.

11. *Id.* at 257 (defining atmospheric rivers as "narrow streams of moisture" that make landfall on the West Coast and "account for 30%–40% of the typical snowpack and annual precipitation in the region and are associated with severe flooding events").

12. *Id.* at 207, 241–42 (noting that a "complex mix of processes complicates the formal attribution of observed flooding trends to anthropogenic climate change and suggests that additional scientific rigor is needed in flood attribution studies" but concurring with the Intergovernmental Panel on Climate Change that "projected increases in heavy rainfall would contribute to increases in local flooding in some catchments or regions").

13. *Id.* at 231, 243–44.

14. *Id.* at 415.

15. 2 U.S. GLOBAL CHANGE RES. PROGRAM, IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT 34 (2018), https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf [hereinafter IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES].

16. *Id.* at 179; U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-74, CLIMATE CHANGE: ENERGY INFRASTRUCTURE RISKS AND ADAPTATION EFFORTS 8–10 (2014), https://www.gao.gov/assets/670/660558.pdf.

conditioning increases.[17] If surface waters become too warm, power plants can no longer use this water for operations and must shut down.[18] Hurricanes and intense rain storms can flood surface facilities such as electric substations or refineries, as well as underground facilities such as oil or natural gas production wells and energy pipelines.[19] High winds knock down power lines and damage wind and solar installations.[20] Intense wildfires burn infrastructure in their path.[21] Landslides rupture energy pipelines and undermine surface structures.[22]

One extreme weather event can damage many different aspects of the energy system. In 2012, the largest Atlantic hurricane in history—Superstorm Sandy—made landfall in New Jersey.[23] The hurricane caused a storm surge of nine feet above the average high tide level in New York Harbor.[24] High winds and flooding severely crippled the region's electricity infrastructure. Several power plants, including nuclear plants, shut down,[25] and 7,000 electric transformers and 15,200 power line poles were damaged.[26] More than eight million customers lost power in twenty-one states, affecting a region extending from North Carolina to Maine and

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17. IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES, *supra* note 15, at 181.

18. *Id.* at 182; *see* U.S. DEP'T OF ENERGY, DOE/PI-0013, U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER i, 2 (2013), https://www.energy.gov/sites/prod/files/2013/07/f2/20130710-Energy-Sector-Vulnerabilities-Report.pdf [hereinafter U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER].

19. IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES, *supra* note 15, at 179–80.

20. *Id.* at 179.

21. *Id.* at 176, 183; U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER, *supra* note 18, at 2, 13 (describing damage to a transmission system from a wildfire in California).

22. *Cf.* JUDSEN BRUZGUL ET AL., POTENTIAL CLIMATE CHANGE IMPACTS AND ADAPTATION ACTIONS FOR GAS ASSETS IN THE SAN DIEGO GAS AND ELECTRIC COMPANY SERVICE AREA 48 (2018), https://www.energy.ca.gov/sites/default/files/2019-07/Energy_CCCA4-CEC-2018-009.pdf (stating that "actual landslide events are localized, currently rare, and affect a small number of customers . . . [but] when landslides do occur, impacts are significant," and "the risk may increase in the future, and steps may need to be taken to protect critical assets in exposed areas").

23. David Sandalow, Acting Under Sec'y of Energy, Remarks at the Columbia University Energy Symposium: Hurricane Sandy and Our Energy Infrastructure *in* U.S. DEP'T OF ENERGY, Nov. 30, 2012, https://www.energy.gov/articles/hurricane-sandy-and-our-energy-infrastructure.

24. U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER, *supra* note 18, at 6.

25. *Id.*; U.S. DEP'T OF ENERGY, OFF. OF ELEC. DELIVERY & ENERGY RELIABILITY, COMPARING THE IMPACTS OF NORTHEAST HURRICANES ON ENERGY INFRASTRUCTURE 13 (Apr. 2013), https://www.energy.gov/sites/prod/files/2013/04/f0/Northeast%20Storm%20Comparison_FINAL_041513b.pdf [hereinafter COMPARING THE IMPACTS OF NORTHEAST HURRICANES ON ENERGY INFRASTRUCTURE].

26. U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER, *supra* note 18, at 6.

from the East Coast to Illinois and Wisconsin.[27] The hurricane also disrupted fuel transportation networks. Flooding damaged petroleum terminals, pipelines, and ports at a major petroleum distribution hub in New York Harbor, constraining petroleum supply to the mid-Atlantic and the northeast.[28] Natural gas distribution pipelines were flooded, shutting down service to 170,000 customers.[29] The hurricane's effects rippled through interconnections in the energy system. Gasoline stations could not operate fuel pumps without electricity, leading to gasoline shortages in the New York City area.[30] After a terminus facility in New Jersey lost electric power, the operator of Colonial Pipeline, a major pipeline transporting refined products from the Gulf Coast to the northeast, shut down a segment of its line for five days.[31]

In the wake of Superstorm Sandy and other extreme weather events, policymakers have called for a more resilient energy system. In 2013, the federal government issued an updated National Infrastructure Protection Plan to "[s]trengthen the security and resilience of the Nation's critical infrastructure," which pointedly included the increased risks of extreme weather events caused by climate change.[32] The same year, the U.S. Department of Energy assessed the energy sector's vulnerabilities to climate change and concluded that "efforts to improve the climate preparedness and resilience of the energy sector will

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27. *Id.*; COMPARING THE IMPACTS OF NORTHEAST HURRICANES ON ENERGY INFRASTRUCTURE, *supra* note 25, at iv.

28. COMPARING THE IMPACTS OF NORTHEAST HURRICANES ON ENERGY INFRASTRUCTURE, *supra* note 25, at 14.

29. The 2017 Storm Hardening Collaborative Report, at 5, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of KeySpan Gas East Corporation and The Brooklyn Union Gas Company, No. 16-G-0058 (N.Y. Pub. Serv. Comm'n Apr. 16, 2018) (reporting that the hurricane "brought unprecedented flooding that caused extensive damage to National Grid's downstate gas infrastructure" and that 140,000 customers were impacted). *Cf.* COMPARING THE IMPACTS OF NORTHEAST HURRICANES ON ENERGY INFRASTRUCTURE, *supra* note 25, at 25 (stating that 32,000 natural gas customers in New Jersey did not have service but also concluding that the storm "did not have a major impact on natural gas infrastructure and supplies in the Northeast").

30. U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER, *supra* note 18, at 6; COMPARING THE IMPACTS OF NORTHEAST HURRICANES ON ENERGY INFRASTRUCTURE, *supra* note 25, at 24.

31. COMPARING THE IMPACTS OF NORTHEAST HURRICANES ON ENERGY INFRASTRUCTURE, *supra* note 25, at 17.

32. U.S. DEP'T OF HOMELAND SEC., NATIONAL INFRASTRUCTURE PROTECTION PLAN 8 (2013), https://www.dhs.gov/sites/default/files/publications/national-infrastructure-protection-plan-2013-508.pdf (explaining that "[o]ngoing and future changes to the climate have the potential to compound the[] risks [of extreme weather] and could have a major impact on infrastructure operations" and citing the 2010 National Security Strategy's statement that "the danger from climate change is real, urgent, and severe").

need to increase."[33] States such as New York and Massachusetts have moved forward and are requiring utilities to develop resilience strategies,[34] while California is currently considering the issue.[35] In 2018, the Federal Energy Regulatory Commission (FERC) opened a docket on the resilience of the bulk electric power system to risks from high-impact, low-frequency events such as extreme weather.[36]

III. FRAMING THE POLICY PROBLEM

To understand resilience as a policy response to the effects of climate change on the energy system, this essay turns to public policy theory—particularly a line of scholarship that analyzes policy through ordering of discourse.[37] In traditional policy analysis (and in some legal scholarship), the policy problem is considered self-evident; the work of policymaking and law is in rationally analyzing the problem to develop policy solutions.[38] In discourse theory, however, defining the problem is an act of interpretation and representation.[39] Policy actors construct and negotiate the policy problem through framing, a process of selecting and synthesizing information to create an "interpretive schema" that provides meaning and structure to the policy

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33. U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER, *supra* note 18, at ii.

34. Order Establishing Eversource's Revenue Requirement, D.P.U. 17-05 (Mass. Dep't Pub. Util. Nov. 30, 2017); Order Approving Electric, Gas and Steam Rate Plans in Accord with Joint Proposal, No. 13-E-0030 (N.Y. Pub. Serv. Comm'n Feb. 21, 2014); *see also* DANIEL SHEA, NATIONAL CONFERENCE OF STATE LEGISLATURES, HARDENING THE GRID: HOW STATES ARE WORKING TO ESTABLISH A RESILIENT AND RELIABLE ELECTRIC SYSTEM 1 (2018) (discussing policies aimed at establishing a reliable and resilient electric system).

35. Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation, R.18-04-019 (Cal. Pub. Util. Comm'n Apr. 26, 2018) (considering how electricity and natural gas public utilities can incorporate climate change adaptation, including resilience, into their planning and operations).

36. Order Terminating Rulemaking Proceeding, Initiating New Proceeding, and Establishing Additional Procedures, RM18-1-1000 and AD18-7-000, 162 FERC ¶ 61,012, (Jan. 8, 2018).

37. Hajer & Laws, *supra* note 3, at 256.

38. Merlijn van Hulst & Dvora Yanow, *From Policy "Frames" to "Framing": Theorizing a More Dynamic, Political Approach,* 46 PUB. ADMIN. 92, 96 (2014) (describing the traditional question as "What's to be done?"). For one example of this approach in legal scholarship, *see* Jonathan Schneider & Jonathan Trotta, *What We Talk about When We Talk about Resilience,* 39 ENERGY L.J. 353 (2018).

39. Hajer & Laws, *supra* note 3, at 256 (stating that "frame analysis takes, to varying degrees, language, or more specifically language use, as the organizing framework for understanding society") (emphasis omitted).

issue.[40] The resulting policy frame is not just a representation of the policy problem—the policy solutions themselves are embedded within the frame.[41]

This vision of policymaking turns traditional policy analysis on its head. The work of policymaking is in the discourse that constructs and gives meaning to a policy problem, while the policy solutions are, if not self-evident, at least largely dictated by the process of definition. That is, "[f]rames are not 'out there;' they *are* the sense we make by identifying some features as 'symptomatic,' relegating others to the background, and binding together the salient features . . . into a pattern that is coherent and graspable."[42] Public policy scholars use frame analysis because it explains the importance of discourse to actual policy formation; a similar concept has been utilized by other fields, such as economics, psychology, sociology, and communication.[43]

Policy actors engage in three interpretative tasks when framing a policy problem: naming the features of the problem; selecting the boundaries of the problem; and developing a narrative that explains the importance of the problem.[44] Actors "name" the problem by highlighting characteristics of the policy issue that are consistent with their understanding and creating labels that reflect these characteristics.[45] Actors select the boundaries of the problem by choosing certain characteristics and downplaying others, constructing a picture frame "within which one is allowed to focus on what is inside as distinct from what is outside."[46] Finally, actors develop narratives by telling generic stories that diagnose the problem and prescribe the answer—explaining "what needs fixing and how it might be fixed."[47]

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40. Martin Rein & Donald Schön, *Frame-Critical Policy Analysis and Frame Reflective Policy Practice,* 9 KNOWLEDGE & POL'Y 85, 89 (1996).

41. *Id.* at 89–90; van Hulst & Yanow, *supra* note 38, at 99 (arguing that "framing lays the conceptual groundwork for possible future courses of action, and actors intersubjectively, interactively construct the socio-political world in and on which they act").

42. Hajer & Laws, *supra* note 3, at 259 (quoting Rein & Schön, *Problem Setting in Policy Research, supra* note 1, at 239).

43. *Id.*; Barbara Gray, *Review: Frame Reflection,* 21 ACAD. MGMT. REV. 576, 576 (1996). Perhaps because the concept is so popular, it has been criticized as amorphous and lacking in verifiability. *See* Hajer & Laws, *supra* note 3, at 256–57. But public policy scholars continue to use and refine the approach. *Cf.* van Hulst & Yanow, *supra* note 38, at 93 (comparing the "static" approach to frames in social movement theory to a more dynamic approach of framing, and arguing that the latter is necessary in policy analysis).

44. van Hulst & Yanow, *supra* note 38, at 96.

45. Rein & Schön, *Problem Setting in Policy Research, supra* note 1, at 239. *Cf.* van Hulst & Yanow, *supra* note 38, at 99 (describing naming, selecting, and categorizing).

46. Rein & Schön, *Frame-Critical Policy Analysis and Frame Reflective Policy Practice*, *supra* note 40, at 89.

47. *Id.*

In the context of climate change and energy systems, policy actors generally describe the policy problem as a threatened energy supply. In 2013, for example, the U.S. Department of Energy stated that "[c]limate change and extreme weather threaten the sustainable, affordable, and reliable supply of energy across the United States and around the globe."[48] In 2018, the U.S. Global Change Research Program, which is overseen by a federal steering committee of twelve agencies and the National Science Foundation, framed the problem similarly: "The Nation's economic security is increasingly dependent on an affordable and reliable supply of energy . . . [C]limate change and extreme weather events are affecting the energy system . . ., threatening more frequent and longer-lasting power outages and fuel shortages."[49]

Embedded in this framing is the ultimate policy goal: a continuous supply of energy. To achieve this goal, policy actors invoke the concept of resilience. The federal government defines resilience broadly, as "the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents."[50] As applied to energy systems, energy regulators define resilience as the energy system's ability to adapt to, withstand, and recover quickly from disruptive events.[51] The U.S. Global Change Research Program identifies two categories of actions to improve the resilience of an energy system: "planning and operational measures that seek to

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48. U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER, *supra* note 18, at 36.

49. IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES, *supra* note 15, at 178. *See also* PACIFIC GAS & ELECTRIC CO., CLIMATE CHANGE VULNERABILITY ASSESSMENT AND RESILIENCE STRATEGIES 5 (2016) ("From extreme weather to rising tides, the threat that climate change poses to crucial sectors of the U.S. economy is becoming all too apparent . . . PG&E . . . is strongly committed to building greater climate resilience. Doing so is integral to the company's ongoing efforts to provide safe, reliable, affordable and clean energy throughout Northern and Central California."). *But see* Juliet Eilperin et al., *White House to Select Federal Scientists to Reassess Government Climate Findings, Sources Say*, DENVER POST (Feb. 24, 2019), https://www.denverpost.com/2019/02/24/white-house-federal-scientists-reassess-government-climate-findings/ (reporting that the National Security Council plans to reassess climate change and national security).

50. Press Release, Presidential Policy Directive 21: Critical Infrastructure Security and Resilience 12 (Feb. 12, 2013) [hereinafter Presidential Policy Directive 21].

51. 162 FERC ¶ 61,012 at 12–13 (2018) (defining resilience as "[t]he ability to withstand and reduce the magnitude and/or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, and/or rapidly recover from such an event"); *see also* MILES KEOGH & CHRISTINA CODY, NAT'L ASSOC. OF REGULATORY UTIL. COMM'RS, RESILIENCE IN REGULATED UTILITIES 5 (2013) (defining resilience as "robustness and recovery characteristics of utility infrastructure and operations, which avoid or minimize interruptions of service during an extraordinary and hazardous event").

anticipate climate impacts and prevent or respond to damages more effectively" and "hardening measures to protect assets from damage during extreme events."[52]

By labeling climate change as threatening the energy supply, policy actors employ the language of national and cyber security to frame climate change as a dangerous force that menaces a critical societal asset.[53] Grouping extreme weather events with intentional attacks, accidents, and other "natural" events frames the policy problem as external to energy systems.[54] In this narrative, operators of energy systems must plan for such events, but their occurrence is treated as outside of the operators' control. The framing embeds the conclusion that energy systems should be "protected" from climate change; otherwise, this threat will "disrupt" or disturb the critical function of the system, which is to provide energy. By highlighting affordability and reliability of the energy supply—two traditional goals of public utility regulation—the policy frame increases the stakes of protection. In this frame, climate change threatens not just the supply of energy, but the very characteristics of the energy system that are at the heart of energy regulation. The frame even treats climate change as a threat to the sustainability of the energy supply—a claim that heightens the sense of danger, but in reality reverses the causal effect.

IV. IMPLICATIONS OF THE POLICY FRAME

The policy frame analysis reveals a fundamental issue with the problem definition: the frame treats climate change as an external threat similar to other threats to energy supply, and fails to address the connection between energy systems, energy use, and increasing risk. This frame may work well as a general policy frame for climate-resilient infrastructure and as a means of communicating the importance of climate change to the public. Indeed, grouping climate risks with other risks to infrastructure

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52. IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES, *supra* note 15, at 176.

53. The effect of this label will depend on the audience. In common parlance, to threaten is "to be likely to injure; to be a source of danger to; [or] to endanger actively." *Threaten*, *Oxford English Dictionary* (3d ed. 2019). U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-18-62, CRITICAL INFRASTRUCTURE PROTECTION 9 (2017) (together with vulnerability and consequence, a threat is an element of risk).

54. *See* Presidential Policy Directive 21, *supra* note 50.

normalizes the policy issue while avoiding debate about the cause or existence of climate change.[55] But why would policy actors frame the *energy* policy problem this way?

One reason is that the boundaries of the frame replicate the traditional divide between energy regulation and environmental protection. Public utility commissions have historically sought to ensure a reliable energy system that serves the public need,[56] and this policy frame focuses attention on the vulnerabilities of energy infrastructure. Its call for action appeals to energy regulators: it is a positive narrative of technological optimism, in which the right investments will ensure a constant stream of energy. Left out of the picture are the costs and difficult tradeoffs involved in mitigating climate change, which have historically been the province of environmental agencies.[57] This is not to deny the role that energy regulators increasingly play in addressing the environmental impacts of energy generation—it is only to argue that the frame is meaningful because it fits comfortably within tradition.[58]

Another reason policy actors frame the energy policy problem this way is because much of the policy attention is on the resilience of the electricity sector. This focus makes sense: electricity infrastructure, particularly overhead transmission and distribution lines, is very vulnerable to extreme weather events.[59] If the network goes down, it has significant and very visible consequences for consumers and industries that rely on electric power. But the focus on electricity infrastructure also allows policy actors to evade difficult tradeoffs between energy supply and mitigation. Resilience policies that improve the

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55. Policymakers use a similar interpretive schema, for example, to define the policy problem of water infrastructure resilience to extreme weather events. IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES, *supra* note 15, at 149 ("Ensuring a reliable supply of clean freshwater to individuals, communities, and ecosystems, together with effective management of floods and droughts, is the foundation of human and ecological health . . . Changes in the frequency and intensity of climate extremes relative to the 20th century and deteriorating water infrastructure are contributing to declining community and ecosystem resilience").

56. *See* Schneider & Trotta, *supra* note 38, at 360–61; KEOGH & CODY, *supra* note 51, at 6 (arguing that resilience is one part of reliability but that the legal frameworks need "tweaking to recognize a good investment in resilience").

57. *See* Jody Freeman, *The Uncomfortable Convergence of Energy and Environmental Law,* 41 HARV. ENVTL. L. REV. 339, 346 (2017) (describing a legal structure in which "energy law largely treats public health and environmental harms as externalities which environmental law is designed to address").

58. *Cf. id.* at 421 (characterizing convergence as the "story of tentative and delicate alignment between energy and environmental law").

59. *See* U.S. DEP'T OF ENERGY, A REVIEW OF CLIMATE CHANGE VULNERABILITY ASSESSMENTS: CURRENT PRACTICES AND LESSONS LEARNED FROM DOE'S PARTNERSHIP FOR ENERGY SECTOR CLIMATE RESILIENCE 22 (2016).

robustness of transmission and distribution networks—such as siting infrastructure in less hazardous areas, upgrading wires and poles, and placing electric lines underground—can be separated from the source of energy generation.[60] The lines can transport electricity generated by renewable energy.[61] And policies that incentivize methods of energy generation that are independent of the electric grid—such as rooftop solar panels and microgrids that "island" themselves in the event of a power outage—generally encourage the use of renewable energy.[62]

Energy pipelines squarely present the tension between resilience and mitigation of climate change. Extreme weather events can damage the pipeline system, causing accidents that release hazardous liquids and natural gas into the environment. In the last twenty years, natural forces have caused 458 pipeline accidents and cost $1.9 billion.[63] These incidents create more harm to the environment and to public safety than the average pipeline accident; while only 8% of the total accidents are caused by natural forces, they comprised 23% of the total accident costs.[64] Heavy rains and floods and high winds—the effects associated with hurricanes and other intense storm events—create the most costly accidents.[65] Policymakers are beginning to give the resilience of energy pipelines more attention.[66] According to the policy frame, a resilience policy should encourage investments in aging oil and gas infrastructure to ensure that energy is delivered to consumers, even if it means that the infrastructure enables continued use of fossil fuels.

The resilience of an electricity system that relies increasingly on natural gas has recently become a significant policy issue. In

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60. *See* RICHARD LASZLO & SARAH MARCHIONDA, QUEST, RESILIENT PIPES AND WIRES REPORT 16 (2015); CENTER FOR CLIMATE & ENERGY SOLUTIONS, POLICY OPTIONS FOR CLIMATE-RESILIENT INFRASTRUCTURE 4–5 (2018).

61. CENTER FOR CLIMATE & ENERGY SOLUTIONS, *supra* note 60, at 4–5.

62. *See* Kevin B. Jones et al., *The Urban Microgrid: Smart Legal and Regulatory Policies to Support Electric Grid Resiliency and Climate Mitigation,* 41 FORDHAM URB. L. J. 1702–03 (2014).

63. *Pipeline Incident 20 Year Trends,* PIPELINE & HAZARDOUS MATERIALS SAFETY ADMIN., https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-incident-20-year-trends (select "Significant Incident 20 Year Trend") (last accessed Nov. 17, 2019).

64. *See id.* (follow hyperlink for the 20-year average incident count to view incidents by cause).

65. *See id.* Heavy rains/floods caused 3% of the total accidents (or 147 accidents) and 13% of the total costs. High winds caused 0.6% of the accidents (or 34 accidents) and 5% of the total costs.

66. *See, e.g.,* Codes, Standards, Specifications, and Other Guidance for Enhancing the Resilience of Oil and Natural Gas Infrastructure Systems Against Severe Weather Events, 84 Fed Reg. 32731 (July 9, 2019) (requesting information on ways to enhance resilience against cyber and physical threats and severe weather events, in order to provide guidance to the private sector and government agencies).

2017, the U.S. Department of Energy argued that natural gas-fired power plants were less resilient than coal-fired and nuclear power plants because the gas-fired plants could not stockpile several months of fuel.[67] FERC did not agree,[68] but in the ensuing policy discussion, the operator of the New England electric grid stated that the biggest risk it faces is a lack of "firm" natural gas supply to meet the growing demand of its power plants.[69] The gas transmission pipeline industry contends that it needs to build more new pipelines to increase the system capacity and blames pipeline opponents for its failure to site lines.[70] According to the policy frame, a resilience policy should encourage investments in the capacity and redundancy of the natural gas pipeline system to provide power plants with a reliable source of fuel for energy supply—even though this will lock in new pipeline infrastructure that will facilitate the burning of natural gas.

V. REFRAMING THE FRAME

Policy actors have drawn the policy frame of climate change and energy systems in a way that leads to perverse results, at least as demonstrated by its application to energy pipelines. But policy frame analysis tells us that frames are not inevitable. Policy problems can be reframed through new interpretative schemas. Rather than ask "how do we protect energy supply?", policy actors could instead ask a more comprehensive question: "How do we protect people and the environment?" Reframing the question in this basic way creates a new policy inquiry that could lead to different policy answers. If the policy goal is reframed to protect people and the environment, pipeline operators should make investments in existing infrastructure to improve public safety and avoid environmental harm. At the same time, energy regulators should make it more difficult for operators to site new pipeline infrastructure, because the environmental and safety costs of the resulting climate change are likely to outweigh

67. Grid Resiliency Pricing Rule, 82 Fed. Reg. 46,943 (proposed Oct. 10, 2017).

68. *See generally* 162 FERC ¶ 61,012, *supra* note 36.

69. Schneider & Trotta, *supra* note 38, at 379.

70. NATURAL GAS COUNCIL, NATURAL GAS SYSTEMS: RELIABLE & RESILIENT 5 (2017); *INGAA President on the State of Pipeline Development,* Energy Dialogues, http://energy-dialogues.com/blog/2018/08/08/ingaa-president-on-the-state-of-pipeline-development/ (Aug. 18, 2018) (acknowledging bottlenecks in supply to New England and stating that "[i]t is much more challenging to build pipelines today, because of increased opposition to pipelines").

the benefits to the public. If we are to address the pressing environmental issue of our time, resilience policy must combat not just the effects of climate change, but also the change itself.