NORTH CAROLINA LAW REVIEW

Volume 100 | Number 4 Article 5

5-1-2022

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CLIMATE RESILIENCE AND PRIVATE LAW'S DUTY TO ADAPT*

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This Article presents a historical, evidentiary, and normative case for a private negligence tort against public utilities for failure to adjust operational and planning decisions to new conditions brought about by climate change. As an extension of the traditional utility duty to serve, the tort duty to adapt includes obligations of reasonable notice of service interruption, avoidance of unnecessary power outages, and updating technologically available standards in operations and planning to encompass the foreseeable risks of climate change. Modern examples of extreme weather service outages, hurricanes, and wildfires are surveyed to demonstrate an evidentiary basis for judicial recognition of a tort duty for public utilities to take reasonable safety precautions to reduce adaptation risks. A private law duty to adapt for public utilities complements existing regulation in addressing rapidly emerging risks presented by climate change.

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INTRODUCTION

To date, climate tort litigation brought against energy infrastructure firms has focused primarily on mitigating a defendant's specific contributions to climate change.[1] Claims "that greenhouse gas emissions constitute an actionable tort under federal or state law"[2] raise complex legal issues and have understandably been the subject of significant scholarship.[3] Less explored is the

1. *See* Am. Elec. Power Co. v. Connecticut, 564 U.S. 410, 423–24 (2011) (dismissing a public nuisance lawsuit seeking imposition of caps on and reduction of greenhouse gas emissions from power companies on the ground that the Clean Air Act displaced federal common law claims); Native Village of Kivalina v. ExxonMobil Corp., 696 F.3d 849, 853 (9th Cir. 2012) (dismissing an action by Alaska Natives seeking damages from oil and power companies for the impacts of climate change on their village on the grounds that state common law was displaced by the Clean Air Act); Complaint at 1, Pac. Coast Fed'n of Fishermen's Ass'ns v. Chevron Corp., No. 18-cv-07477 (N.D. Cal. filed Nov. 14, 2018 in Cal. Super. Ct. as No. 18-571285) (pending action by a commercial fishing industry trade group to hold fossil fuel companies liable for adverse climate change impacts to the ocean off the coasts of California and Oregon which resulted in prolonged closures of Dungeness crab fisheries); Opinion and Order at 1–2, Rhode Island v. Chevron Corp., No. 18-cv-00395 (D.R.I. filed July 2, 2018 in R.I. Super. Ct. as No. PC-2018-4716) (remand order pending before 1st Cir.) (seeking to hold fossil fuel companies liable for causing climate change impacts that adversely affect Rhode Island and jeopardize state-owned or -operated facilities, real property, and other assets).

2. Douglas A. Kysar, *What Climate Change Can Do About Tort Law*, 41 ENV'T L. 1, 2 (2011).

3. *See generally* Randall S. Abate, *Automobile Emissions and Climate Change Impacts: Employing Public Nuisance Doctrine as Part of a "Global Warming Solution" in California*, 40 CONN. L. REV. 591 (2008); Timothy D. Lytton, *Using Tort Litigation To Enhance Regulatory Policy Making: Evaluating Climate-Change Litigation in Light of Lessons from Gun-Industry and Clergy-Sexual-Abuse Lawsuits*, 86 TEX. L. REV. 1837 (2008); Shi-Ling Hsu, *A Realistic Evaluation of Climate Change Litigation Through the Lens of a Hypothetical Lawsuit*, 79 U. COLO. L. REV. 701 (2008); Jonathan Zasloff, *The Judicial Carbon Tax: Reconstructing Public Nuisance and Climate Change*, 55 UCLA L. REV. 1827 (2008); David Hunter & James Salzman, *Negligence in the Air: The Duty of Care in Climate Change Litigation*, 155 U. PA. L. REV. 1741 (2007) [hereinafter Hunter & Salzman, *Negligence in the Air*]; Myles Allen, Pardeep Pall, Daithi Stone, Peter Stott, David Frame, Seung-Ki Min, Toru Nozawa & Seiji Yukimoto, *Scientific Challenges in the Attribution of Harm to Human Influence on Climate*, 155 U. PA. L. REV. 1353 (2007) [hereinafter Allen et al., *Scientific Challenges*]; Thomas W. Merrill, *Global Warming as a Public Nuisance*, 30 COLUM. J. ENV'T L. 293 (2005); Myles R. Allen & Richard Lord, *The Blame Game: Who Will Pay for the Damaging Consequences of Climate Change?*, 432 NATURE 551 (2004); Eduardo M. Peñalver, *Acts of God or Toxic Torts? Applying Tort Principles to the Problem of Climate Change*, 38 NAT. RES. J. 563 (1998). For a collection of essays exploring the implications of climate change litigation in a variety of contexts

question of an energy service provider's obligations to address the adverse impacts of climate change.[4] That is, does an energy service provider have a negligence-based duty to adapt its operations, planning, and investments to new risks created by climate change? And if so, what are the implications of that duty?

Climate change impacts society in profound ways. Its consequences include population displacement, food insecurity, and health and economic harms associated with flooding and extreme weather, among other things.[5] Some of the most visible harms associated with climate change, such as injuries to persons or property due to fires or flooding, flow directly from the operation of energy infrastructure during extreme weather events. Climate adaptation, or the "adjustment in natural or human systems in anticipation of or response to a changing environment," requires investment in new measures aimed at promoting a more resilient energy system.[6]

Litigation surrounding climate adaptation risks in the U.S. energy industry is already underway. A number of cases alleging negligence have been filed in Texas following multiple extended power outages associated with 2021's Winter Storm Uri.[7] Massive and widespread harms associated with wildfires in California have given rise to private tort claims for losses resulting from risks associated with subpar safety engineering in the operation of a utility's infrastructure.[8] Other cases seek to establish statutory and common law tort liability for oil and gas corporations, public utilities, engineering companies,

both tort and nontort, see generally ADJUDICATING CLIMATE CHANGE: STATE, NATIONAL, AND INTERNATIONAL APPROACHES (William C.G. Burns & Hari M. Osofsky eds., 2009).

4. *But see* Jacqueline Peel & Hari M. Osofsky, *Sue To Adapt?*, 99 MINN. L. REV. 2177, 2235–49 (2015) (drawing lessons for the United States from adaptation litigation in Australia, including tort claims seeking compensation for harms from wildfires).

5. *See* THE LAW OF ADAPTATION TO CLIMATE CHANGE: U.S. AND INTERNATIONAL ASPECTS 3–8 (Michael B. Gerrard & Katrina Fischer Kuh eds., 2012) (explaining that "adaptation" describes "efforts to moderate, cope with, and prepare for the current and anticipated impacts of climate change on human and natural systems"). Resilience is a "closely related concept" that describes "the capability to anticipate, prepare for, respond to, and recover from climate impacts." *Id.* at 3.

6. Exec. Order No. 13653, 78 Fed. Reg. 66819, 66824 (Nov. 6, 2013); *see also Glossary*, U.S. GLOB. CHANGE RSCH. PROGRAM, https://www.globalchange.gov/climate-change/glossary [https://perma.cc/A8RU-7TXW].

7. *See, e.g.*, Katy Boose, *Round-Up of Texas Winter Storm Lawsuits*, LEGAL EXAM'R (Mar. 19, 2021), https://www.legalexaminer.com/legal/round-up-of-texas-winter-storm-lawsuits/ [https://perma.cc/6PGE-Y452]; *see also* Plaintiff's Original Petition and Application for Temporary Injunction and Permanent Injunction at 11–13, CPS Energy v. Elec. Reliability Council of Tex., No. 2021CI04574 (Tex. Dist. Ct. 2021) [hereinafter Plaintiff's Petition and Application], https://www.cpsenergy.com/content/dam/corporate/en/Documents/2021-03-12%20CPS%20Energy%20Original%20Petition%20w%20Ex%20A(117202625_1).PDF [https://perma.cc/M6U8-5AZ5].

8. *See, e.g.*, *California Wildfire Victims Sue Utility PG&E Alleging Negligence*, REUTERS (Nov. 14, 2018, 9:09 AM), https://www.reuters.com/article/us-california-wildfires-lawsuit/california-wildfire-victims-sue-utility-pge-alleging-negligence-idUSKCN1NJ20G [https://perma.cc/3KED-EDNE].

real estate professionals, and developers based on a failure to appropriately respond to foreseeable climate risks.[9] At the same time, public utility regulation is increasingly requiring electric utilities to proactively plan for resilience risks in operating and planning for energy infrastructure.[10]

A negligence-based climate adaptation tort aims to remedy a fundamentally different kind of harm from tort lawsuits seeking compensation for a defendant's contributions to climate change. An adaptation tort also does not raise the complex causation issues that plague current climate change mitigation tort suits.[11] As important, a climate adaptation tort provides a mechanism for adjudicating a different kind of misconduct: an entity's negligence in failing to make operational and planning decisions in a manner that accounts for changing conditions in light of climate change.

This raises an important question for tort and regulatory law in the energy sector. Namely, when can a utility or other energy provider be sued in tort, not for its present or past activities that contribute to climate change, but for failure to operate, plan, or invest in energy infrastructure in a manner that accounts for the consequences of climate change?[12] Embedded here are questions of whether climate science imparts sufficient specificity and foresight to allow actors to take feasible advance measures to beneficially modify operations and more wisely invest in and allocate resources to address climate adaptation risks.

A private tort to hold public utilities accountable for climate-adaptation risks has strong historical, evidentiary, and normative foundations. This Article charts a pathway for recognition of such a claim as an extension of the public utility's traditional "duty to serve."[13] This longstanding common law obligation,

9. *See* DEANNA MORAN & ELENA MIHALY, CONSERVATION L. FOUND., CLIMATE ADAPTION AND LIABILITY: A LEGAL PRIMER AND WORKSHOP SUMMARY REPORT 7–17 (2018), https://www.clf.org/wp-content/uploads/2018/01/GRC_CLF_Report_R8.pdf [https://perma.cc/A8TD-ENBV] (discussing potential contract and tort liability of real estate and design professionals).

10. *See* ROMANY M. WEBB, MICHAEL PANFIL & SARAH LADIN, CLIMATE RISK IN THE ELECTRICITY SECTOR: LEGAL OBLIGATIONS TO ADVANCE CLIMATE RESILIENCE PLANNING BY ELECTRIC UTILITIES 27–38 (2020), https://climate.law.columbia.edu/sites/default/files/content/Full%20Report%20-%20Climate%20Risk%20in%20the%20Electricity%20Sector%20-%20Webb%20et%20al_0.pdf [https://perma.cc/246X-7SPL].

11. For discussion of the causation challenges in nuisance and other legal claims against the energy sector for causing the adverse effects of climate change, see generally Allen et al., *Scientific Challenges*, *supra* note 3.

12. Unlike climate change mitigation tort ligation, which typically requires some factual finding of a defendant's causal attribution to climate change, tort claims focused on adaptation harms do not require a court to make a finding that a defendant has caused climate change or a specific harm that is causally attributed to climate change—only that the utility's operations or planning in relation to the consequences of climate change have directly caused physical or economic harm to specific victims.

13. Other duties may additionally be relevant to this inquiry, such as statutory obligations implicated by climate adaptation risks. *See, e.g.*, Conservation L. Found., Inc. v. ExxonMobil Corp., 3 F.4th 61, 70 (1st Cir. 2021) (alleging violations of the Resource Conservation and Recovery Act and

conferred upon businesses engaged in the provision of utility services, provides a solid basis for judicial recognition of a tort claim to respond to the ongoing adaptation risks associated with the energy grid, which we term the "duty to adapt." We show that judicial recognition of a private duty to adapt for energy providers is consistent with the principles of both tort and utility law and discuss its challenges and limits.

As every first-year law student learns, a prima facie case of negligence has four basic elements: duty, breach, causation, and damages.[14] This Article focuses on the duty element of a negligence-based tort and its implications for climate change litigation against public utilities and, in certain applications, energy grid operators.[15] A public utility "duty to serve" already plays a foundational role in defining the obligations of many energy companies, typically requiring an electric or natural gas utility to provide continued, adequate service to its customers.[16] As a general matter, regulators (not courts) oversee the basic reliability floor for utility services. But, as we discuss in this Article, the duty to serve is still sometimes implicated by courts as a common law remedy where a customer suffers harm because service is interrupted or fails. Private tort remedies for negligence (or, at the very least, gross negligence)[17] based on an

Clean Water Act in failing to prepare a marine terminal for climate change impacts); Conservation L. Found., Inc. v. Shell Oil Prods. U.S., No. 17-cv-00396, 2020 WL 5775874, at *1 (D.R.I. Sept. 28, 2020) (alleging a violation of the Clean Water Act in failing to prepare a bulk-fuel-storage facility for climate change impacts). There may also be common law duties related to contract and property law, such as the public trust doctrine. *See generally* Robin Kundis Craig, *Adapting to Climate Change: The Potential Role of State Common-Law Public Trust Doctrines*, 34 VT. L. REV. 781 (2010) (describing how the public trust doctrine is well suited to provide legal support for climate adaptation regimes in the area of water law). Additionally, an actor's obligations owed under a general duty of care in tort may be relevant, which we discuss in relation to the duty to adapt expressed more fully in Part III.

14. *See* W. PAGE KEETON, DAN B. DOBBS, ROBERT E. KEETON & DAVID G. OWEN, PROSSER AND KEETON ON THE LAW OF TORTS § 30, at 164–65 (5th ed. 1984).

15. We use the term "energy grid operators" generically to include transmission grid operators, regulated electric utilities (sometimes referred to as "load serving entities"), and upstream energy suppliers (such as power generators) that are not regulated utilities. We enunciate a duty to adapt that, as premised on a duty to serve, specifically considers obligations owed by public utilities. However, at various times and circumstances, obligations may apply to other energy grid operators based on the duty of care, as described in Part III. In such instances, much of the foreseeability analysis presented in Section II.C would apply. Similarly, depending upon commercial arrangements and the extent to which regulatory tariff requirements apply, defendants may have potential defenses to duty-to-adapt claims, as is discussed in Section III.B.

16. Although our focus here is on energy utilities, the duty to serve is similarly foundational for other public utilities, such as water or sewer utilities. A duty to adapt may apply in those sectors for the same reasons and may raise similar legal issues.

17. Historically, utilities have been shielded from liability for temporary interruption or outages in emergencies or due to forces beyond their control. *See infra* Section III.B.1. As we discuss in Section III.B.1, however, defenses based on acts of God do not (or should not) apply broadly to foreseeable climate adaptation harms. Some states may similarly limit liability where the damage caused by severe weather is unpreventable.

energy utility's duty to adapt derive from and help to reinforce the traditional duty to serve. A duty to adapt is consistent with the normative foundations of both tort and regulation and can help to inform the analysis of defenses to private claims against regulated utilities.

In Part I, we discuss the history of the utility duty to serve and highlight its dual common law and regulatory origins. The duty to serve sits at the intersection of private law (namely, contract and tort) and modern utility regulation. We present a basic typology of the duty's constituent obligations, based on the traditional harms it is designed to protect against and the remedies and enforcement it provides. We identify three distinct obligations that courts have historically recognized as a basis for private tort enforcement against utilities: (1) a duty to provide reasonable notice to customers before service interruption; (2) a duty to ensure adequate and safe service; and (3) a duty to meet technical operational standards.

In Part II, we present an evidentiary argument supporting judicial recognition of an ongoing private tort duty to adapt as an extension of the traditional duty to serve. In their operations and planning, private energy grid operators today increasingly confront foreseeable risks associated with climate change that require different actions than business as normal would otherwise dictate. As recent weather-related disruptions to the energy sector demonstrate, climate change shifts the frequency and severity of historically low-probability, high-impact events that can impact the energy grid. This underscores a need not only to focus on the traditional reliability objectives that regulators and courts have built into the duty to serve but also to be attentive to grid resilience.[18]

Examples of recent climate-amplified weather events that have caused significant physical or economic harm to victims demonstrate how the energy industry has knowledge of climate-induced risks, as well as of feasible responses to them. At minimum, and as the 2021 winter storm power outages in Texas illustrate, where a customer suffers harm due to a prolonged loss of service from an extreme weather event, a utility's obligation to provide reasonable notice of service affords a straightforward basis for a court to adjudicate private tort liability for an ongoing failure to adapt. Customer notice claims may be low-

18. Although climate change is emblematic of emerging energy resilience challenges, it is not the only example. Cybersecurity concerns similarly pose low-probability, high-impact harms to the energy sector and present a rapidly shifting risk profile. *See generally DOE Announces Cybersecurity Programs for Enhancing Safety and Resilience of U.S. Energy Sector*, DEP'T ENERGY (Mar. 18, 2021), http://www.energy.gov/article/doe-announces-cybersecurity-programs-enhancing-safety-and-resilience-us-energy-sector [https://perma.cc/QF2F-5N4Z]. The duty to serve may similarly be relevant to such concerns, though the analysis of tort liability is also more complicated due to an intervening intentional tortfeasor.

hanging fruit, as they do not require a substantial investment by a defendant to meet the expectations of the duty to adapt. But we also show that an energy utility's discharge of the duty to adapt can go beyond customer notice. The duty to serve's requirement to provide adequate service can also be extended to include adaptation planning by the utility for foreseeable risks of harm, such as the devastating personal and property losses produced by wildfires in California in 2017 and 2018.[19] Regulators in several states have recognized these obligations, and courts have likewise been willing to impose private liability for damage caused by severe weather where the harm is foreseeable and preventable, suggesting a utility obligation to properly plan and prepare for shifts in demand that will place a strain on the grid. These examples demonstrate the modern evidentiary foundation for recognition of a duty to adapt, extending the traditional duty to serve to obligate public utilities to make operational and planning decisions in a manner that accounts for changing conditions in light of climate change.

A duty to adapt raises important questions about whether it is a good idea for adaptation risks to be remedied by private law rather than regulation. In Part III, we discuss why, as a normative matter, judicial recognition of a private duty to adapt for energy grid operators advances the functions of both tort and regulatory law. Recent climate-related events present an enormous challenge for the energy industry. Going forward, extensive regulatory responses will be necessary to address the harms of climate adaptation. But existing regulation alone is insufficient to address climate adaptation risks. Utility regulation is notoriously slow and clunky in recognizing new forms of risks and in promoting new technologies—especially to the extent that many utilities remain substantially invested in expensive (and increasingly obsolete) legacy power plants and transmission lines. Common law remedies, such as the duty to adapt, have an important role to play in addressing the challenges of climate change, while advancing the goals of both tort and regulatory law. Like the common law duty to serve, the duty to adapt allows courts to impose a flexible obligation on utility grid operators that reflects expectations for energy service, while also providing a remedy for risks that cause harm. Over time, the obligations of the duty to adapt may, like the duty to serve, ultimately be incorporated into regulation.[20] In this sense, the duty to adapt can help to improve utility

19. As is discussed in Section II.B, California law has allowed recovery for these impacts under a strict liability standard, whereas in other jurisdictions these kinds of harms would typically be adjudicated as negligence cases.

20. To the extent that jurisdictional and institutional obstacles can be overcome, for example, foundational ratemaking principles could serve as a firm basis for incorporating climate adaptation through regulation actions. *See, e.g.*, Jonas J. Monast, *Precautionary Ratemaking*, 69 UCLA L. REV. (forthcoming 2022) (manuscript at 5) (on file with authors) (arguing that utility ratemaking should shift from a focus on "least cost" to "least cost-least risk," based on the precautionary principle).

regulation by providing stronger incentives for energy grid operators to proactively reduce adaptation risks and to address grid resilience.

To be clear, we are not arguing that strict liability should apply to harms attributed to energy infrastructure because of climate change, or that utilities are obligated to insure against all such harms. Rather, our argument is for a form of traditional negligence-based liability as an extension (and modification) of the traditional duty to serve. On this basis, we believe that the common law foundations of the duty to serve support a private law duty that, like other tort obligations, can be defined (and limited) by a reasonably identifiable zone of risk of harm to foreseeable victims. Tort defenses still may play a role, but courts applying defenses to such claims should consider guideposts that fit with the functional goals of the duty to adapt.

We conclude that, while a private duty to adapt is not a panacea to the energy grid's adaptation risks, it is an essential piece to the puzzle of addressing the harms of climate change.

I. THE UTILITY'S DUTY TO SERVE

Over the past 150 years, courts and regulators have frequently invoked the "duty to serve" to define the floor for the provision of service by public utilities. The duty to serve has informed responses to the "grimmest imaginable" economic and social problems, including poverty, racial discrimination, and economic inequality.[21] And it is difficult to imagine what modern public utility regulation would look like without a duty to serve.[22]

Inevitably, there is jurisdictional variation in the specific requirements of the duty to serve. However, the duty encompasses some common obligations related to the provision of adequate service. Importantly too, the duty to serve has a common law foundation, allowing courts to enforce obligations independent of statutes and regulations.[23] It is typically "imposed upon the public service corporation because it is organized to do business affected with a

21. For a good survey of the duty to serve's historical significance, see CHARLES M. HAAR & DANIEL WM. FESSLER, THE WRONG SIDE OF THE TRACKS: A REVOLUTIONARY REDISCOVERY OF THE COMMON LAW TRADITION OF FAIRNESS IN THE STRUGGLE AGAINST INEQUALITY 15 (1986) ("Over the centuries, the common law doctrine of equal services and the duty to serve surfaced and resurfaced as a potent and dynamic means to address changing—and often the grimmest imaginable—social and economic conditions.").

22. An unsigned but oft-cited *Columbia Law Review* Note calls the duty to provide adequate service the "primary duty" of the public utility. Note, *The Duty of a Public Utility To Render Adequate Service: Its Scope and Enforcement*, 62 COLUM. L. REV. 312, 312 (1962) [hereinafter *The Duty of a Public Utility*].

23. Messer v. S. Airways Sales Co., 17 So. 2d 679, 681–82 (Ala. 1944) ("This duty to serve the public exists independent of statutes regulating the manner in which public service corporations or companies shall do business. . . . This obligation to serve the public also arises independent of contract with the municipality in the shape of a franchise, or of a contract with the individual.").

public interest, and because the corporation has held itself out to the public as being willing to serve all members thereof."[24]

The private law foundations of the duty to serve include both contract and tort law. For a utility customer who has a contract to purchase energy, the duty to serve can inform the terms of service that the utility is expected to provide as a seller and the customer's rights as a purchaser. But courts have long recognized that the duty to serve creates private obligations independent of contract—especially where the terms of service are not spelled out in explicit contractual terms.[25] These can range from the requirement to provide a customer reasonable notice prior to service shutoff to obligations to noncustomers who are harmed when a utility discontinues service.

After describing these historical foundations, this part presents a typology to isolate the basic obligations of the duty to serve and their significance in approaching modern problems associated with utility infrastructure. The duty to serve is distinct from other regulatory requirements relevant to utility operation, namely price regulation and open-access requirements. And each of the basic obligations in the typology not only encompass regulatory requirements, but can also support private tort obligations for utilities.

A. *Historical Foundations*

Modern understandings of public utility regulation trace their political and legal origins to the late nineteenth century, but the common law principles behind the idea of the public utility stretch back several centuries. In *Munn v. Illinois*,[26] the U.S. Supreme Court upheld state price regulation of grain elevators.[27] The Court took inspiration from Lord Mathew Hale's notion that a business "affected with a public interest" requires special regulatory attention.[28] "Every ferry," Lord Hale wrote in the seventeenth century, "ought to be under public regulation; [to wit] that it give attendance at due times, keep a boat in due order, and take but reasonable toll."[29] Early in the twentieth century, American reformers such as John Commons drafted state laws granting monopoly franchises to electric and natural gas utilities, subjecting them to

24. *Id.* at 681. The historical foundations of the duty to serve arguably make it a "fundamental principle from which all the rules of public service may be derived." *Id.* at 682.

25. *Id.*

26. 94 U.S. 113 (1876).

27. *Id.* at 154.

28. *See id.* at 127; *see also* Walton H. Hamilton, *Affectation with Public Interest*, 39 YALE L.J. 1089, 1092–99 (1930) (discussing the history of Lord Hale's phrase and its adoption by the Court in *Munn*).

29. MATHEW HALE, *De Jure Maris et Brachiorum Ejusdem*, *in* A TREATISE, IN THREE PARTS, *reprinted in* 1 A COLLECTION OF TRACTS RELATIVE TO THE LAW OF ENGLAND FROM MANUSCRIPTS 5, 6 (Francis Hargrave ed., 1787).

price regulation and customer service obligations (a precursor to the duty to serve and modern notions of "universal service").[30]

New Deal reformers embraced the public utility as a progressive institution aimed at promoting fairness and addressing economic inequality.[31] At the same time, the argument that natural monopoly regulation is necessary to promote economic efficiency and consumer welfare served as an intellectual anchor for economic regulation of water and sewage services, railroads, airlines, trucking, natural gas, electric power, and telecommunications.[32] All of these industries experimented with various forms of the duty to serve and customer service obligations, establishing a fairly consistent set of tasks for regulators across various public utility industries.[33] Though there has been almost consistent criticism of public utility regulation[34] and regular calls for restructuring of utility services,[35] for the most part the idea of the public utility and related legal doctrines (including the duty to serve) have proved durable.

In recent years, public utility regulation has experienced a new renaissance. Even with competition in formerly regulated industries, such as telecommunications and energy, it is recognized that public utility regulation

30. *See* William J. Novak, *The Public Utility Idea and the Origins of Modern Business Regulation*, *in* CORPORATIONS AND AMERICAN DEMOCRACY 139, 140 (Naomi R. Lamoreauex & William J. Novak eds., 2017).

31. *Id.* at 139–40; *see also* HAAR & FESSLER, *supra* note 21, at 15–18, 247.

32. *See* Herbert Hovenkamp, *Technology, Politics and Regulated Monopoly: An American Historical Perspective*, 62 TEX. L. REV. 1263, 1263 (1984).

33. Often, the public utility has been theorized as a form of incomplete contract, offering financial stability to the regulated firm (primarily, by helping to lower its costs of capital) while also protecting consumers from various abuses associated with monopoly. George L. Priest, *The Origins of Utility Regulation and the "Theories of Regulation" Debate*, 36 J.L. & ECON. 289, 301–13 (1993).

34. Harold Demsetz began to question the logic of traditional economic regulation in the 1960s. *See generally* Harold Demsetz, *Why Regulate Utilities?*, 11 J.L. & ECON. 55 (1968). Public choice theory and the Chicago School rose to prominence in its critique of industry regulation during the 1970s. *See generally* George J. Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3 (1971); Sam Peltzman, *Toward a More General Theory of Regulation*, 19 J.L. & ECON. 211 (1976). Many economists celebrated the allocative efficiency of competitive markets, calling into question the core features of public utility regulation and natural monopoly regulation. *See* Peter Z. Grossman & Daniel H. Cole, *Introduction* to *The End of a Natural Monopoly: Deregulation and Competition in the Electric Power Industry*, *in* 7 THE ECONOMICS OF LEGAL RELATIONSHIPS 3–6 (Peter Z. Grossman & Daniel H. Cole eds., 2003).

35. Calls for deregulation of electric power reached a crescendo in the 1990s. *See, e.g.*, Peter Navarro, *Electric Utilities: The Argument for Radical Deregulation*, HARV. BUS. REV., https://hbr.org/1996/01/electric-utilities-the-argument-for-radical-deregulation [https://perma.cc/J73K-GQ57 (dark archive)]. While the Federal Energy Regulatory Commission ("FERC") has restructured wholesale electric power supply markets and some states (such as Texas) have restructured some aspects of retail power supply, controversy over the effectiveness of energy markets has continued for more than a quarter of a century. *See* Richard Cudahy, *The Folklore of Deregulation (with Apologies to Thurman Arnold)*, 15 YALE J. ON REGUL. 427, 436–38 (1998); David B. Spence, *Naïve Energy Markets*, 92 NOTRE DAME L. REV. 973, 988 (2017).

remains relevant.[36] With the proliferation of modern "network" industries, the idea of the public utility is being invoked as a way of addressing new problems associated with private control of infrastructure. Concerns about network efficiency and the ownership and control of important information are giving rise to new calls for the extension of regulation, especially in confronting economic concerns with the modern information economy.[37] Regulators (and sometimes courts) are being called on to extend features of public utility regulation into new frontiers, including net neutrality,[38] certain aspects of environmental regulation,[39] and health care.[40] This makes it a propitious time to revisit the scope and content of the duty to serve and what it requires of public utilities, especially for industries in the energy sector facing the new challenge of responding to climate change.

One important question is whether liability for service interruptions can ever extend beyond the traditional utility. Increased competition in power supply has resulted in the emergence of new private actors in the energy sector, including wholesale merchant power generators (which sell energy to load-serving utilities in upstream wholesale markets) and, especially in those states with retail competition, retail power marketers and customer energy service firms.[41] These entities take on functions historically played by the public utility but, as a regulatory matter, are often not formally bound to the same set of service obligations. This includes the duty to serve, which typically remains with the public utility that directly serves customers, regardless of whether it operates within a state with no, partial, or complete restructuring.[42] On its face, regulation would appear to limit liability for non-utilities, but non-utility actors are increasingly able to respond to crises in a nimble manner and may be even

36. Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1324–25 (1998).

37. BRETT M. FRISCHMANN, INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES, at xi–xiii, xvii (2012).

38. *See* TIM WU, THE MASTER SWITCH: THE RISE AND FALL OF INFORMATION EMPIRES 281–90 (2010).

39. *See* William Boyd, *Public Utility and the Low-Carbon Future*, 61 UCLA L. REV. 1614, 1618–19 (2014).

40. *See* Nicholas Bagley, *Medicine as a Public Calling*, 114 MICH. L. REV. 57, 60–62 (2015).

41. *See* U.S. ENERGY INFO. ADMIN., ELECTRIC POWER ANNUAL 2020 tbl.1.3 (2022), https://www.eia.gov/electricity/annual/pdf/epa.pdf [https://perma.cc/SER9-G8TJ] (reporting that more than thirty-five percent of electricity supply comes from non-utility generation); *Power Marketers Are Increasing Their Share of U.S. Retail Electricity Sales*, U.S. ENERGY INFO. ADMIN. (June 12, 2018), https://www.eia.gov/todayinenergy/detail.php?id=36415 [https://perma.cc/5NNW-8N8Y] (noting that power marketers supplied twenty-one percent of retail electricity sold in 2016).

42. *See* Jim Rossi, *The Common Law "Duty To Serve" and Protection of Consumers in an Age of Competitive Retail Public Utility Restructuring*, 51 VAND. L. REV. 1233, 1243 (1998) [hereinafter Rossi, *The "Duty To Serve" and Protection of Consumers*].

better positioned than utilities to control the same risks of harm—calling into question whether this traditional approach continues to make sense.

B. *Constituent Obligations*

As described above, the duty to serve is central to historical shifts in the understanding of utility service, including efforts to extend service to rural and impoverished communities,[43] and is also central to modern debates surrounding universal service and net neutrality in telecommunications.[44] The constituent obligations of the duty to serve, however, are often left unspecified by both regulators and courts. With various degrees of comprehension, commentators have attempted detailed assessments of the regulatory obligations that the duty to serve entails—and we do not purport to reproduce them here.[45] Rather, we think it is important to make an effort to isolate the nature of the various obligations a utility's duty to serve entails, to whom these obligations are owed, and the remedies that the law provides for violation of these obligations. We believe that this will allow for a clearer understanding of how the duty to serve supplements other requirements (such as price regulation, described above) that attach to public utilities and provide a more complete articulation of when private remedies are available for violation of the duty to serve.

Echoing Lord Hale, modern accounts of the duty to serve commonly explain it as a part of the hypothetical bargain associated with the state granting a private utility a monopoly franchise.[46] As one early Illinois Supreme Court case put it, "[i]t is well settled that parties, who carry on a business which is public in its nature, or which is impressed with a public interest, must serve all who apply on equal terms and at reasonable rates."[47] Understood as a distinct

43. HAAR & FESSLER, *supra* note 21, at 15–19; *see also* Joseph William Singer, *No Right To Exclude: Public Accommodations and Private Property*, 90 NW. U. L. REV. 1283, 1298 (1996) ("[T]he most plausible statement of the law is that all businesses open to the public had a duty to serve the public.").

44. *See, e.g.*, *Keeping the Internet Neutral?: Tim Wu and Christopher Yoo Debate*, 59 FED. COMMC'NS L.J. 575, 575–80 (2007); *see also* Tripp Mickle, *Google Should Be Treated as Utility, Ohio Argues in New Lawsuit*, WALL ST. J. (June 8, 2021, 7:04 PM), https://www.wsj.com/articles/google-should-be-treated-as-utility-ohio-argues-in-new-lawsuit-11623172734 [https://perma.cc/4HDQ-DVUE (staff-uploaded, dark archive)] (raising the claim that an internet search engine should be regulated as a public utility under state common law).

45. *See* Heather Payne, *Unservice: Reconceptualizing the Utility Duty To Serve in Light of Climate Change*, 56 U. RICH. L. REV. (forthcoming 2022) (manuscript at 5–15) (on file with authors).

46. States typically grant electric utilities a franchise to operate in a given geographic footprint, subject to price regulation aimed at ensuring that the utility can recover its costs. This grant is not without condition, and utilities must comply with a number of regulatory requirements, including the obligations encompassed by the duty to serve. *See* Jim Rossi, *Universal Service in Competitive Retail Electric Power Markets: Whither the Duty To Serve?*, 21 ENERGY L.J. 27, 30 (2000) [hereinafter Rossi, *Universal Service*].

47. City of Danville v. Danville Water Co., 53 N.E. 118, 122 (Ill. 1899); *see also* Messer v. S. Airways Sales Co., 17 So. 2d 679, 682 (Ala. 1944) ("[T]he law cannot compel any individual to serve

duty owed by a utility to a customer, the duty to serve encompasses several specific requirements, including obligations "to interconnect and extend service if requested, to provide continuing reliable service, to provide advanced notice of service disconnection, and to continue service without full payment."[48] For example, courts have invoked the duty to serve to require a gas company to allow a prospective customer to interconnect with its gas lines, despite the utility's allegation that it lacked adequate supply to meet its existing customers' needs.[49]

The duty to serve has also been commonly interpreted to encompass a duty to render "adequate" service,[50] or to only discriminate in providing terms of service where it is reasonable to do so. Defining the specific nature of a duty that hinges on "adequacy," "reasonableness," or even a set understanding of "service" has proved inevitably elusive. Variation may in part be inevitable; what constitutes adequate service depends on "the type of service rendered and the needs of the area in which the utility operates."[51] Statutory text across jurisdictions thus provides a starting place, with standards for adequate service frequently set via state statute. At a minimum, a utility typically must "provide safe, continuous, comfortable, and efficient service with facilities that reflect technological developments in the industry."[52] Such standards were designed with historic conceptions of reliability in mind, and the duty to serve thus plays an important role in setting a community's expectations for energy services. These set the floor for recovery in negligence, and the duty to serve itself is not tethered to the traditional regulatory confines of what constitutes reliable service.

For example, California's Public Utilities Code ("PUC") Section 451 lays the foundation for public utilities' duty to serve, requiring that "[e]very public utility shall furnish and maintain such adequate, efficient, just, and reasonable service, instrumentalities, equipment, and facilities . . . as are necessary to promote the safety, health, comfort, and convenience of its patrons, employees, and the public."[53] California utilities' duty is also informed by their tariffs with customers: California PUC Rule 14, which regulated utilities typically incorporate into their tariff filings with state regulators, requires utilities to

another; but it does make it clear that any one who undertakes a public employment is thereby committed to the performance of that service in the way which the law says that conditions demand for the protection of the public.").

48. Rossi, *The "Duty To Serve" and Protection of Consumers*, *supra* note 42, at 1243.

49. State *ex rel.* Wood v. Consumers' Gas Tr. Co., 61 N.E. 674, 677 (Ind. 1901).

50. Peter W. Hanschen & Gordon P. Erspamer, *A Public Utility's Obligation To Serve: Saber or Double-Edged Sword?*, 17 ELEC. J. 32, 35 (2004).

51. *The Duty of a Public Utility*, *supra* note 22, at 313.

52. *Id.*

53. CAL. PUB. UTIL. CODE § 451 (Westlaw through Ch. 12 of 2022 Reg. Sess.).

"exercise reasonable diligence and care to furnish and deliver a continuous and sufficient supply of electric energy to the customer."[54] This provision has been interpreted by the courts to require that utilities take affirmative actions to avoid unreasonable risks to customers and, where possible, to minimize the effects of outages.[55] Florida's duty-to-serve statute includes a similar set of obligations to exercise reasonable care in the provision of service.[56]

These statutory and contractual obligations are rooted in common law origins and often encase standards of care. For example, existing statutes or regulations that provide energy service requirements may set a standard of care under the theory of liability that every first-year law student knows as "negligence per se"—meaning a party has breached their duty of care and is thus negligent solely by violating a statute or regulation.[57] Importantly, however, the establishment of a standard of care for negligence per se does not prevent courts from also holding a regulated firm to a common law standard of care that requires even more precautions than the statute or regulation. Similarly, absent a legislative directive to the contrary, application of the duty to serve is not limited to contractual terms or to requirements defined by regulation.[58] Instead, regulators and courts alike have long recognized that the duty to serve is also closely tied to negligence concepts in tort law. For example, the California Supreme Court has allowed a customer to sue a utility for economic losses it suffered in the operation of a fish hatchery due to a failure to provide power.[59] While the utility is "not an insurer or guarantor of service," the court reasoned, it has a "general duty to exercise reasonable care in operating its system to avoid

54. *See, e.g.*, PAC. GAS & ELEC. CO., ELECTRIC RULE NO. 14: SHORTAGE OF SUPPLY AND INTERRUPTION OF DELIVERY (2003), https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_RULES_14.pdf [https://perma.cc/8SXZ-32LG] (documenting a Pacific Gas & Electric tariff describing terms of service for end-use customers and their agents).

55. *See* Langley v. Pac. Gas & Elec. Co., 262 P.2d 846, 852–53 (Cal. 1953) (en banc); Mobil Oil Corp. v. S. Cal. Edison Co., No. B145834, 2003 Cal. App. Unpub. LEXIS 595, at *46–49 (Jan. 21, 2003).

56. FLA. STAT. § 366.03 (Westlaw through Mar. 15, 2022, in effect from the 2022 2d Reg. Sess) ("Each public utility shall furnish to each person applying therefor reasonably sufficient, adequate, and efficient service upon terms as required by the commission. . . . All rates and charges made, demanded, or received by any public utility for any service rendered, or to be rendered by it, and each rule and regulation of such public utility, shall be fair and reasonable."). As an example of how this standard is applied, FPL's tariff, which has been approved by utility regulators, states that the company "will use reasonable diligence at all times to provide continuous service" to customers. FLA. POWER & LIGHT CO., GENERAL RULES & REGULATIONS FOR ELECTRIC SERVICE (2006), https://www.fpl.com/content/dam/fpl/us/en/rates/pdf/electric-tariff-section6.pdf [https://perma.cc/6T5Y-ECUF (staff-uploaded archive)]. It also states that it is not liable for interruptions "from causes beyond its control," including "through the ordinary negligence of its employees, servants or agents." *Id.*

57. RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM § 14 (AM. L. INST. 2010).

58. Messer v. S. Airways Sales Co., 17 So. 2d 679, 682 (Ala. 1944).

59. *Langley*, 262 P.2d at 849.

unreasonable risk of harm to the persons and property of its customers."[60] Even where a utility's unreasonable conduct did not cause an outage, it still might be liable for injuries from outages where the cause "could have been prevented by foresight and sufficient expenditure" and where it should have been "taking steps to ensure performance and to prevent an event from occurring."[61]

Recognizing a private claim based on the duty to serve affords victims a distinct remedy for harm that is suffered due to a utility's misconduct or failure to act, while also holding the industry accountable to a flexible, evolving standard of care.[62]

At the same time, the duty to serve also inherently resists precision. Articulating the exact nature of its obligations ex ante is difficult.[63] Cases invoking the duty to serve will often involve a utility itself asking for a regulator or court to allow it to cover the costs of providing service to customers in accordance with then-existing legal requirements. But the duty to serve's specific common law obligations are not always spelled out in advance: only once a plaintiff sues the utility to recover for the utility's past misconduct will they even come up. In this sense, much like other tort standards of care, the precise expectations of the standard of care required by the duty to serve are only spelled out by courts ex post.

Indeed, the very idea of what constitutes "adequate service" from an energy utility is not fixed and evolves as new technologies become available or as customer uses of energy change. For example, adequate service today in areas where customers charge electrical vehicles and have rooftop solar may differ from the understanding of adequate service fifty years ago. Likewise, the understanding of adequate service in some areas of the country, such as Denver, may evolve too, as extreme heat events make air conditioning necessary to maintain health during summer months.[64] A negligence standard seems

60. *Id.*

61. Mobil Oil Corp. v. S. Cal. Edison Co., No. B145834, 2003 Cal. App. Unpub. LEXIS 595, at *30–31 (Jan. 21, 2003) (emphasis omitted).

62. Importantly, however, in instances where liability was found, plaintiffs have typically demonstrated actual knowledge of the specific risks and harms that would be incurred from service outage—typical of the kind of foreseeability courts would require to meet the breach element of negligence. *See* Comment, *Liability of Public Utility for Temporary Interruption of Service:* National Food Stores, Inc. v. Union Electric Co., 494 S.W.2d 379 (Mo. Ct. App. 1973), 1974 WASH. U. L.Q. 344, 350 [hereinafter *National Food Stores* Comment].

63. "Cases dealing with liability for failure or breach of duty to supply electric current of sufficient power and continuity for a specified purpose do not satisfactorily define the character and extent of the duty." C.L. Feinstock, Annotation, *Liability of Electric Power or Light Company to Patron for Interruption, Failure, or Inadequacy of Power*, 4 A.L.R.3d 594 § 2[b] (1965).

64. In response to an expected shift toward hotter summers, as was experienced during 2021, Denver's Office of Climate Action, Sustainability and Resilience has proposed installing heat pumps (reversible air conditioning units) powered by renewable energy, targeting the most vulnerable

especially well suited to adapt the utility standard of care to changing societal expectations, especially where regulation itself is not consistently updated to reflect a community's evolving understanding of adequate energy service.

Precedent may well counsel against imbuing the duty to serve with too granular of precision; however, some analytical precision is important to identify the general obligations that it entails. In terms of the duty to serve's adequate service requirements, case law emphasizes obligations to (1) provide reasonable notice of interruption, (2) take reasonable measures to minimize outages, and (3) meet industry-wide technical standards.

First, the duty to serve requires utilities to provide sufficient notice of impending interruption to their customers. For example, in *National Food Stores, Inc. v. Union Electric Co.*,[65] record heat waves in the summer of 1966 strained the defendant utility's ability to meet soaring electric demand.[66] In the face of impending system failure, the defendant instituted "load reduction"—that is, it disconnected service to certain customers to preserve overall system integrity.[67] The plaintiff food store was one such customer and suffered spoilage of perishable food as a result.[68] It sued not on the basis of interrupted service, but on the defendant's failure to provide notice of that impending interruption.[69] While the defendant claimed it owed no such duty, the court held that "an electric power company which undertakes to supply current, although not an insurer of service, has an obligation to provide a patron with adequate and continuous service."[70] This obligation encompasses a duty to "give a reasonable notice to its consumers of its intentions to interrupt services when the utility knows or could reasonably anticipate a situation that would make it necessary to interrupt service" and "knows or should know that by so failing to give notice the interruptions might result in loss or harm to its consumers."[71]

Second, the duty to serve requires utilities to proactively manage equipment and operations to minimize outages. Here, the duty to serve requires that a utility not arbitrarily cut off service. Tort liability for interruptions in power and/or failure of service is typically available to customers who suffer

communities without air conditioning (which thirty percent of Denver homes lack). *See* Sam Brasch & Rebecca Spiess, *Denver Has a New Plan To Keep Residents Cool—Without Wrecking the Climate*, DENVERITE (June 14, 2021, 10:57 PM), https://denverite.com/2021/06/14/stay-cool-without-wrecking-the-climate/ [https://perma.cc/H5C7-6QHV].

65. 494 S.W.2d 379 (Mo. Ct. App. 1973).

66. *Id.* at 381. Notice was also central to the court's inquiry in the above-mentioned case, *Langley v. Pacific Gas & Electric Co.*, 262 P.2d 846, 847 (Cal. 1953) (en banc).

67. *Nat'l Food Stores*, 494 S.W.2d at 381.

68. *Id.* at 380.

69. *Id.* at 381.

70. *Id.*

71. *Id.* at 384.

harm as well.[72] Most states limit liability for service interruption to conduct that is, at the very minimum, negligent, though many states' regulations or approved tariffs provide some defense to customer recovery unless the utility was willfully or grossly negligent.[73] Most courts have upheld these provisions,[74] though some have suggested that they should be void for public policy purposes similar to liability waivers in tort.[75]

Provisions of continuous service are additionally relevant. The court in *Curry v. Norwood Electric Light & Power Co.*,[76] for instance, was asked whether the defendant public utility was obligated to furnish continuous electric service to the plaintiff.[77] The court held in the affirmative, referencing the standard foreseeability principle of whether the defendant should have "anticipated or expected such a situation to arise."[78] Likewise, in *Pager v. Metropolitan Edison*,[79] defendant Metropolitan Edison cut off service to a customer who sold a home in foreclosure, leading to pipes freezing and damage to the property.[80] The case for private recovery was allowed to go forward on a negligence theory based on the utility's obligation to provide service that is "reasonably continuous and without unreasonable interruptions of delay."[81] These private suits can be understood as negligence claims to the extent that a utility "which holds itself out to serve the public" must "exercise reasonable diligence and care towards its customers."[82] While in most cases temporary interruptions of service do not

72. *See, e.g.*, Rossin v. S. Union Gas Co., 472 F.2d 707, 709–10 (10th Cir. 1973) (noting that a negligence standard applies to storm-related service cutoff that caused harm to plaintiff's property, but rejecting a claim for recovery based on the trial court's finding that the storm from January 2–8, 1971, was "unequaled in New Mexico climatological history in both intensity and duration" and that the "storm was not forecast with a degree of accuracy necessary to give warning of its severity").

73. *E.g.*, Singer Co. v. Balt. Gas & Elec. Co., 558 A.2d 419, 428 (Md. Ct. Spec. App. 1989) (finding no liability for an interruption where the tariff says the utility is only liable for willful default, meaning "an intentional omission or failure to perform," or willful neglect, meaning "intentional, conscious, or known negligence"); Perez v. N.Y. City Hous. Auth., 452 N.Y.S.2d 510, 515–16 (Civ. Ct. 1982) (finding Consolidated Edison's tariff provided a limited exemption from liability for ordinary negligence). *Contra* Sw. Pub. Serv. Co. v. Artesia Alfalfa Growers' Ass'n, 353 P.2d 62, 69 (N.M. 1960) (finding that an existing tariff was not sufficient for the utility to avoid negligence liability).

74. *See, e.g.*, Lee v. Consol. Edison Co. of N.Y., 413 N.Y.S.2d 826, 828 (App. Term 1978) (per curiam) (finding that an exculpatory clause for negligence, but not gross negligence, did not violate public policy).

75. *See Artesia Alfalfa Growers' Ass'n*, 353 P.2d at 69 (finding a contract that relieved an electric company of all liability for temporary interruptions violated public policy on the ground that a duty to furnish adequate, efficient, and reasonable service was owed and so negligently caused harm was not excused).

76. 211 N.Y.S. 441 (Cnty. Ct. 1925).

77. *Id.* at 443.

78. *Id.* at 443–44.

79. No. 17-CV-00934, 2019 WL 4736227 (M.D. Pa. Sept. 27, 2019).

80. *Id.* at *2.

81. *Id.* at *10.

82. *National Food Stores* Comment, *supra* note 62, at 346 n.12.

produce liability, "negligent acts or omissions which cause foreseeable harm" may.[83]

Third, suits allowing for private recovery against utilities frequently hinge on whether utility operators have met the industry-wide technical standards or expectations for the provision of service on the electric grid. For example, suits for recovery may turn on whether the level of power (voltage) provided is sufficient or on whether utilities have handled power transmission or distribution equipment in a reasonable manner. Providing insufficient current to properly light a 100-watt lamp,[84] failing to provide electrical current of a sufficient voltage to power a cold storage plant,[85] and switching transformer systems causing a loss of power significantly reducing heat to a hatchery are all examples.[86] Where a customer suffers harm in such cases, a negligence claim may be brought for failing to use reasonable care to provide adequate power or for breach of contract, implied or express, to provide adequate power or a stated level of power.[87] With respect to these cases, the duty to serve plays an additional function: it helps to ensure that utilities are held to a standard of care that reflects technical feasibility and custom in the industry.

C. *A Typology of the Duty To Serve's Constituent Obligations*

Building on this initial identification of the constituent obligations associated with the public utility duty to provide adequate service, this section presents a typology (Figure 1) that separates the various duties and obligations that are commonly associated with the duty to serve. In so doing, we hope to more clearly identify those obligations that are relevant to private tort suits responding to climate change—underscoring in particular the private enforcement dimension of the duty to serve.

83. *Id.* at 348 n.17.
84. Ky. Power Co. v. Kilbourn, 307 S.W.2d 9, 13 (Ky. Ct. App. 1957).
85. Bromer v. Fla. Power & Light Co., 45 So. 2d 658, 659 (Fla. 1950) (en banc).
86. Lund v. Village of Princeton, 85 N.W.2d 197, 200–01 (Minn. 1957).
87. Feinstock, *supra* note 63, § 2[b].

Figure 1. Duty To Serve—Typology

Scope of the Duty To Serve	Duty-To-Serve Obligations	To Whom Owed	Primary Remedies[88]
Duty To Provide Adequate Service	Adequate notice	Current customers	1. Regulatory enforcement (through applicable standards and enforcement) 2. Private enforcement (through contract and tort claims)
	Minimize outages	Current customers	1. Regulatory proceedings, through utility service standards (and accompanying penalties for violation) 2. Private enforcement (through contract and tort claims)
	Meet technical standards	Limited and identifiable class of foreseeable victims	1. Regulatory enforcement (through applicable standards and enforcement) 2. Private enforcement (through contract and tort claims)
Duty To Extend Service	X	X	X
Duty To Interconnect with Suppliers and Open-Access Obligations	X	X	X

The first column of Figure 1 organizes the scope of the duty to serve, which historically includes constituent duties around extension of service, interconnection with suppliers, and open-access obligations. As noted above, the core duty-to-serve obligations surrounding the duty of adequate service include constituent obligations to: (1) provide reasonable notification of impending interruption, (2) take reasonable measures to minimize outages, and (3) meet technical standards in the operation of the energy grid. This specific core duty and set of constituent obligations form the foundation of the duty to adapt.

Importantly, these three obligations implicate both public remedies (regulatory enforcement by agencies) *and* private remedies (legal claims available to individuals), as reflected in the last column of the typology. In instances where tariffs outline the terms of service and a remedy for harm, a

88. This is not intended to be an exhaustive list of remedies but instead to describe the primary remedies associated with each dimension of the duty to serve.

tariff may specify the consequence of service interruption, or in some instances regulators may be subject to regulatory penalties for failure to comply with a regulatory duty to serve. But these tariff and regulatory obligations serve as a floor and are supplemented by tort obligations. Unlike any previous discussion of the duty to serve, this Article places its focus on private remedies for the conditions within the control of a utility that cause harm to foreseeable victims. As is the case with any negligence standard of conduct, once a foreseeable zone of risk of harm is identified, an energy utility has an obligation to exercise reasonable care to mitigate that risk. Private enforcement through tort claims is an important vehicle for making sure that the utility makes reasonable decisions in the operation of its infrastructure. As is reflected in the third column of Figure 1, how the duty to serve obligates utilities can depend on one's status as a current customer or a foreseeable member of the public who could be harmed by a utility's operations. As is discussed below, the scope of the duty to serve is not limitless, or, in other words, it is not a duty to the world at large.

We also think it important to distinguish the core obligations related to the provision of adequate and reliable utility service from other adjacent regulatory requirements, some of which are imposed on regulated utilities under the duty-to-serve rubric. Two of those are relevant here, namely, interconnection (or service-extension) requirements and open-access requirements.

The duty to serve often refers to a utility's obligation to provide service to a customer within the utility's franchise area. Utility franchise regulation often gives utilities a service monopoly, and price regulation allows a utility to recover a fair rate of return for the costs it incurs to provide customers service in this franchise area.[89] A duty to serve can require a utility to provide and continue service to customers even when it would not ordinarily be considered profitable to do so.[90] In rate regulation, utilities are commonly subject to an obligation to charge just, reasonable, and nondiscriminatory rates. Questions of prudency, and whether the utility's costs were so incurred, dominate.[91] This rate-regulation requirement is closely connected to and complementary with the duty to serve, but at its core it is a different type of obligation, focused on the utility's right to recover costs and on how customers are treated vis-à-vis other customers.[92] The duty to serve differs from broad regulatory obligations related

89. Rossi, *Universal Service*, *supra* note 46, at 29.

90. *Id.*

91. *See, e.g.*, Payne, *supra* note 45 (manuscript at 15–22) (exploring the ways in which statutorily crafted duty-to-serve obligations interact with prudent investment considerations in the context of climate change).

92. Prudency may serve as an additional basis to compel proactive action by utilities to prepare for climate change impacts. *See* WEBB ET AL., *supra* note 10, at 18–20.

to the utility's cost of capital, or the obligation that the utility owes its investors. The duty to serve—understood as an obligation that a utility owes to its customers or other private individuals—is also distinct from the policy questions of what different customer segments may owe (commonly known as "rate allocation"). Issues related to the setting of rates and rate allocation are deeply immersed in policy trade-offs, best assessed by expert regulators to the extent that their resolution is highly contingent on specific facts regarding a utility's financial operations. The duty to serve has been employed all too often in this context as utility providers' justification for added expense, despite measures relating only tangentially to reliability.[93] But as an obligation between the utility and private parties, the duty to serve has a structure and scope distinct from price regulation. It applies even where a regulator has not deemed an investment to be prudent, and, in addition to affording regulatory remedies (which often overlap with price regulation), the duty to serve can create distinct and independent private (common law) obligations and remedies for harm.[94]

The duty to serve is also a distinct obligation from other regulatory requirements that apply to grid operators related to the protection of competition or markets. In terms of economic regulation, some industries are considered common carriers (most notably railroads), while others (such as natural gas and electric power) are routinely subjected to specific open-access requirements.[95] Such regulatory requirements differ from the duty to serve, to the extent that they primarily draw on economic and antitrust principles to create obligations toward competitors or other firms serving the same market. They are typically not geared toward customers or others who are harmed by a utility's operations, apart from ensuring that the service offered to a customer is the byproduct of a fair market transaction. Antitrust law reinforces some of the same goals as economic regulation, to the extent that it protects against monopolistic conduct and protects competition between firms. But again, these obligations are owed to competing business and are distinct from the duty to serve customers or members of the public.

For purposes of analysis, the typology presented in Figure 1 identifies the constituent duty to provide adequate service, but the various obligations of the duty to serve can overlap. The remainder of this Article focuses on the duty to serve's private obligation to provide adequate service. This is not intended to diminish the significance of other duties, such as the duty to extend service or the duty to provide competitors open access to the grid.[96] Our typology instead

93. *See* Hanschen & Erspamer, *supra* note 50, at 32–34.

94. *The Duty of a Public Utility*, *supra* note 22, at 312–13.

95. *See* Kearney & Merrill, *supra* note 36, at 1327.

96. For example, service-extension requirements can be important to customers who generate their own power via rooftop solar and may need to rely on the grid for backup power. And open-access

aims to emphasize that these duties differ in type from the duty to provide adequate service, in terms of the nature of the remedies they typically afford and the manner in which their expectations are usually spelled out.[97] Our typology's identification of constituent obligations of a utility's duty to provide adequate service supports courts looking to the duty to serve as a basis for adjudicating tort claims based on the adaptation harms associated with climate change—a task we turn to in the next part of this Article.

II. CLIMATE CHANGE AND PRIVATE LAW'S DUTY TO ADAPT

As a regulatory matter, since the duty to serve customers requires a utility to meet service expectations, its core obligations have been incorporated into most past utility planning and investment decisions in the form of reliability requirements.[98] In this sense the duty to serve sets a physical baseline for any utility's infrastructure capacity. But the obligations of the duty to serve are not limited to determining the reasonableness of a utility's past investment decisions, as reflected in just and reasonable rates; they also serve as an ongoing obligation for the utility to take precautions to guard against foreseeable interruption of service and provide continued access to electrical supply in its operation and planning. This obligation is often expressed in the language of reliability but also encompasses girding against foreseeable reliability threats, including not only commonplace electric interruptions—but also, increasingly, concerns expressed in terms of energy resilience, or "the ability to withstand, adapt and recover from disasters."[99]

Climate change can pose new challenges to energy reliability and resilience, which in turn can produce new vulnerabilities related to the operation of infrastructure.[100] To the extent that utility operations produce reasonably foreseeable harms, and actions to protect against those harms are known within the industry, there is sufficient evidence to support judicial

requirements for transmission utilities are important to renewable energy resources that need competitive access to transmission. While these obligations can be described in terms of the duty to serve, their discussion is beyond the scope of this Article.

97. For both utility service and open-access requests, the harms suffered by victims are typically forward-looking and the regulatory process typically provides *both* a fairly complete service obligation *and* a remedy for noncompliance. By contrast, harms related to the duty to provide adequate service are primarily backward looking (much like other tort claims) and are more likely to be based on an incompletely defined regulatory obligation and a lack of a complete regulatory remedy for the injury.

98. *See* Hanschen & Erspamer, *supra* note 50, at 35.

99. *See* Habibollah Raoufi, Vahid Vahidinasab & Kamyar Mehran, *Power Systems Resilience Metrics: A Comprehensive Review of Challenges and Outlook*, SUSTAINABILITY, Nov. 20, 2020, at 1, 1, https://www.mdpi.com/2071-1050/12/22/9698/htm [https://perma.cc/6NWE-UPZW (staff-uploaded archive)].

100. *See, e.g.*, Alexandra Klass, Joshua Macey, Shelley Welton & Hannah Wiseman, *Grid Reliability Through Clean Energy*, 74 STAN. L. REV. (forthcoming 2022) (manuscript at 3–5) (on file with authors).

recognition of an ongoing tort duty. In other words, the traditional duty to serve extends to obligate public utilities to make operational and planning decisions in a manner that accounts for changing conditions in light of climate change.

We term this novel legal obligation the "duty to adapt." At the most abstract level, the duty to adapt almost reads like mathematical proof: (1) the duty to serve obligates utilities to protect against foreseeable service interruption; (2) climate change and the accompanying variance in extreme weather events create new and often foreseeable adaptation risks for energy grid operations, such as a heightened risk of service interruption; and so (3) utilities must take ongoing actions to guard against climate adaptation risks for energy infrastructure within their control.

But what does a duty to adapt require in application, to whom does it extend, and how can a utility effectively discharge a duty to adapt or meet its standard of reasonable care? These are difficult questions to answer in the abstract. To give them some grounding, we look to recent examples of climate-related events that have impacted energy service delivery: power outages related to the 2021 winter storm in Texas; damage caused by Hurricane Sandy in New York in 2012; and wildfires in California in 2007, 2017, and 2018. These examples show how energy grid operators are increasingly being confronted with foreseeable risks of harm associated with their operations and have ways to respond to mitigate these risks. Industry practices and customs are evolving in rapid new ways, and the duty to adapt has an important role to play in ensuring that energy grid operators are held to account on an ongoing basis as new risks materialize and new technological approaches to mitigate risks become feasible.

This part first briefly describes the state of climate science and the recognized impacts of extreme weather for the power sector. We believe this evidence is compelling enough that courts should take general judicial notice of a general tort duty to adapt for energy utilities. Our analysis focuses on the negligence element of duty and does not purport to answer specific factual questions related to breach, which will ultimately be questions for a jury to decide on a case-by-case basis.[101] Still, these examples show that there are feasible practices in the industry that can reduce many of the risks the energy grid faces on an ongoing basis. The constituent obligations of the duty to adapt—namely, interruption notice, outage minimization, and modifying technical standards—are considered, and then the part turns to the question of to whom the duty to adapt is owed. This is not a duty to the world at large, but

101. For an excellent survey of the issues related to the determination of whether a duty has been breached in climate change cases, see Hunter & Salzman, *Negligence in the Air*, *supra* note 3, at 1756–84.

we argue that courts should apply basic negligence law principles that define the scope of a duty to customers or, where the risks of harm are foreseeable, to a limited set of noncustomers.

A. *Climate Change's Impact on the Energy Grid*

Scientific consensus of anthropogenic climate change is well established.[102] Its consequences are immense and will only grow in magnitude, imparting far-reaching risks to virtually all aspects of society. As a sector largely defined by its capital-intensive, immense, and place-based nature, electric power is especially vulnerable to consequences of climate change.[103] As much as twenty-seven percent of all power production in the United States could be severely impacted by the 2030s[104]—raising a significant possibility that many energy grid activities will present new forms of climate adaptation risks that cause harms to customers and others.

These harms should be highly relevant to an industry that is intensely risk adverse in other areas. Because energy grid outages are expensive, health-harming events,[105] the sector has been built, in certain aspects, to meet reliability expectations that guard against the risk of large-scale system outage. Significant effort goes into preventative measures and contingency planning to prevent blackouts, including designing and operating the power system "in a manner

102. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014 SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS 2 (2014), https://www.ipcc.ch/site/assets/uploads/2018/02/AR5_SYR_FINAL_SPM.pdf [https://perma.cc/Z9XF-3PCE]; John Cook, Naomi Oreskes, Peter T. Doran, William R.L. Anderegg, Bart Verheggen, Ed W. Maibach, J. Stuart Carlton, Stephan Lewandowsky, Andrew G. Skuce, Sarah A. Green, Dana Nuccitelli, Peter Jacobs, Mark Richardson, Bärbel Winkler, Rob Painting & Ken Rice, *Consensus on Consensus: A Synthesis of Consensus Estimates on Human-Caused Global Warming*, 11 ENV'T RSCH. LETTERS, April 13, 2016, at 1, 1, https://iopscience.iop.org/article/10.1088/1748-9326/11/4/048002 [https://perma.cc/C3RC-GS7Z].

103. *See, e.g.*, Lisa Wood, Ross Hemphill, John Howat, Ralph Cavanagh & Severin Borenstein, *Rethinking Rate Design: Berkeley Lab's Discussion with Five Experts*, PUB. UTILS. FORT., Nov. 2016, at 20, 21–25 (discussing the need for rate changes in response to the changing consumer energy demand); JOHN J. MACWILLIAMS, SARAH LA MONACA & JAMES KOBUS, COLUMBIA SIPA CTR. ON GLOB. ENERGY POL'Y, PG&E: MARKET AND POLICY PERSPECTIVES ON THE FIRST CLIMATE CHANGE BANKRUPTCY 6–7 (2019), https://www.energypolicy.columbia.edu/sites/default/files/file-uploads/PG&E-CGEP_Report_081519-2.pdf [https://perma.cc/2ZDS-RJWS].

104. Poulomi Ganguli, Devashish Kumar & Auroop R. Ganguly, *US Power Production at Risk from Water Stress in a Changing Climate*, 7 SCI. REPS., Sept. 20, 2017, at 1, 1, **Error! Hyperlink reference not valid.**https://www.nature.com/articles/ s41598-017-12133-9#ref-CR16 [https://perma.cc/2LGB-EPRY] (noting that U.S. power production is particularly vulnerable to water scarcity and estimating water stress for power production with about twenty-seven percent of the production severely impacted by the 2030s).

105. KRISTINA HAMACHI LACOMMARE & JOSEPH H. ETO, ERNEST ORLANDO LAWRENCE BERKELEY NAT'L LAB'Y, UNDERSTANDING THE COST OF POWER INTERRUPTIONS TO U.S. ELECTRICITY CONSUMERS, at i (2004), https://eta-publications.lbl.gov/sites/default/files/lbnl-55718.pdf [https://perma.cc/49XS-6XAY] (estimating the annual cost to consumers of power interruptions at $80 billion).

that the likelihood of having to disconnect customers occurs no more than one day in ten years, on average."[106]

Increasingly too, utilities have placed an emphasis on energy resilience.[107] In contrast to electric reliability, where overlapping standards and practices function to minimize commonplace service disruptions, energy resilience is concerned with a system's "ability to withstand, adapt and recover from disasters."[108] Improving energy resilience may require practices and activities different from those associated with ensuring electric reliability. For example, energy resilience requires grid planners and operators to learn lessons from prior disruptions and to plan how to better handle the next crisis facing the grid.[109] Additionally, actions associated with improved energy resilience may include recognition that the system needs to be designed to anticipate some operational planning and to respond quickly to crises by providing customer services such as backup power or energy storage.[110]

Climate change is relevant to both energy reliability and resilience. As to the former, climate change will shift the historical weather baselines used in planning, from temperature to sea-level rise.[111] These shifts in baseline conditions affect public utility assets and operations in foreseeable, addressable ways. For example, testimony in a 2013 Consolidated Edison rate case revealed that utility equipment had been designed with precise temperature parameters in mind that did not account for temperature increases expected as a result of climate change.[112] Doing so left the equipment impaired and unlikely to function across the course of its planned useful life.[113] As to the latter, climate

106. *What is Reliability?*, ISO NEW ENG., https://www.iso-ne.com/about/what-we-do/in-depth/what-is-reliability [https://perma.cc/RE6U-UKQ8]. We take no position here on whether this standard is the best one to minimize harms. For discussion of how a reliable electric power grid differs from a resilient grid, see Sue Tierney, Opinion, *About That National Conversation on Resilience of the Electric Grid: The Urgent Need for Guidance and Action*, UTIL. DIVE (Dec. 13, 2017), https://www.utilitydive.com/news/about-that-national-conversation-on-resilience-of-the-electric-grid-the-ur/512545/ [https://perma.cc/KW3T-K4HF].

107. *See* Klass et al., *supra* note 100 (manuscript at 11–12).

108. Raoufi et al., *supra* note 99, at 1.

109. News Release, Nat'l Acads. Scis., Eng'g, & Med., Enhancing the Resilience of the Nation's Electricity System (July 20, 2017), https://www.nationalacademies.org/news/2017/07/enhancing-the-resilience-of-the-nations-electricity-system [https://perma.cc/X2RP-ANNT].

110. *See* Tierney, *supra* note 106.

111. P.C.D. Milly, Julio Betancourt, Malin Falkenmark, Robert M. Hirsch, Zbigniew W. Kundzewicz, Dennis P. Lettenmaier & Ronald J. Stouffer, *Stationarity Is Dead: Whither Water Management*, 319 SCIENCE 573, 573–74 (2008).

112. Env't Def. Fund & Colum. L. Sch. Sabin Ctr. for Climate Change L., Comment Letter on FERC's Request for Comments Related to the Technical Conference on Climate Change, Extreme Weather, and Electric System Reliability (Docket No. AD21-13-000), at 10 (Apr. 15, 2021) [hereinafter EDF & Sabin Comments], https://www.icrrl.org/files/2021/06/EDF-Sabin-Center-Comments.pdf [https://perma.cc/PME9-2BET].

113. *Id.*

change effects on energy resilience are often expressed in the form of extreme weather impacts on the electric grid and upstream energy suppliers. Aspects of extreme weather events are likewise increasingly foreseeable and addressable. The frequency and intensity of such events are shifting in understandable ways, and accounting for such shifts can improve core utility planning assumptions.[114]

Revealing how climate change affects extreme weather is critical, as such events are perhaps the most significant event-rated risk that utilities today need to consider in their operations and planning. Extreme weather is already the leading cause of electric outages in the United States, and weather-related outages are expected to increase in coming years.[115] The North American Electric Reliability Corporation ("NERC"), the federally designated electric-reliability organization that provides reliability standards for the electric power transmission grid (including standards that are used by regulators),[116] has analyzed data to evaluate risk profiles for various foreseeable events affecting the operation of the bulk electric transmission system, focusing on the likelihood of an event occurring and the adverse impacts associated with it.[117] With respect to extreme weather events, one of the most significant risk profiles identified, NERC has explained, "[I]t is important for operations and planning personnel to remain vigilant and prepare for high-risk seasons by learning from prior events, practicing recovery efforts, and anticipating impacts of an event to critical infrastructure . . . ."[118]

Despite the premium placed upon grid reliability, the electricity sector has been slow to proactively consider climate-related risks in its planning, investment, and operational decisions.[119] This failure is not due to an inability to foresee the consequences of changed climate conditions. Instead, it is often due to embedded planning assumptions about weather patterns, such as stationarity (or the notion that variance is constant over fixed time periods).[120] With climate change, we are facing new variations in the extremes, frequency, and distribution of environmental attributes, such as temperature, precipitation,

114. *Id.* at 11–12.

115. U.S. DEP'T OF ENERGY, QUADRENNIAL ENERGY REVIEW: TRANSFORMING THE NATION'S ELECTRICITY SYSTEM: THE SECOND INSTALLMENT OF THE QER, at S-12 (2017), https://www.energy.gov/sites/prod/files/2017/02/f34/Quadrennial%20Energy%20Review--Second%20Installment%20%28Full%20Report%29.pdf [https://perma.cc/DZJ5-7PHC].

116. North American Electric Reliability Corp., 116 FERC ¶ 61,062 paras. 3–4 (2006) (ERO Certification Order).

117. *See* NERC RELIABILITY ISSUES STEERING COMM., 2019 ERO RELIABILITY RISK PRIORITIES REPORT 5–6 (2019), https://www.nerc.com/comm/RISC/Documents/RISC%20ERO%20Priorities%20Report_Third_Draft_September_2019_CLEAN.pdf [https://perma.cc/Z3GS-CJRD] (evaluating risks to the electric transmission system).

118. *Id.* at 18–19.

119. *See* WEBB ET AL., *supra* note 10, at 10.

120. Milly et al., *supra* note 111, at 573.

and wildfire; as has been stated in the context of water planning, "stationarity is dead."[121] Scientific models are increasingly attentive to nonlinear variance and big picture risks associated with grid service during extreme weather conditions in particular areas of the country.[122] And climate science has evolved to provide granular enough information that corporate actors can make company-level, and even asset-level, decisions that consider climate change effects on a probabilistic basis.[123] The degree of specificity should not be overstated; for example, we are aware of no climate model that can predict with precision that a specific event will occur at a specific time. However, available models do exist that provide downscaled climate projections that convey event probabilities with a degree of accuracy that improves corporate decision-making, including probabilistic forecasting of system load for utilities.[124] This information, in turn, can be used to inform operational practices and investment standards. These learnings are highly relevant and implementable, and might result in any number of changes, from updates to storm de-energization protocols to changes in equipment siting based on updated floodplain mapping.[125]

Importantly, the process by which a public utility can obtain this information is increasingly known throughout the energy industry. The process, most often referred to as "climate resilience planning," generally requires that utilities first develop a climate vulnerability assessment, which identifies where assets may be at risk from climate impacts, and second enact a climate resilience plan, which leverages that learning to update equipment, planning, and operations.[126] Yet many utilities still plan for infrastructure based on "similar day" forecasts predicated on linear data assumptions and have not engaged in planning that proactively addresses probabilistic risks.[127] Often, where

121. *See id.*

122. *See, e.g.*, Sean W.D. Turner, Kristian Nelson, Nathalie Voisin, Vincent Tidwell, Ariel Miara, Ana Dyreson, Stuart Cohen, Dan Mantena, Julie Jin, Pete Warnken & Shih-Chieh Kao, *A Multi-Reservoir Model for Projecting Drought Impacts on Thermoelectric Disruption Risk Across the Texas Power Grid*, 231 ENERGY, 2021, at 1, 1 (examining the effects of drought on water storage at thirty major reservoirs in Texas).

123. STEPHANIE H. JONES, GABRIEL MALEK, MICHAEL PANFIL & DAVID G. VICTOR, ENV'T DEF. FUND & BROOKINGS, WHAT INVESTORS AND THE SEC CAN LEARN FROM THE TEXAS POWER CRISIS 9 (2021), https://www.ourenergypolicy.org/resources/what-investors-and-the-sec-can-learn-from-the-texas-power-crises/ [https://perma.cc/6M5P-98DZ].

124. *See, e.g.*, Tao Hong & Shu Fan, *Probabilistic Electric Load Forecasting: A Tutorial Review*, 32 INT'L J. FORECASTING 914, 914–36 (2016) (explaining probabilistic electric load forecasting).

125. *See generally* WEBB ET AL., *supra* note 10, at 4.

126. *Id.*

127. *See, e.g.*, TAO HONG & MOHAMMAD SHAHIDEHPOUR, E. INTERCONNECTION STATES' PLAN. COUNCIL, LOAD FORECASTING CASE STUDY 1–3 (2015), https://pubs.naruc.org/pub.cfm?id=536E10A7-2354-D714-5191-A8AAFE45D626 [https://perma.cc/KT72-8KPK] ("The similar day method, which derives a future load profile using the historical days with similar temperature profiles and day type (e.g., day of the week and holiday), is still used by many utilities.").

comprehensive risk planning has occurred, it is only following some form of tragic extreme weather event, leading to a narrow focus on averting a single type of crisis rather than a broader probabilistic assessment of risks.[128] And too often risk assessment is based on out-of-date historical data and is not regularly updated based on new data reflecting the variances in weather associated with climate change or state-of-the-art modeling.[129]

Part of the challenge today for energy grid operators is the issue of latent risks associated with legacy investments.[130] Historically, most energy planning focused on planning infrastructure to meet peak customer usage, relying primarily on past usage data on customer peaks, along with assumptions about future customer use. Utilities planning for peaks in high usage times typically rely on past weather records and crude forecasts to predict future weather problems—and the existing energy transmission grid and most of the power supply has been built with these assumptions in mind.[131] However, today, state-of-the-art data and predictive modeling for energy grid forecasting, planning, and operations is far more sophisticated.[132] As new energy infrastructure is planned, comprehensive assessment of climate risks (including, in some instances, adaptation risks) is increasingly common. But this does not address that the legacy investments that have been made over the past fifty years were not planned or built with these risks in mind.[133] A duty to adapt not only focuses on the current planning obligations a utility may have when it makes new investments today but also includes how a utility should plan for and think about the risks associated with its legacy grid assets.

Historically, utility planning focused on a narrow definition of risks, fixating on reliability rather than ideas of resilience and risks of other harms, such as those associated with climate change.[134] But the duty to serve is not

128. WEBB ET AL., *supra* note 10, at 4.

129. *Id.* at 9–10 (noting, for example, that Entergy only instituted a climate risk and resilience study following Hurricanes Katrina and Rita, and Consolidated Edison only did so after Superstorm Sandy).

130. For a discussion of the challenges presented by legacy risks, see generally Emily Hammond & Jim Rossi, *Stranded Costs and Grid Decarbonization*, 82 BROOK. L. REV. 645, 650–63 (2017).

131. *See* JUAN PABLO CARVALLO, PETER H. LARSEN, ALAN H. SANSTAD & CHARLES A. GOLDMAN, ERNEST ORLANDO LAWRENCE BERKELEY NAT'L LAB'Y, LOAD FORECASTING IN ELECTRIC UTILITY INTEGRATED RESOURCE PLANNING, at viii–x (2016), https://www.osti.gov/servlets/purl/1371722 [https://perma.cc/A9PA-5MCS (staff-uploaded archive)] (comparing usage planning from twelve U.S. utilities).

132. *See* WEBB ET AL., *supra* note 10, at 5 (explaining that the availability of data has increased significantly in recent years).

133. *See* Hammond & Rossi, *supra* note 130, at 650–59 (describing stranded costs in energy infrastructure).

134. *See* BENJAMIN L. PRESTON, SCOTT N. BACKHAUS, MARY EWERS, JULIA A. PHILLIPS, CESAR A. SILVA-MONROY, JEFFREY E. DAGLE, ALFONSO G. TARDITI, JOHN (PAT) LOONEY & THOMAS J. KING, JR., RESILIENCE OF THE U.S. ELECTRICITY SYSTEM: A MULTI-HAZARD

confined by such a narrow definition and is flexible enough to apply to burgeoning challenges to adequate service. Utilities not only need to plan in order to keep customers' lights on, they also need to take a big picture approach to the risks of operating the power grid as a system. Extreme weather events highlight the interdependence of the energy grid with other environmental resources, such as the water that is used to cool at least seventy percent of existing power plant capacity.[135] When customer demand for energy is highest because of extreme weather, water and other inputs to the energy production process are also likely to be experiencing shortage conditions too.[136] And an unduly narrow approach to promoting reliability can have unintended consequences that ultimately impair the very service such protocols are designed to uphold. Failure to affirmatively de-energize power lines in advance of wildfire conditions might in the short term, for example, provide for uninterrupted service. Yet system-wide electric service may be interrupted far longer for a larger number of customers if those same lines directly cause a wildfire.

A singular fixation on maintaining customer service reliability without context is ill-advised for a variety of other reasons, including that doing so puts the long-term maintenance of the grid at risk. Guaranteeing reliability in light of new forms of climate risk is also likely to be expensive, and the benefits and costs of service reliability need to be weighed with the customer in mind.[137] Age-old concerns embedded in monopolistic industries, particularly surrounding the lack of competition and utilities' impulse to overspend, apply here.[138] Relatively low-cost precautions, such as more proactive notice of service interruption and improved utility planning for emergencies, are among the most effective

PERSPECTIVE 41–42 (2016), https://www.energy.gov/sites/prod/files/2017/01/f34/Resilience%20of%20the%20U.S.%20Electricity%20System%20A%20Multi-Hazard%20Perspective.pdf [https://perma.cc/8FZ4-B3TF].

135. *See* Hannah Northey & Peter Behr, *Severe Heat, Drought Pack Dual Threat to Power Plants*, ENERGYWIRE (June 28, 2021, 7:08 AM), https://www.eenews.net/energywire/2021/06/28/stories/1063735943?utm_campaign=edition&utm_medium=email&utm_source=eenews%3Aenergywire [http://perma.cc/7AC7-QR9E (staff-uploaded archive)] (observing that more than seventy percent of the U.S. power plant capacity requires water for cooling and that severe drought presents an especially precarious situation for thermoelectric plants—coal, natural gas and nuclear facilities—that consume fresh water to cool and condense steam that drives power turbines, as well as hydroelectric dams in the West).

136. *Id.*

137. ALISON SILVERSTEIN, ROB GRAMLICH & MICHAEL GOGGIN, A CUSTOMER-FOCUSED FRAMEWORK FOR ELECTRIC SYSTEM RESILIENCE 53–56 (2018), https://gridprogress.files.wordpress.com/2018/05/customer-focused-resilience-final-050118.pdf [https://perma.cc/M4ZA-UJM9].

138. *See* Harvey Averch & Leland L. Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AM. ECON. REV. 1052, 1066–67 (1962) (explaining concerns in the context of communications common carriers).

options available to a utility.[139] Just as important is the need to consider the interplay between long-term planning, reliability, and climate change, as certain measures can magnify adaptation challenges.

For example, extreme heat during 2021 increased the demand for air conditioning, and in many areas of the country the short-term utility response to expanding power supply output resulted in an increase in emissions from fossil fuel plants.[140] Similarly, in anticipation of demand growth due to vehicle electrification, utilities need to be mindful of climate impacts.[141] This pattern, where solution addresses symptom while concurrently exacerbating the underlying condition, should be avoided. In planning to meet the demand for energy, grid operators must proactively approach power supply with an eye towards climate impacts and must aim to prevent "maladaptation."[142] This requires a utility to focus not only on the immediate challenge of keeping customers' lights on, but also on finding longer-term ways to address system resilience, including reducing peaks in energy demand, promoting conservation, and building new low-carbon power supply capacity.[143]

B. *Obligations of the Private Law Duty To Adapt*

For energy grid operators, there is considerable evidence that a range of harms connected to climate change are widely known throughout the industry, supporting judicial recognition of a general duty to adapt obligating public

139. *See, e.g.*, CONSOL. EDISON, CLIMATE CHANGE RESILIENCE AND ADAPTATION: SUMMARY OF 2020 ACTIVITIES 34–41 (2021), https://www.coned.com/-/media/files/coned/documents/our-energy-future/our-energy-project/climate-change-resiliency-plan/climate-change-resilience-adaption-2020.pdf [https://perma.cc/3USY-6UK4] (describing several low-cost planning, design, and emergency response strategies that are available to Consolidated Edison as it faces an increased likelihood of extreme climate events).

140. Benjamin Storrow, *How Heat Waves and AC Propel a Climate Feedback Loop*, E&ENEWS (June 28, 2021, 6:42 AM), https://www.eenews.net/climatewire/2021/06/28/stories/1063735921?utm_campaign=edition&utm_medium=email&utm_source=eenews%3Aclimatewire [https://perma.cc/NNY6-QAE7 (staff-uploaded, dark archive)] (noting that a narrow focus on reliability may lead grid operators to keep operating less efficient, dirtier fossil fuel plants, only to run them during heat waves, raising the risks to the climate).

141. For a discussion of the challenges in shifting toward electrification without adversely impacting climate emissions, see generally Alexandra B. Klass, *Public Utilities and Transportation Electrification*, 104 IOWA L. REV. 545 (2019).

142. Maladaptation occurs where regulatory interventions "address the symptom of a particular risk while also exacerbating its underlying cause"—a policy result that should generally be avoided. *See* EDF & Sabin Comments, *supra* note 112, E**rror! Hyperlink reference not valid.**at 8 (quoting WEBB ET AL., *supra* note 10, at 4).

143. *See* J.B. Ruhl, *General Design Principles for Resilience and Adaptive Capacity in Legal Systems—with Applications to Climate Change Adaptation*, 89 N.C. L. REV. 1373, 1393–402 (2011) (emphasizing the need for adaptive systems to proactively engineer for resilience in order to restore disturbances from system equilibrium).

utilities to make operational and planning decisions in a manner that accounts for changing conditions in light of climate change.

There is also considerable evidence of practices that can mitigate these risks, supporting a more precise enunciation of the utility's duty to adapt in relation to the three constituent obligations of the duty to provide adequate service, encompassed in the duty to serve: providing reasonable interruption notice, minimizing outages, and meeting technical standards in operation of the grid. We demonstrate these foreseeable harms and feasible risk mitigation strategies in turn, considering each in the context of three recent energy outages to aid inquiry: the 2021 Texas winter storms; 2012 Hurricane Sandy in New York; and the 2007, 2017, and 2018 wildfires in California. Whether a duty has been breached in a particular context is ultimately still a question of fact left to a jury, but we draw on these examples to show that the industry has a range of feasible options to mitigate ongoing climate adaptation risks with the power grid.

1. "Adequate" Notice of Interruption

In the second week of February 2021, extreme winter weather conditions affected the middle of the country.[144] Record low temperatures and snow and ice that lasted for days produced a major power crisis in Texas, with rolling blackouts across the state over a period of several days.[145] The impact of these blackouts was devastating. Seventy percent of Texans served by the state's power grid lost power for an average of forty-two hours, with more than half of those experiencing a loss of access to other critical services, such as water.[146] Dozens (according to some reports, hundreds) of individuals are reported to have died for reasons connected to the energy outages.[147] The outages resulted in significant property and economic losses throughout the entire state, ranging in impact from $80 to $130 billion with insured losses estimated at $10 to $20 billion.[148]

144. *See* Kara Norton, *Why Texas Was Not Prepared for Winter Storm Uri*, PBS (Mar. 25, 2021), https://www.pbs.org/wgbh/nova/article/texas-winter-storm-uri/ [https://perma.cc/VMT8-3P5G].

145. *Id.*

146. Neelam Bohra, *Almost 70% of ERCOT Customers Lost Power During Winter Storm, Study Finds*, TEXAS TRIB. (Mar. 29, 2021, 5:00 AM), https://www.texastribune.org/2021/03/29/texas-power-outage-ERCOT/ [https://perma.cc/34CH-XS9R].

147. *See* Zach Despart, Alejandro Serrano & Stephanie Lamm, *Analysis Reveals Nearly 200 Died in Texas Cold Storm and Blackouts, Almost Double the Official Count*, HOUS. CHRON. (Apr. 2, 2021, 4:40 PM), https://www.houstonchronicle.com/news/houston-texas/houston/article/texas-cold-storm-200-died-analysis-winter-freeze-16070470.php [https://perma.cc/8WY8-U9RT].

148. Garrett Golding, Anil Kumar & Karel Mertes, *Cost of Texas' 2021 Deep Freeze Justifies Weatherization*, FED. RSRV. BANK DALL. (Apr. 15, 2021), https://www.dallasfed.org/research/economics/2021/0415.aspx [https://perma.cc/URW9-X9EF].

The causes of the tragic power outages in Texas in the winter of 2021 are complex. At bottom, record-breaking winter demand for electric power could not meet supply, at a time when power plant equipment was frozen due to record-setting low temperatures throughout the entire state.[149] At the peak of the power outages, over forty-eight percent of the region's total power generation capacity was unavailable, with every type of generation technology facing some problems.[150] Gas-fired generators (which suffered greater outages than other power generation technologies) faced pervasive fuel shortages when the compressors necessary to supply gas via pipeline were disabled by a combination of freezing weather and the lack of power.[151] The extreme winter weather in February 2021 was not unique to Texas (other parts of the country faced freezing conditions too), but there are a number of reasons the state's power grid was hit particularly hard by it. While adjacent states participate in interconnected national transmission grids, Texas has isolated most of its transmission grid and placed it under the control of the Electricity Reliability Council of Texas ("ERCOT"), allowing operation of most of the state's electric power industry to avoid federal oversight.[152] Unlike every other region of the United States with a central energy grid operator, Texas does not have a mandatory centralized capacity market administrated by the grid operator nor a state-supervised least-cost planning process to ensure sufficient energy supply.[153] Rather, the state's "energy only" power supply approach within ERCOT relies exclusively on market price signals to create incentives for generation resources to be available when there are power shortages.[154] Texas also lacks reliability standards that directly require generators to perform winterization (a contrast to many other regions of the United States prone to freezing), leaving the state's power supply particularly vulnerable to cold weather.[155] With power demand peaking and nearly half the state's power plants

149. BILL MAGNESS, REVIEW OF FEBRUARY 2021 EXTREME COLD WEATHER EVENT—ERCOT PRESENTATION 10 (Feb. 24, 2021), http://www.ercot.com/content/wcm/key_documents_lists/225373/2.2_REVISED_ERCOT_Presentation.pdf [https:/perma.cc/UTQ2-5M4H].

150. *Id.*

151. *Id.* at 14.

152. Stephanie Kelly, Tim McLaughlin & Swati Verma, *Explainer: Texas's One of a Kind Power System Raises Questions During Price Spike*, REUTERS (Feb. 16, 2021, 4:43 PM), https://www.reuters.com/article/us-usa-weather-power-prices-explainer/explainer-texass-one-of-a-kind-power-system-raises-questions-during-price-spike-idUSKBN2AG2KD [https://perma.cc/N835-J7V5].

153. *Id.*

154. *Id.* (noting that since 2010 reserve margins in the state had dropped "to about 10% from about 20%").

155. *See* Jim Krane, Robert Idel & Peter Volkmar, *Winterization and the Texas Blackout: Fail To Prepare? Prepare To Fail*, FORBES (Feb. 19, 2021, 10:55 AM), https://www.forbes.com/sites/thebakersinstitute/2021/02/19/winterization-and-the-texas-blackout-fail-to-prepare-prepare-to-fail/?sh=693f0a5d7c83 [https://perma.cc/FT7W-NPUJ].

out of operation, Texas grid operators had no choice but to institute rolling blackouts for most customers, as the Texas power grid was "'seconds and minutes' away from" complete failure.[156] These rolling blackouts helped the state preserve the safety of its grid by avoiding fires and unsafe operating conditions.[157]

The 2021 Texas blackout was an avoidable disaster, and in fact, it has been described as a "disaster foretold."[158] Over and over again, for more than a decade, Texas regulators, ERCOT, and participants in the Texas power market were warned that the state's power grid was vulnerable to reliability disruptions.[159] As one expert testified to Congress, "[i]t is clear that steps could have been taken by state officials, grid operators and energy asset owners in Texas that would have at least lessened the extent of power system and gas system outages, and the human hardships that resulted from them."[160] Over several years, NERC had warned that ERCOT was operating with narrow power reserve margins and with reliability risks.[161] The event itself was likewise not without precedent: in February 2011, ERCOT had experienced difficulties maintaining reliable electric service during extreme weather conditions due to freezing instrumentation and equipment; following these outages a decade ago, a report issued by the Federal Energy Regulatory Commission ("FERC") and NERC called the winter outages "avoidable" and made several recommendations, including the need for the industry and regulators to be

156. Erin Douglas, *Texas Was "Seconds and Minutes" Away from Catastrophic Monthslong Blackouts, Officials Say*, TEX. TRIB. (Feb. 18, 2021, 6:00 PM), https://www.texastribune.org/2021/02/18/texas-power-outages-ercot/ [https://perma.cc/LYS4-QGBE].

157. *Id.*

158. Jeffrey Ball, *The Texas Blackout Is the Story of a Disaster Foretold*, TEX. MONTHLY (Feb. 19, 2021), https://www.texasmonthly.com/news-politics/texas-blackout-preventable/ [https://perma.cc/LW2R-UVRU].

159. Megan Hernboth, *At Least Two Lawsuits Filed Against Texas' Energy Committee Claim It Was Aware of Shortcomings in the State's Energy Supply from Previous Winter Storms*, BUS. INSIDER (Feb. 20, 2021, 11:49 AM), https://www.businessinsider.com/lawsuits-filed-against-texas-energy-committee-for-outages-2021-2 [https://perma.cc/8LR6-GTP3].

160. *Lessons Learned from the Texas Blackouts: Research Needs for a Secure and Resilient Grid: Hearing Before the H. Comm. on Sci., Space & Tech.*, 117th Cong. 69 (2021) (statement of Susan F. Tierney, Senior Advisor, Analysis Group, Inc.), https://www.congress.gov/117/chrg/CHRG-117hhrg43633/CHRG-117hhrg43633.pdf [https://perma.cc/L6X6-K2YH (staff-uploaded archive)].

161. *Reliability, Resiliency, and Affordability of Electric Service in the U.S. amid the Changing Energy Mix and Extreme Weather Events: Hearing Before the S. Comm. on Energy & Nat. Res.*, 117th Cong. 8 (2021) (statement of James Robb, President and CEO of NERC), https://www.energy.senate.gov/services/files/EB1D7E02-BC93-4DFF-A6A9-002341DA34CF [https://perma.cc/PPK8-RM4R] ("Concern for ERCOT's reserve margins has been a standing concern in NERC's assessments. In the most recent 2020/2021 Winter Reliability Assessment, NERC warns of the potential for extreme generation resource outages in ERCOT due to severe weather in winter and summer, and the potential need for grid operators to employ operating mitigations or energy emergency alerts to meet peak demand.").

attentive to weatherization of power plants.[162] The FERC/NERC report following the February 2011 outages recommended too that ERCOT should obtain "forecasts of real output capability [from power suppliers] in advance of an anticipated severe weather event," which "should take into account both the temperature beyond which the availability of the generating unit cannot be assumed, and the potential for natural gas curtailments."[163] As FERC has reported following its investigation of the winter 2021 Texas outage, this was the *fourth* event in a decade that threatened the reliability of the Texas grid due to unplanned cold-weather-related power generation outages.[164]

The impacts of these outages were devastating. Texas power customers experienced prolonged periods of freezing in their homes, resulting in significant property damage related to freezing pipes and flooding and, in some unfortunate cases, death.[165] As a result, a number of lawsuits have been filed against ERCOT and power suppliers in the state,[166] including suits on behalf of vulnerable individuals who died due to hypothermia when heat was unavailable in their homes.[167] These suits against energy operators raise a range of issues, but several suits have focused on the adequacy of notice regarding service outage. For example, the mother of an eleven-year-old boy who died of hypothermia while sleeping during the winter storms sued ERCOT and the local utility, Entergy, alleging that misinformation and inaccuracies in communications with customers led to confusion during the storm and needlessly exposed customers to dangerous weather conditions.[168] Specifically, the suit alleges, while ERCOT and Entergy warned customers of temporary,

162. FERC & NERC, REPORT ON OUTAGES AND CURTAILMENTS DURING THE SOUTHWEST COLD WEATHER EVENT OF FEBRUARY 1–5, 2011: CAUSES AND RECOMMENDATIONS 203 (2011), https://www.ferc.gov/sites/default/files/2020-04/08-16-11-report.pdf [https://perma.cc/CJ8Q-8HSN] ("States in the Southwest should examine whether Generator/Operators ought to be required to submit winterization plans, and should consider enacting legislation where necessary and appropriate.").

163. *Id.* at 202.

164. FERC & NERC, FEBRUARY 2021 COLD WEATHER GRID OPERATIONS: PRELIMINARY FINDINGS AND RECOMMENDATIONS 3 (2021), https://www.ferc.gov/february-2021-cold-weather-grid-operations-preliminary-findings-and-recommendations [https://perma.cc/3XBF-5UD7 (staff-uploaded archive)].

165. Ball, *supra* note 158.

166. *See, e.g.*, Boose, *supra* note 7; Plaintiff's Petition and Application, *supra* note 7. Although ERCOT routinely raises a sovereign immunity defense when faced with such lawsuits, the Texas Supreme Court recently punted on making a decision about this issue, leaving the question of sovereign immunity open for the time being under Texas law and ERCOT open to tort suits. *See* ERCOT v. Panda Power Generation Infrastructure Fund, LLC, 619 S.W.3d 628, 631 (Tex. 2021).

167. Giulia McDonnell Nieto del Rio, Richard Fausset & Johnny Diaz, *Extreme Cold Killed Texans in Their Bedrooms, Vehicles and Backyards*, N.Y. TIMES, https://www.nytimes.com/2021/02/19/us/texas-deaths-winter-storm.html [https://perma.cc/3SYW-4XNZ (dark archive)] (Sept. 1, 2021).

168. Doha Madani, *Mother of 11-Year-Old Texas Boy Who Died During Power Outage Sues ERCOT, Entergy*, NBC NEWS (Feb. 22, 2021, 6:05 PM), https://www.nbcnews.com/news/us-news/mother-11-year-old-texas-boy-who-died-during-power-n1258564 [https://perma.cc/4KMX-DYPQ].

rolling blackouts (which might last for a period of twenty to thirty-four minutes), it failed to warn customers that there might be longer blackouts that would last for days—and that grid operators had sufficient information to know that blackouts for some customers would be longer.[169] The suit also maintains that the local utility chose which circuits to shut down in a manner that disproportionately impacted some of the most vulnerable customers, while allowing businesses in certain areas to operate without any power interruption at all.[170]

Negligence claims alleging inadequate notice demonstrate one way that a duty to adapt can help hold utilities accountable on an ongoing basis for mitigating the risks of operating the energy grid during extreme climate events. Utility regulators routinely require "reasonably adequate notice" of service disconnection, but it is unclear what "reasonably adequate" entails. Over time, what is required for adequate notice has changed, especially as more widespread use of forecasting coupled with the use of real-time information and big data by energy grid operators has allowed for more granular forecasting of service outages. No one else has access to this kind of specific information about the power grid's operation—and a utility, not a customer, is in the best position to know whether it will suffer temporary rolling blackouts or more sustained outages that might require customers to seek alternatives to using electricity in their homes.[171] More pervasive interconnection to customers through the telecommunications network also changes societal expectations for how service outages should be communicated. Most basically, with widespread use of cell phones and the internet as communication tools, utilities are also able to deliver information regularly to customers and provide updates about service outages in real time to customers without incurring a significant cost. Many customers even have advanced smart meters that allow utilities to exercise a granular level of control over power supply by controlling the flow of energy not only at the level of distribution switches that may affect neighbors but also at the level of the individual customer.[172] At a minimum, the availability of these technologies

169. *Id.*

170. *Id.*

171. *Cf.* David Montgomery, Rick Rojas, Ivan Penn & James Dobbins, *Through Chattering Teeth, Texans Criticize Extended Power Outages*, N.Y. TIMES, https://www.nytimes.com/2021/02/16/us/texas-winter-storm-power-outages.html [https://perma.cc/FL2B-67YV (dark archive)] (Feb. 18, 2021).

172. For example, just months after the winter 2021 rolling blackouts, Texas utilities communicated with customers about voluntary conservation of energy to relieve the strain on the state's power grid during extreme summer heat. Eric Levenson, *Electric Grid Operator Asks Texans To Stop Blasting AC as Unplanned Outages and Heat Collide*, CNN (June 15, 2021, 11:42 AM), https://www.cnn.com/2021/06/15/us/texas-ercot-heat-energy/index.html [https://perma.cc/3NK6-WJ44]. Some utilities in the state deployed smart meters to limit customer energy use to reduce demand associated with home air conditioner operation. *See* Matt Dougherty, '*Woke Up Sweating*': *Some Texans Shocked To Find Their Smart Thermostats Were Raised Remotely*, KHOU, https://www.khou.com/article/

would suggest an obligation not just to provide some notice of interruption but also to provide regular and accurate updates about expected outage duration and service restoration. In addition, utility operators have obligations to warn customers about related risks associated with power outages and to provide information relevant to mitigating these risks, such as warnings about traffic signal outages, exposure to extreme weather conditions, and impacts on water and safe shelter—all of which were implicated by the 2021 winter power outages in Texas.

2. Minimizing Unnecessary Power Outages

The duty to serve obligates public utilities to take reasonable measures to minimize unnecessary power outages. This includes an obligation to take feasible ongoing operational measures and to take longer-term measures to better plan the grid to minimize outages where reasonable. However, it does not require perfect reliability of service for customers, especially where utilities are having dangerous extreme weather events. Although the statutory duty to serve is often oriented with conceptions of reliability in mind, the private duty to serve is not tethered to historic conceptions of reliability alone. Rather, and of particular relevance in addressing harms associated with climate change, it includes an obligation to take into account considerations more aptly described as energy resilience, including the grid's ability to recover safely and quickly when confronted with emergencies such as those represented by extreme weather events.[173]

The 2021 Texas winter power outages demonstrate how the proactive deployment of feasible operational measures can help to minimize outages. A decade prior to the 2021 winter storms, grid operators and power suppliers in Texas warned about some specific operational and design risks that made the state's power grid especially vulnerable to winter storm outages.[174] FERC and NERC specifically recommended generators weatherize equipment.[175] There is no evidence that power suppliers or utilities in much of the state made significant changes to their operations in response to previous calls for power plant weatherization or the use of predictive forecasting techniques to harden the grid in order to improve reliability. To the extent that grid operators failed to take feasible measures to respond to particular, previously identified risks,

news/local/texas/remote-thermostat-adjustment-texas-energy-shortage/285-5acf2bc5-54b7-4160-bffe-1f9a5ef4362a [https://perma.cc/Y9G5-AJWX] (June 18, 2021, 9:42 AM).

173. For further discussion of the challenges with transmission grid resilience, see generally PRESTON ET AL., *supra* note 134.

174. *See supra* notes 161–64 and accompanying text (describing FERC/NERC recommendations to the Texas power industry).

175. *See supra* notes 161–64.

plaintiffs would appear to have a solid basis for raising a failure-to-adapt claim against ERCOT and distribution utilities. As discussed more below in Section II.B.3, similar claims, premised on a general duty of care, could also be brought against power suppliers or natural gas companies for the foreseeable harms that their operations caused to noncustomer victims during the winter 2021 outages.

The obligation to minimize outages not only includes operational decisions by utilities and energy suppliers; it also extends to a utility's planning and design of the grid. It does not depend on a specific prior warning of a particular weather event, as occurred in Texas. Rather, the obligation is oriented in particular to energy resilience benefits made possible through incorporation of climate science. Through climate resilience planning, public utilities can uncover specific and actionable information that results in changes across operational, planning, and investment decisions. These changes, which are owed under the duty to adapt, improve energy resilience in response to climate change impacts, and ultimately connect back to the duty to serve's obligation that public utilities minimize unnecessary power outages.

Importantly too, the obligation may require utilities to undertake careful balancing of equities. A utility might, for example, shut off power for limited durations for some customers in order to manage and maintain grid resilience.[176] Increasingly, the need to de-energize portions of the grid in the face of extreme weather events in order to protect system resilience and the safety of customers[177] raises the possibility that the duty to adapt may require not only keeping the power on but also actual interruption of power for some customers in order to maintain the overall integrity of the energy grid. It may require utilities to consider even broader investments in resilience measures too, such as battery storage and microgrids.[178]

Consider Hurricane Sandy, one of the most destructive extreme weather events in recent history.[179] In the United States, Sandy affected much of the

176. *See* PRESTON ET AL., *supra* note 134, at 7.

177. *See, e.g.*, Ellen Howard Kutzer & Erun Overturf, *Changing Climate, Changing Utilities: Extreme Weather, Wildfires, Technology, and the Electric Grid*, 35 NAT. RES. & ENV'T, Winter 2021, at 1 (noting the use of service interruption as a risk mitigation tool but also that this can cause significant hardship and even harm to some customers).

178. *See, e.g.*, Herman K. Trabish, *De-Energize and DERs: The Tough Options Wildfires Pose for California Utilities*, UTIL. DIVE (Feb. 20, 2019), https://www.utilitydive.com/news/the-hard-choice-californias-wildfires-have-forced-on-its-utilities-and-a/548614/ [https://perma.cc/H8L6-GU5C] (noting how customer distributed energy resources can help to improve system resilience); Kutzer & Overturf, *supra* note 177, at 4–5 (discussing how distributed energy resources can help utilities better manage wildfire risks).

179. *See* Sarah Gibbens, *Hurricane Sandy, Explained*, NAT'L GEOGRAPHIC (Feb. 11, 2019), https://www.nationalgeographic.com/environment/natural-disasters/reference/hurricane-sandy/#:~:text=In%20the%20nine%20days%20that,costliest%20storms%20in%20U.S.%20history [https://perma.cc/N5TK-3HQ6].

East Coast, with a particularly severe impact on New York and New Jersey.[180] In the days prior to Sandy, New York utility Consolidated Edison Company ("Con. Ed.") undertook several proactive measures to mitigate the risks of harm from the storm.[181] Power was shut off and lines were de-energized to protect assets.[182] Historic storm surges were reviewed, and the utility prepared for the hurricane on the basis of that data.[183]

These preventative efforts proved insufficient. Before Sandy, the record storm surge in New York City occurred in 1821, at a height of eleven feet.[184] In light of that historical marker, Con. Ed. built their system to withstand storm surges of twelve-and-a-half feet.[185] Sandy, however, "created a fourteen-foot storm surge that flooded into the East River substation and destroyed underground equipment, leaving about 250,000 customers without power."[186] In total, the hurricane left over a million Con. Ed. customers, roughly one-third of the utility's service population, without power.[187] In the aftermath of Sandy, "[r]estoring power required replacement of 140 miles of electric cable and investigation of damages at 30,000 locations. In a single week, Con. Ed. exhausted a supply of utility poles and transformers that normally would have lasted for six months."[188] For some customers, it would take as many as two weeks to restore electrical service.[189]

Did this event implicate a duty to adapt for Con. Ed.? Central to this inquiry is what defines Con. Ed.'s obligation to minimize outages. The duty to serve obligates the utility to provide "safe, continuous, comfortable, and efficient service."[190] Again, this is not an expectation of perfect reliability but instead an obligation to use "reasonable diligence and care towards its customers"[191]—a standard of negligence, not strict liability. The duty to adapt would impose an ongoing obligation on a utility to minimize unnecessary outages in the context of climate change through reliability standards, planning, and protocols, as well as emerging industry standards that focus on grid resilience. Thus, the duty to adapt includes a constituent obligation to ensure

180. *Id.*

181. James M. Van Nostrand, *Keeping the Lights on During Superstorm Sandy: Climate Change Adaptation and the Resiliency Benefits of Distributed Generation*, 23 N.Y.U. ENV'T L.J. 92, 101 (2015).

182. *Id.*

183. *Id.*

184. *Id.*

185. *Id.*

186. *Id.*

187. *Id.* at 101–02.

188. *Id.* at 102.

189. *Id.*

190. *The Duty of a Public Utility*, *supra* note 22, at 313.

191. *National Food Stores* Comment, *supra* note 62, at 346 n.12.

relevant reliability standards, protocols, and resilience plans that incorporate reasonably available climate science.

If applied today to a weather event akin in destructive force to Hurricane Sandy, a duty to adapt would require a markedly different approach than the preparation made by Con. Ed. in the days preceding Sandy. At minimum, base reliability planning for the grid that uses historic storm surge data that does not incorporate the impacts of climate change would be unlikely to provide a reasonably accurate predictor of extreme weather risks and would impede resilience efforts.

Importantly, the steps a public utility could take consistent with what the duty to adapt requires here are not theoretical. Con. Ed.'s actions immediately following Sandy demonstrate in practical, implementable terms how better planning and operational choice can mitigate the climate-adaption risks associated with power system outages. In the aftermath of Sandy, New York State's Public Service Commission required Con. Ed. to conduct a climate change vulnerability study.[192] In doing so, the utility employed the best available climate science and probabilistic modeling, considering a range of potential climate change scenarios, to identify climate risk vulnerabilities particular to the utility.[193] The study found that climate change was shaping and will continue to shape New York's weather in a myriad of ways relevant to Con. Ed.[194] Its findings were specific, granular, and comprehensive, ranging from findings on temperature increase (heat waves are projected to occur up to twenty-five times more frequently) to precipitation (expected to increase up to fifteen percent) to flooding (expected to increase by roughly fifty percent) to extreme weather (stronger hurricanes and cyclones noted in particular).[195]

The vulnerability study identified a number of ways in which consideration of climate change impacts could be incorporated into reliability standards, planning, and protocols to help minimize unnecessary outages.[196] The study also identified a need for planning that goes beyond focusing on reliability to include resilience in order to better incorporate these findings into utility operations.[197] Recommended actions to address these risks include improved anti-flood measures (and in particular updated flood maps that account for sea level rise), improved resource adequacy planning (higher temperatures and

192. *See* WEBB ET AL., *supra* note 10, at 13.

193. CONSOL. EDISON, CLIMATE CHANGE VULNERABILITY STUDY 17–19 (2019), https://www.coned.com/-/media/files/coned/documents/our-energy-future/our-energy-projects/climate-change-resiliency-plan/climate-change-vulnerability-study.pdf?la=en [https://perma.cc/32QM-SGVZ].

194. *Id.* at 19–25.

195. *Id.*

196. *Id.* at 25.

197. *Id.*

humidity drive electrical demand and decrease generation efficiency), updated extreme weather protocols (customer outages were underpredicted in such instances by an order of magnitude), reformed emergency preparedness and recovery strategies, and increased demand-side efforts (including distributed generation, energy storage, automated metering infrastructure, further support to energy efficiency programs, and encouraged on-site generation and microgrids).[198]

These findings and conclusions help to clarify and inform an ongoing duty to adapt in the operation and planning of the power grid. Specifically, the duty to serve's constituent obligation to minimize unnecessary outages includes a utility requirement to meet relevant reliability standards and protocols and to address grid resilience in a manner that incorporates reasonably available climate science.

3. Modifying/Updating Technical Standards

Wildfires create significant risk to utility assets and operations, and attribution science has found that climate change "exacerbates wildfire risk through hotter and drier conditions."[199] As temperatures and periods of drought increase, wildfire season will expand in certain parts of the United States, potentially shifting from a fall-specific risk to a year-round one.[200] This trend is already emerging, with the number of high-fire-potential days increasing "since the early 2000s."[201] Climate science predicts that "these trends are likely to continue and worsen into the future."[202]

Wildfires pose new challenges not only to utility efforts to minimize outages, but to meeting technical standards and best practices. In particular, wildfires implicate a utility's provision of safe service, insofar as utility equipment can be the direct ignition of a wildfire.[203] A "reasonable worst-case scenario" includes, among other things, injuries and fatalities to the public, employees, and contractors, property damage, damage to utility assets, and impairment of reliability.[204]

198. *Id.* at 32–55.

199. Michael Burger, Jessica Wentz & Radley Horton, *The Law and Science of Climate Change Attribution*, 45 COLUM. J. ENV'T L. 57, 121 (2020).

200. San Diego Gas & Elec. Co.'s (U 902 E) Wildfire Mitigation Plan at 15, *In re* San Diego Gas & Elec. Co., No. R.18-10-007 (Cal. Pub. Utils. Comm'n Feb. 6, 2019) [hereinafter 2019 Wildfire Mitigation Plan Filing], https://www.sdge.com/sites/default/files/regulatory/R.18-10-007%20SDG%26E%20Wildfire%20Mitigation%20Plan.pdf [https://perma.cc/57XD-7LLE].

201. *Id.* at 51.

202. *Id.* at 16, 52.

203. *See PG&E Confesses to Killing 84 People in 2018 California Fire as Part of Guilty Plea*, GUARDIAN (June 16, 2020, 3:30 PM), https://www.theguardian.com/business/2020/jun/16/pge-california-wildfire-camp-fire-paradise-guilty-plea [https://perma.cc/Q99D-TX5X].

204. 2019 Wildfire Mitigation Plan Filing, *supra* note 200, at 16.

In 2007, California utility San Diego Gas & Electric's ("SDG&E") assets caused a series of major wildfires in its service territory.[205] In the fall of that year, three significant wildfires occurred in succession: the Rice Fire, Witch Fire, and Guejito Fire.[206] The Rice Fire began in Fallbrook, California, started by a tree branch falling upon and subsequently breaking SDG&E overhead conductors.[207] The Witch Fire was caused by a collision between two overhead conductors during unusually strong Santa Ana Winds.[208] The Guejito Fire was traced to contact between a communications wire and SDG&E conductor.[209]

Preventative measures to reduce the likelihood of wildfires exist, such as tree trimming, ensuring sufficient clearance for equipment, and de-energizing distribution lines. However, in the case of SDG&E in 2007, these preventative measures proved to be insufficient. The wildfires resulted in substantial damage, cumulatively leading to roughly 200,000 acres burned, 1,300 homes destroyed, 40 injuries and 2 deaths.[210] The California Consumer Protection and Safety Division ("CPSD") alleged the utility acted negligently with respect to all three fires, which SDG&E denied.[211]

Does a duty to adapt encompass circumstances such as these, where a utility's equipment and operation contributed to harm? In California, there is no question that liability for injury suffered by property owners who suffered losses does exist, albeit not through the application of a duty to adapt. Under the California Constitution, the state uniquely applies a doctrine of inverse condemnation to electric utilities, which effectively results in strict liability for any wildfire caused by utility equipment.[212] This doctrine has been particularly

205. Decision Denying Application at 2, *In re* San Diego Gas & Elec. Co., Dec. No. 17-11-033 (Cal. Pub. Utils. Comm'n Dec. 6, 2017) [hereinafter Decision Denying Application], https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M200/K045/200045020.PDF [https://perma.cc/ZK6K-84ZK] (denying SDG&E's application to the California Public Utilities Commission to recover costs related to the 2007 wildfires).

206. *Id.*

207. *Id.* at 36.

208. *Id.* at 11–12.

209. *Id.* at 29.

210. *Id.* at 14; *see also* Rob Nikolewski, *CPUC Rules Against SDG&E in 2007 Wildfire Case*, SAN DIEGO UNION-TRIB. (Nov. 30, 2017, 3:55 PM), https://www.sandiegouniontribune.com/business/energy-green/sd-fi-sdge-wildfirecaseruling-20171130-story.html [https://perma.cc/6M8B-MRSY] [hereinafter Nikolewski, *CPUC Rules*].

211. *See* Decision Approving and Adopting the Witch/Rice and Guejito Fire Settlements at 10, *In re* San Diego Gas & Elec. Co., Dec. No. 10-04-047 (Cal. Pub. Utils. Comm'n Apr. 26, 2010), https://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/116945.PDF [https://perma.cc/P5PP-T7VC] (approving a SDG&E settlement agreement in the wake of the 2007 wildfires).

212. COMM'N ON CATASTROPHIC WILDFIRE COST & RECOVERY, FINAL REPORT OF THE COMMISSION ON CATASTROPHIC WILDFIRE COST AND RECOVERY 4 (June 17, 2019), https://opr.ca.gov/docs/20190618-Commission_on_Catastrophic_Wildfire_Report_FINAL_for_transmittal.pdf [https://perma.cc/5QUC-SB6D]; *see also* Jeremy Gradwohl, Comment, *Electric Utility-Caused Wildfire*

relevant in recent years, with another California utility, Pacific Gas & Electric ("PG&E"), bearing liability for billions of dollars in devastation caused by wildfires connected to its operations in 2017 and 2018.[213] While other states may have similar protections for the takings of property by public actors, strict liability will rarely (if ever) apply to provide a meaningful remedy for harm caused by private actors who operate the energy grid in other jurisdictions. Rather, other jurisdictions consider allegations that a utility failed to meet technical standards in operation or planning of the grid under a tort negligence standard.[214]

Such a claim arose in the aftermath of Hurricane Sandy. In *Praetorian Insurance Co. v. Long Island Power Authority*,[215] Plaintiffs alleged that a New York state utility failed to de-energize its power lines in anticipation of the storm, a reasonable step given the foreseeable impacts expected.[216] The case, still ongoing at the time of this writing, is premised upon a basic negligence violation of the duty of care.[217] Yet the court's holding in denying defendant's motion to dismiss is relevant here. The court found that the utility's duty extended to the "exercise [of] reasonable care in the supply of electric service" and that it obligated utility standards "commensurate with the inherent danger hidden in its high voltage equipment."[218] Extreme weather impacts upon utility systems will, as described above, increasingly emerge in the context of climate change.[219] The safe operation and maintenance of the power system remains a core utility obligation under the duty to serve. We believe the duty to adapt attaches to this obligation and specifically obligates utilities to evaluate and update technical standards on an ongoing basis to gird its assets and operations for the foreseeable impacts of climate change.

Damages: Strict Liability Under Article I, Section 19 of the California Constitution, 92 TEMP. L. REV. 595, 596 (2020) (describing the California inverse condemnation approach as "unique").

213. Decision Approving Proposed Settlement Agreement with Modifications at 2–3, *In re* Pac. Gas & Elec. Co., Dec. No. 20-05-019 (Cal. Pub. Utils. Comm'n May 8, 2020), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M336/K236/336236538.pdf [https://perma.cc/FF3M-98JH] (summarizing a settlement over harms from 2017 and 2018 wildfires caused by PG&E); *see also* Ivan Penn, Lauren Hepler & Peter Eavis, *PG&E Reaches $13.5 Billion Deal with Wildfire Victims*, N.Y. TIMES (Dec. 6, 2019), https://www.nytimes.com/2019/12/06/business/energy-environment/pge-wildfire-victims-deal.html [https://perma.cc/54ER-MH66 (dark archive)].

214. In some jurisdictions, the standard may be gross negligence, typically due to restrictions in utility tariffs. For a discussion of this, see *infra* Section III.B.2.a.

215. No. 704580/2014, 2019 N.Y. Misc. LEXIS 2952 (Sup. Ct. Apr. 2, 2019).

216. *Id.* at *4.

217. *Id.*

218. *Id.* at *18.

219. *See, e.g.*, Press Release, Cal. Indep. Sys. Operator, Cal. Pub. Utils. Comm'n & Cal. Energy Comm'n, CAISO, CPUC, and CEC Issue Preliminary Report on Causes of August Rotating Outages (Oct. 6, 2020), http://www.caiso.com/Documents/CAISO-CPUC-CEC-Issue-Preliminary-Report-Causes-August-Rotating-Outages.pdf [https://perma.cc/BE6G-PR96].

If applied to a utility's operations today, this constituent obligation of the duty to adapt would require a substantially different approach than that which SDG&E relied upon in 2007. Concerns were raised in the immediate aftermath of the event around whether the utility met technical standards, particularly the sufficiency of its preventative measures and vegetation management.[220] The utility's actions following the 2007 wildfires illuminate how it has found feasible ways to mitigate many wildfire risks. Today, SDG&E is considered an industry leader in wildfire mitigation planning.[221] In the span of fourteen years, the utility has taken dramatic efforts to reduce wildfire risk in light of increasing physical risks due to climate change.[222] As reported in its annual Wildfire Mitigation Plans, the utility has iteratively improved its technical capabilities to prevent assets and operations from causing wildfires.[223] The utility has "developed an in-house meteorology team to forecast fire danger" and provided that team with a "network of dense, utility-owned weather stations to provide detailed weather data across the service territory."[224] The consequent data and analysis are interwoven into the "day-to-day operational decision-making at all levels of the company."[225] SDG&E developed its own modeling tool, the Wildfire Risk Reduction Model, which creates probability distributions for "ignitions rates by equipment type and external causes, fire growth potentials,

220. Nikolewski, *CPUC Rules*, *supra* note 210.

221. Unlike in the case of Con. Ed. and the NYPSC-mandated climate vulnerability assessment, discussed in notes 192–95 and accompanying text, these efforts were not taken in response to CPUC mandate. The utility itself expressly disavows any particular event as impetus for its work in the space. However, and as explored above, the 2007 wildfires led to over 2,500 lawsuits against the utility, ultimately resulting in a settlement which required it to pay $2.4 billion to injured individuals. Petition for Writ of Certiorari at 5, 7, San Diego Gas & Elec. Co. v. Cal. Pub. Utils. Comm'n, 140 S. Ct. 188 (2019) (cert. denied). SDG&E's efforts to rate base this settlement were denied by the CPUC. Decision Denying Application, *supra* note 205, at 2.

222. SAN DIEGO GAS & ELEC. CO., WILDFIRE MITIGATION PLAN 4 (Feb. 7, 2020) [hereinafter 2020 WILDFIRE MITIGATION PLAN], https://www.sdge.com/sites/default/files/regulatory/SDG%26E%202020%20Wildfire%20Mitigation%20Plan%2002-07-2020_0.pdf [https://perma.cc/365J-TMDP]; *see also* David Roberts, *3 Key Solutions to California's Wildfire Safety Blackout Mess*, VOX (Oct. 22, 2019, 10:30 AM), https://www.vox.com/energy-and-environment/2019/10/22/20916820/california-wildfire-climate-change-blackout-insurance-pge [https://perma.cc/9TZ7-M2PX].

223. Climate change frames these actions, with SDG&E noting that "[c]atastrophic wildfires, driven by the change in climate and resulting extreme winds, have ignited in California with increased frequency and severity in recent years." 2020 WILDFIRE MITIGATION PLAN, *supra* note 222, at viii.

224. *Id.* SDG&E owns 177 weather stations, which provide readings of "wind speed, humidity, and temperature in fire prone areas every 10 minutes." News Release, San Diego Gas & Elec. Co., SDG&E's 2019 Wildfire Mitigation Plan Builds on Past Successes To Further Strengthen Fire Preparedness and Safety (Feb. 6, 2019), http://www.sdgenews.com/article/sdges-2019-wildfire-mitigation-plan-builds-past-successes-further-strengthen-fire#:~:text=6%2C%202019%20%E2%80%93%20As%20conversations%20about,fires%2C%20improve%20the%20resiliency%20of [https://perma.cc/S3K9-T6EM].

225. 2020 WILDFIRE MITIGATION PLAN, *supra* note 222, at viii.

and values at risk."[226] The Model permits simulations of wildfire risk "that can be configured for all weather types, or specific weather patterns."[227] The utility is beginning to incorporate data science into its vegetation management as well, and plans to develop a "Vegetation Risk Index of the highest risk trees in its service territory."[228] Additional SDG&E efforts include a drone-based inspection program, regular safety inspections, deployment of LiDAR (light detection and ranging) surveys, development of predictive modeling, and installation of cameras throughout the more mountainous regions of its service territory.[229]

SDG&E leverages its wildfire data and analysis to mitigate risk and promote grid resilience. Some of these mitigation activities are multiyear endeavors, such as establishing community resource centers, hardening electric transmission and distribution, establishing work protocols implemented during extreme conditions, increasing line undergrounding, and databasing trees proximate to its infrastructure.[230] Others are immediately implementable, such as upgrading wood poles to fire-resistant steel poles, tree trimming, and deploying backup generation to critical community infrastructure.[231] When conditions reach levels that the utility considers unsafe, it will affirmatively de-energize power lines, which it does more frequently than its peers.[232]

SDG&E's actions provide an example of one set of measures that a utility might take in approaching its duty to adapt and to furthering safe operation of its system by considering the effects of climate change-amplified weather. Climate resilience planning should typically be more holistic in nature, however, as a focus on a singular set of climate risks may fail to consider the full suite of risks faced and the potential for multithreat solutions. Still, SDG&E's efforts here impart important lessons relevant to the duty to adapt. In particular, those efforts illustrate the importance of evaluating and updating technical standards to gird assets and operations for the foreseeable impacts of climate change. Just as the duty to serve requires a utility to constantly update technical standards in light of the environment in which it operates, the duty to adapt should similarly compel updates in light of what climate science makes

226. 2019 Wildfire Mitigation Plan Filing, *supra* note 200, at 18.

227. *Id.*

228. *Id.* at 44; 2020 WILDFIRE MITIGATION PLAN, *supra* note 222, at ix.

229. 2020 WILDFIRE MITIGATION PLAN, *supra* note 222, at 48–54, 58–59, 91–110; 2019 Wildfire Mitigation Plan Filing, *supra* note 200, at 3, 31.

230. 2019 Wildfire Mitigation Plan Filing, *supra* note 200, at 1, 9, 22, 32, 41.

231. *Id.* at 40–41.

232. 2020 WILDFIRE MITIGATION PLAN, *supra* note 222, at viii; *see also* Rob Nikolewski, *SDG&E Turns in Its Wildfire Plan for 2019—and It's Different than Other Power Companies in California*, SAN DIEGO UNION-TRIB. (Feb. 7, 2019, 5:30 PM), https://www.sandiegouniontribune.com/business/energy-green/sd-fi-sdge-wildfire-plan-20190207-story.html [https://perma.cc/3YMZ-5F8L (dark archive)].

available. Such considerations may be particularly relevant where energy infrastructure faces widespread damage due to climate-induced events, even though it may comply with technical standards set decades ago—as may have been the case with the collapse of transmission towers and resulting citywide power outages in New Orleans associated with Hurricane Ida in 2021.[233]

Climate science imparts increasingly precise, downscaled, and accurate information about future weather baselines and extreme weather probabilities. In turn, baseline and extreme weather events become increasingly foreseeable, with the impact of climate change-amplified weather measured in miles and predicted (with varying degrees of confidence) years and months in advance.[234] The subsequent work conducted by Con. Ed. and SDG&E is likewise indicative of improvements in operational and planning practices that, at a minimum, other energy grid operators have an obligation to consider. Climate resilience planning generally has lagged far behind need, although indications suggest this may be changing.[235] As noted above, the ultimate question of whether a duty to adapt has been breached is factual and requires a jury consideration on a case-by-case basis.[236]

In evaluating energy grid design and planning, basic negligence doctrines related to industry custom are likely to come into play, especially where there are private standards that can be used to establish a standard of care. To the extent some existing industry custom (such as a custom of looking to historical averages in planning) fails to recognize adaptation risks in energy grid planning, this does not excuse a utility's inaction or failure to take proactive operational

233. *See* Tim McLaughlin & Stephanie Kelly, *Why Hurricane Ida Crippled the New Orleans Power Grid*, REUTERS (Sept. 4, 2021, 10:02 AM), https://www.reuters.com/business/environment/why-hurricane-ida-crippled-new-orleans-power-grid-2021-09-04/ [https://perma.cc/G6Y7-XSR5] (noting that several of New Orleans utility Entergy's transmission towers were designed to meet hurricane wind standards from decades ago, not more recent and more rigorous technical standards).

234. *See* WEBB ET AL., *supra* note 10, at 5.

235. *See* Agreement and Stipulation of Settlement at 4–5, *In re* Duke Energy Progress, LLC, No. E-2 (N.C. Utils. Comm'n July 9, 2020), https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=2bebd0aa-03d9-4108-a105-6dfdfd455d49 [https://perma.cc/9JJN-EBC9] (memorializing a settlement agreement between Duke Energy Progress, LLC, and Vote Solar in which Duke Energy agreed to convene a Climate Resilience Working Group); *Technical Conference To Discuss Climate Change, Extreme Weather, & Electric System Reliability (Docket No. AD21-13-000)*, FERC, https://www.ferc.gov/news-events/events/technical-conference-discuss-climate-change-extreme-weather-electric-system [https://perma.cc/EA5F-3AHU] (Aug. 11, 2021).

236. For example, risk-utility analysis weighs "the burden of preventing injury" against "the product of the magnitude of the injury and its likelihood," requiring a jury to engage in predictive analysis. Hunter & Salzman, *Negligence in the Air*, *supra* note 3, at 1756 (citing U.S. v. Carroll Towing Co., 159 F.2d 169, 174 (2d Cir. 1947)). The foreseeability and degree of certainty of harm are explicit factors that must be considered under such an approach; absent a plaintiff producing some evidence of foreseeability, it is not uncommon for a claim to fail. *See, e.g.*, Adams v. Bullock, 125 N.E. 93, 94 (N.Y. 1919).

or planning measures. As Judge Learned Hand famously observed in *T.J. Hooper v. Northern Barge Corp.*,[237] "[T]here are precautions so imperative that even their universal disregard will not excuse their omission."[238] As important, while the failure to adhere to an existing industry practice to address risks may not be negligence in and of itself, it is evidence of what is feasible, and it may serve to establish emerging customs for addressing new forms of risk. Similarly, to the extent existing customs fail to recognize adaptation risks in energy grid planning, this should not excuse a utility's inaction or failure to take proactive operational or planning measures.[239] Such an approach is particularly relevant to assessing the obligations of the duty to adapt, since the industry's understanding of the climate adaptation risks associated with the energy grid improves with each new extreme weather event, and climate science increasingly allows for updated understandings of feasible ways to mitigate these risks.

C. *To Whom the Duty Is Owed*

A duty to adapt may appear uncontroversial when applied in some contexts, but defining its scope can raise some difficult issues. It stands on its firmest ground when applied to utility-customer claims, but we believe the duty is best expressed as one that can also hold utilities accountable for foreseeable harms to noncustomers in certain circumstances. Based on similar foreseeability principles, the duty to adapt should also extend to claims against energy providers who are not utilities.

There will rarely be a question of whether a duty to adapt is owed when the plaintiff is a contracted customer with a defendant utility. More challenging are those cases where utilities are subject to tort obligations beyond their customers. Utilities are not liable without limitation under the duty to serve, nor does recognition of a duty to adapt require that utilities owe an obligation in tort to the world at large.[240] As a basic principle of tort law, negligence is relational and does not create absolute duties, but instead courts define the scope of tort obligations in terms of the foreseeability of harm to a class of

237. 60 F.2d 737 (2d Cir. 1932).

238. *Id.* at 740.

239. *See* Tex. & Pac. Ry. Co. v. Behymer, 189 U.S. 468, 470 (1903) (noting that the negligence inquiry of what ought to be done is based on reasonable prudence, rather than what is usually done). In medical malpractice cases, where custom routinely sets the standard of care, some courts have been willing to consider new, alternative treatments that mitigate the risks of harm under a reasonable person standard. *See, e.g.*, Helling v. Carey, 519 P.2d 981, 983 (Wash. 1974) (finding ophthalmologist had acted carelessly by not administering cheap, safe, and efficacious "pressure test" to detect glaucoma under the reasonable person standard, even though the accepted custom at the time was to only use this test for high-risk patients).

240. *See infra* Section III.B.1.

individuals affected by a defendant's risk-creating activities.[241] As with other negligence cases, notions of foreseeability and policy considerations provide courts with important tools to tailor the scope of the constituent obligations of the duty to adapt.[242]

Privity might be considered the starting point for a duty to adapt, especially since contracts are frequently invoked to impose obligations on utilities to serve their customers.[243] Then-Judge Cardozo (in)famously invoked privity to limit a water utility's duty of care toward a noncustomer who suffered losses in the form of property damage because of a fire that was not put out due to a water outage caused by the utility's negligence.[244] The New York Court of Appeals similarly referenced a privity bright-line rule in holding that a utility owed no duty of care to a tenant injured in a common area of an apartment building during a citywide blackout (leaving approximately three million Con. Ed. customers without power) caused by the utility's gross negligence.[245] Citing Judge Cardozo, the court reasoned that the lack of privity is not irrelevant to its conclusion that no duty was owed; however, public policy concerns with opening a liability floodgate for a large, undefined range of potential plaintiffs was equally central to its result.[246] Even though the utility's obligation to provide service to a customer is "rooted in contract," the court recognized that this obligation can still "engender a duty owed to those not in privity."[247] Duty on the basis of privity between plaintiff and defendant is not a necessity for tort liability, but instead a rough marker used to "limit the legal consequences of wrongs to a controllable degree."[248] Ultimately, "an ability to extend the defendant's duty to cover specifically foreseeable parties but at the same time to contain liability to manageable levels" is central to defining the scope of the utility's duty.[249]

241. For the general argument that the recognition of new duties in tort law based on a negligence principle can help to induce safer conduct, see John C.P. Goldberg & Benjamin C. Zipursky, *Accidents of the Great Society*, 64 MD. L. REV. 364, 368 (2005) (arguing for a relational notion of negligence, which emphasizes a "loci of responsibility" grounded in duty).

242. *See, e.g.*, *id.*

243. *See supra* notes 26–42 and accompanying text (discussing how the duty to serve is frequently grounded in a utility's tariff or its contract with a customer); *see also* Rossi, *The "Duty To Serve" and Protection of Consumers*, *supra* note 42, at 1243 (discussing the obligation to provide notice of disconnection).

244. H.R. Moch Co. v. Rensselaer Water Co., 159 N.E. 896, 898–99 (N.Y. 1928). Judge Cardozo's reasoning in the case also infamously characterized the utility's failure to provide water not as an affirmative "force or instrument of harm" but as an example of omission or nonfeasance. *Id.* at 898.

245. *See* Strauss v. Belle Realty Co., 482 N.E.2d 34, 36–38 (N.Y. 1985).

246. *Id.*

247. *Id.* at 36.

248. *Id.* (quoting Tobin v. Grossman, 249 N.E.2d 419, 424 (N.Y. 1969)).

249. *Id.* at 37.

Judge Cardozo's strict "limited duty" approach to noncustomer utility liability based on privity is controversial. Despite an occasional reference, even New York cases do not rely on or follow it as the primary basis for limiting the scope of a utility's obligations. The New York Court of Appeals has reasoned that the lack of privity is not a barrier to a defendant owing a duty to "a known and identifiable" group so long as the business functions being performed are not directed to a "faceless or unlimited number of persons."[250] Other jurisdictions also typically define the scope of duty with respect to a class of foreseeable victims of the defendant's conduct. Banks, for example, have been held to owe a duty of care toward noncustomers suffering economic losses for use of escrow funds[251] or fraudulent use of a noncustomer's name in opening an account.[252] Duties in tort for service loss can also extend to noncustomers. In *Goldberg v. Florida Power and Light*,[253] the Florida Supreme Court held that an electric utility that shut off power to repair a line owed an obligation to a private motorist who was harmed at a traffic intersection.[254] In addition to recognizing a duty, the court rejected the utility's argument that proximate cause should provide a bright-line basis for rejecting the claim, instead reasoning that questions of intervening cause require fact-specific consideration by the trier of fact.[255] An earlier Florida case that defined a utility's duty based on a foreseeable zone-of-risk approach observed too that, though power companies "are not insurers, they nevertheless must shoulder a greater-than-usual duty of care in proportion to the greater-than-usual zone of risk associated with the business enterprise they have undertaken"—particularly since "[e]lectricity has unquestioned power to kill or maim."[256]

These cases are best understood as an application of tort law's longstanding principle that a duty is owed to a plaintiff who is the member of a specifically

250. Palka v. Servicemaster Mgmt. Servs. Corp., 634 N.E.2d 189, 195 (N.Y. 1994) (allowing a hospital employee to sue a contractor who negligently installed a fan that fell and injured her, even though she was not specifically identified in the contract). Relevant factors include "reasonably interconnected and anticipated relationships; particularity of assumed responsibility under the contract and evidence adduced at trial; displacement and substitution of a particular safety function designed to protect persons like this plaintiff; and a set of reasonable expectations of all the parties." *Id.* at 194–95.

251. *See* Chang v. JP Morgan Chase Bank, 845 F.3d 1087, 1097 (11th Cir. 2017) (describing how a noncustomer of bank who advanced escrow funds for a prospective borrowers' commercial loan was allowed to sue a bank for negligence, on the ground that the bank owed a duty of reasonable care to monitor against misappropriation of escrow funds).

252. *See* Patrick v. Union St. Bank, 681 So. 2d 1364, 1371 (Ala. 1996) (holding that a bank owed a duty of care to a person in whose name an account was opened to ensure that the person opening an account is not an imposter).

253. 899 So. 2d 1105 (Fla. 2005).

254. *See id.* at 1113.

255. *See id.* at 1117–18.

256. McCain v. Fla. Power Corp., 593 So. 2d 500, 504 (Fla. 1992).

foreseeable class of individuals.[257] In *Palsgraf v. Long Island Railroad*,[258] Judge Cardozo famously identified negligence as a "term of relation" that ultimately hinged on whether an accident victim faced "possibilities of danger so many and apparent" as to create an obligation that is special to her.[259] Under his majority opinion, a duty would be triggered where "the eye of vigilance perceives the risk of damage," but not where no hazard is "apparent to the eye of ordinary vigilance."[260] For Judge Cardozo, "the orbit of the danger as disclosed to the eye of reasonable vigilance would be the orbit of the duty."[261] Ultimately, the scope of the defendant's duty hinges on questions of the foreseeability of harm to the victim of an activity in the general factual context in which the accident arose—not with respect to a bright-line, noncontextual notion of contract, privity of interest, or the proximity of relationship. This depends on a degree of certainty to which harms to a specific set of persons can reasonably be identified.[262] A court ultimately will make this determination of the "orbit" of duty as a matter of law, though this legal determination is mindful of factual context related to risks toward specific persons associated with the allegedly tortious activity that caused the harm.

The trend among recent courts may well be toward recognizing a presumptive duty of care in negligence. Still, to the extent that courts consider negligence as a relational concept, the duty to adapt's extension of utility obligations cannot be so ill-defined as to create liability to the world at large. We think that a limiting principle exists: an energy grid operator owes a duty to adapt to a limited and identifiable class of foreseeable victims as it evaluates and updates its technical standards to gird assets and operations for the foreseeable impacts of climate change. By expanding potential plaintiffs here, only with respect to the constituent obligation of meeting technical standards, we believe these conceptions embedded in foreseeability are met. In particular, unlike with notice and interruption, harm emanates here from equipment. Concerns of limitless liability, like that expressed by the New York Court of

257. *See* John C.P. Goldberg & Benjamin C. Zipursky, *The Moral of* MacPherson, 146 U. PA. L. REV. 1733, 1821 (1998); *cf.* MacPherson v. Buick Motor Co., 111 N.E. 1050, 1054 (N.Y. 1916) (holding that a duty is owed to an individual if the injury is foreseeable to that individual).

258. 162 N.E. 99 (N.Y. 1928).

259. *Id.* at 101.

260. *Id.* at 99–100. Judge Andrew's dissenting opinion conceives of an even more expansive form of the duty of care, "imposed on each one of us to protect society from unnecessary danger, not to protect A, B, or C alone." *Id.* at 102 (Andrews, J., dissenting).

261. *Id.* at 100 (majority opinion).

262. *Id.* at 101. For Judge Andrews, who defines the duty more broadly, these questions of foreseeability would remain relevant, though primarily as jury questions related to breach of duty. *See id.* at 103 (Andrews, J., dissenting).

Appeals in *Strauss*, are thus avoided, and instead this potential class of plaintiffs is definable and discernable.

D. *Mapping the Duty To Adapt*

We now present a typology (Figure 2) that elaborates with some specificity upon the obligations for public utilities under a duty to adapt. We retain the primary elements of the duty-to-serve typology presented in the previous part, adding only a new column to extend the application of the duty to adapt to each particular obligation.

Figure 2. Duty To Adapt—Typology

Duty-To-Serve Obligations	Application to Duty To Adapt	To Whom Owed	Primary Remedies[263]
"Adequate" Notice of Interruption	Reasonable notice provided of foreseeable service interruptions associated with impending weather events. Reasonable notice provided of changed service protocols associated with impending weather events.	Current customers	1. Regulatory enforcement (through applicable standards and enforcement) 2. Private enforcement (through contract and tort claims)
Minimizing Unnecessary Outages	Regularly incorporate reasonably available climate science into relevant *reliability* standards, protocols, and planning, and address energy system *resilience* measures.	Current customers and identifiable class of foreseeable victims	1. Regulatory proceedings, through utility service standards (and accompanying penalties for violation) 2. Private enforcement (through contract and tort claims)
Modifying/ Updating Technical Standards	Evaluate and update technical standards based on industry practices to gird assets and operations for the foreseeable impacts of climate change.	Limited and identifiable class of foreseeable victims	1. Regulatory enforcement (through applicable standards and enforcement) 2. Private enforcement (through contract and tort claims)

263. This is not intended to be a list of exclusive remedies but instead to describe the primary remedy associated with each dimension of the duty to serve.

We believe these obligations serve as compelling bases to inform the scope and presence of a duty to adapt, extending the traditional duty to serve to obligate public utilities to make operational and planning decisions in a manner that accounts for changing conditions in light of climate change.

III. FUNCTIONAL FOUNDATIONS OF THE DUTY TO ADAPT AND THEIR IMPLICATIONS

As a normative matter, judicial recognition of a private duty to adapt for energy utilities advances the functions of both tort law and economic regulation. We view these functions primarily as a form of gap filling, given extant utility regulation's failure to fully recognize the foreseeable risks and harms associated with climate change and energy resilience in operations and planning. Ultimately, there may be more interplay between the two than static review suggests, and the duty to adapt may over time drive regulatory regimes to better account for climate change and improve energy resilience. As is also discussed in this part, these functions can provide courts some guideposts as they consider various defenses to claims based on the duty to adapt, such as the act of God and filed rate defenses.

A. *The Duty To Adapt's Benefits for Tort and Regulatory Law*

Perhaps the most widely accepted rationale for tort liability is that providing victims compensation for harms caused by a defendant holds the defendant accountable for foreseeable harm.[264] Imposing liability on a defendant can simultaneously provide for victim compensation and effectuate deterrence, incentivizing the defendant and others in the same industry to invest in safety precautions to reduce the risks of future harms.[265] There is considerable evidence that energy utilities do not robustly disclose climate risks to investors in capital markets.[266] Imposing a private obligation on a defendant that operates energy infrastructure facilities which present a risk of harm helps to internalize the costs of its operations; this incentivizes firms to invest in precautions that will reduce the likelihood and degree of future harm, thus serving a deterrence function for the energy industry. Recognition of a private tort duty to adapt should help to improve the accuracy of the risks that energy regulators disclose to capital markets and to drive utilities to assess adaptation

264. *See* MacPherson v. Buick Motor Co., 111 N.E. 1050, 1051–53 (N.Y. 1916).

265. Compensation and deterrence are widely recognized as the two primary functions of private tort liability. *See* Douglas Kysar, *The Public Life of Private Law: Tort Law as a Risk Regulation Mechanism*, 9 EUR. J. RISK REGUL. 48, 49 (2018).

266. A review of corporate 10-K reports that seven Texas utilities filed with the SEC showed little or no discussion of material physical risks associated with foreseeable weather events associated with climate change. *See* JONES ET AL., *supra* note 123, at ii.

risks in their internal decision-making processes more proactively and regularly, improve the ways in which they notify customers of expected outages, and expand investments to reduce liability stemming from service interruption and/or failure to meet technical service standards. A private law duty to adapt can thus encourage the industry to address climate adaptation risks that current regulatory institutions fail to properly value.

As a practical matter, a private duty to adapt does not require courts to mandate that a utility provide a particular level or kind of adequate service or to meet a specific set of technical standards. As an ongoing obligation, we see the main advantage of the duty to adapt as encouraging an energy grid operator to engage in certain processes to evaluate its approach to adaptation risks, rather than requiring it to invest in specific assets or technologies. To discharge the duty to adapt, a utility may be expected to more regularly update its risk assessments to reflect the harms associated with climate change and/or conduct climate resilience planning. Because the duty to adapt requires public utilities to make operational and planning decisions in a manner that accounts for changing conditions in light of climate change, the duty should at minimum obligate firms to consider the benefits and feasibility of doing so through conducting climate vulnerability studies. Such an obligation could serve a similar function to tort cases that find liability where a manufacturer failed to consider safer options in designing a product, without requiring a manufacturer to adopt a specific product design. Also, much like the obligation of a manufacturer of a product to warn of risks it becomes aware of after a product has been sold, the duty to adapt is an ongoing and evolving obligation.[267] This formulation of the duty to adapt as an ongoing obligation allows it to remain applicable over time as new technologies and feasible best practices are identified.

A duty to adapt also advances tort principles pertaining to insurance and cost spreading. The utility is able to spread the costs of harm among a broad pool of customers, and once the duty to adapt imposes an obligation, regulators may allow a utility to recover prudently incurred costs in rates.[268] At the same time, a tort perspective highlights that it is also important to think about the limits of relying too heavily on a duty to adapt for insurance against harms. If

267. According to the *Restatement (Third) of Torts*, a manufacturer's duty to warn of a risk associated with the intended use of a product is not discharged at the time of sale. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIAB. § 10 (AM. L. INST. 1998). A manufacturer also has a duty to warn end users of the product who can be identified and communicated with of new risks after the sale of the product, as long as the risk of injury or death from the hazard is greater than the burden of providing the notice to the end user. *Id.*

268. *See* JOEL B. EISEN, EMILY HAMMOND, JIM ROSSI, DAVID B. SPENCE & HANNAH J. WISEMAN, ENERGY, ECONOMICS AND THE ENVIRONMENT 479–572 (5th ed. 2020) (discussing utility ratemaking principles, including cost allocation and the prudent investment standard).

the utility is ultimately asked to serve as the insurer for all harms (as would be the case with absolute liability), even those that are not foreseeable, this can create moral hazard problems. For example, if customers do not take into account the risks of harms, such as damage due to wildfires caused by a utility's transmission system, this may induce them to engage in behaviors (such as building new homes in high-risk areas) that can increase, rather than decrease, the risk of harm.[269]

Similar moral hazard concerns exist for utilities. Competitive firms have every reason to account for potential liabilities, as adverse judgments are a cost, ultimately paid by its shareholders. In contrast, a public utility can often shift liability costs to its customers. Because utility revenues are driven by cost recovery, newfound liability may perversely increase profits. At its extreme, this concern would turn the duty to adapt on its head, giving the utility reason to disregard climate impacts and welcome its liabilities. This outcome is preventable, as utility regulators have the authority to deny cost recovery for liabilities incurred by the utility, shifting costs to shareholders. California regulators chose this course of action in response to SDG&E's request to include settlement costs incurred from wildfire damage in its rate base.[270] We do not mean to suggest, however, that regulators should reflexively deny cost recovery. This is particularly true in cases where a regulator denies utility plans to address climate impacts. Here, a utility may find itself in a double bind, where regulation prevents it from recouping the costs to implement adaptation measures but holds its shareholders accountable for the liabilities incurred under the duty to adapt.

These concerns are not unique to the duty to adapt and are generally relevant whenever a monopolistic firm with a captured rate base faces liability. They also highlight one benefit conveyed by the duty to adapt's negligence standard, particularly in contrast to utility obligations premised in strict liability. The latter limits the judicial inquiry, foreclosing jury assessments of reasonableness. Strict liability may also result in the most extreme manifestations of the concerns highlighted above, and utility efforts to implement adaptation measures may be stymied if only one choice, be it cost shifting or shareholder responsibility, becomes the norm.[271] Although a

269. *See, e.g.*, SADIE FRANK, ERICK GESICK & DAVID G. VICTOR, INVITING DANGER: HOW FEDERAL DISASTER, INSURANCE AND INFRASTRUCTURE POLICIES ARE MAGNIFYING THE HARM OF CLIMATE CHANGE (2021), https://www.brookings.edu/wp-content/uploads/2021/03/Inviting_Danger_FINAL.pdf [https://perma.cc/6WVA-GLFY].

270. *See supra* note 221.

271. Although legislative, California's approach to future costs associated with utility-caused wildfires provides one example where shareholders and ratepayers will equally share responsibility. AB 1054, which creates a $21 billion fund to support utility wildfire damage costs, will be jointly funded

negligence standard does not extinguish these concerns, it does not impose the same scope of liability and links liability to the reasonableness of an energy operator's decisions. By giving a jury discretion to determine the reasonableness of decisions made by the utility, a duty to adapt provides a mechanism for producing information and developing a record about adaptation measures, especially where regulation has failed to require consideration of adaptation risks.

In this sense, recognizing the duty to serve as a form of private obligation in tort allows private law to help reinforce and improve utility regulation, which can suffer from significant gaps in its remedies and lags in the decision-making process about how to address adaptation harms. To the extent that the existing regulatory apparatus already provides applicable standards for the duty to serve, negligence per se can be used to supply the standard of wrongfulness, which would reinforce existing regulatory standards. As in other negligence cases, existing regulatory standards should set the floor for expected conduct, not impose a ceiling on it.[272] Thus, properly understood, the duty to adapt would supplement existing regulation—not serve as a substitute for it.[273] It can help to improve regulatory enforcement and provide better information to regulators as they set regulatory standards, approve infrastructure plans, and make prudency determinations related to climate adaptation risks.

In its current form, public utility regulation does not do a particularly good job of addressing or remedying climate adaptation risks associated with operation of the energy grid. Regulatory oversight is necessarily constrained and, although public utility statutes are often written broadly, the authority of utility regulators is not boundless. Utility regulator mandates and utility tariffs typically focus on ensuring, among other things, just and reasonable rates and prudent investment, and on protecting customers from discriminatory pricing—not addressing environmental risks and harms.[274] Courts have a broad set of remedies available, including awarding monetary damages, but regulatory

by shareholders and ratepayers, each contributing $10.5 billion. *See* Act of July 12, 2019, § 16, 2019 Cal. Stat. 1888, 1910–19 (codified as amended at CAL. PUB. UTIL. CODE §§ 3280–3297 (2022)).

272. In negligence cases, compliance with a state statute or regulation is not typically considered a defense. RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM § 16(a), 16 cmt. 10 (AM. L. INST. 2010). Of course, in limited instances compliance with federal statutes may preempt common law claims. *See* Geier v. Am. Honda Motor Co., 529 U.S. 861, 881–83 (2000). An even broader form of preemption of federal common law claims was found in *American Electric Power Co. v. Connecticut*, 564 U.S. 410, 415 (2011) (dismissing public nuisance lawsuit on the grounds that the Clean Air Act displaced federal common law claims).

273. Among tort law scholars, Robert Rabin has made similar arguments in his criticism of the regulatory compliance defense. *See generally* Robert L. Rabin, *Keynote Paper: Reassessing Regulatory Compliance*, 88 GEO. L.J. 2049 (2000).

274. For a discussion of this, see Jody Freeman, *The Uncomfortable Convergence of Energy and Environmental Law*, 41 HARV. ENV'T L. REV. 339, 359 (2017).

commissions that prioritize consumer protection goals often operate with more constrained remedial tools—they may, for example, be able to provide customers refunds for overcharges but do not have authority on their own to remedy backward-looking harms.[275] In areas of the country with organized markets, determinations around generation and resource adequacy are at the very least less tightly controlled than in decades past.[276] Tort claims based on the duty to adapt can fill these jurisdictional gaps as a complement to, not a substitute for, energy regulation's setting of just and reasonable rates.

Perhaps more important than existing statutory confines are the confluence of institutional, political, budgetary, and informational problems that any regulatory agency must necessarily face. Utility commissioners frequently leave before terms expire, with twenty-five percent of state regulators turning over each year.[277] The size of commission staffs vary dramatically across states, as do agency budgets, with the average budget at $30 million. Texas, the second most populous state, only has a utility regulator budget of $16 million.[278] Resources for enforcement are often limited, and imposition of regulatory penalties are often constrained by onerous procedural requirements.[279] Even where regulatory commission authority is broad on paper, elements such as experience, staffing, and budget all cabin the extent to which it is actually used in practice. Stakeholder engagement can also weigh heavily upon commissions' direction. Some states, either through designations or funding mechanisms, support robust intervention by consumer and public interest organizations.[280] But others do not, and limit participation to only those entities that can afford to retain legal counsel, expert witnesses, and/or other specialists.[281]

275. *See* WEBB ET AL., *supra* note 10, at 39–48 (assessing differences in availability and remedy between courts and PUCs).

276. *See* Freeman, *supra* note 274, at 370–71.

277. *See* Hannah Polikov, *Everything You Need To Know About Public Utility Commissions*, ADVANCED ENERGY ECON. (July 17, 2013, 11:36 AM), https://blog.aee.net/aee/bid/318037/everything-you-need-to-know-about-public-utility-commissions [https://perma.cc/M2CC-E6C7].

278. *See* Jessie Ciulla & Cory Felder, *ERCOT Isn't the Only Thing That Needs Fixing*, ROCKY MOUNTAIN INST. (Mar. 15, 2021), https://rmi.org/ercot-isnt-the-only-thing-that-needs-fixing/ [https://perma.cc/C5YF-32SC].

279. *See, e.g.*, Order in the Matter of the Petition of Pub. Serv. Elec. & Gas Co. for Approval of the Energy Storage Program, *In re* Pub. Serv. Elec. & Gas Co., Nos. EO13020155 & GO13020156 (N.J. Bd. Pub. Utils. Sept. 30, 2013), https://www.nj.gov/bpu/pdf/announcements/2013/ES%20Motion%20to%20Intervene.pdf [https://perma.cc/K7AQ-RSNS] (denying environmental organizations' request to intervene).

280. *See, e.g.*, *Intervenor Compensation Program*, CAL. PUB. UTILS. COMM'N, https://www.cpuc.ca.gov/proceedings-and-rulemaking/intervenor-compensation [https://perma.cc/Y7DU-TAGN].

281. For a discussion of state energy regulators, see generally REGUL. ASSISTANCE PROJECT, ELECTRICITY REGULATION IN THE US: A GUIDE (2011), https://www.raponline.org/wp-

Effective oversight of the industry can be particularly vulnerable to circumstances where industry standards and customs evolve quickly. In its present form, electricity regulation is ill-equipped to address climate adaptation risks. Prudence (or "reasonableness") review by regulators is most often premised upon questions of whether the utility has overspent in the past; absent some mechanism to encompass the costs associated with climate change, this approach does not easily lend itself to the recognition of many of the risks associated with climate change, such as the harms of extreme events.[282] Over time, regulator-mandated climate resilience planning should result in cost savings for ratepayers, but comparing less historically defined benefits against more easily quantifiable and near-term costs has proven difficult for regulators.

This concern is particularly salient for energy resilience considerations and catastrophic and novel forms of risk, where high-impact, low-probability, long-tail, and black-swan events may be difficult to assess using the deterministic risk-based tools most familiar to utility regulators. Reliability metrics alone may not be sufficient in addressing such resilience risks, and a duty to adapt may grow in significance to the extent that climate change increases threats to energy resilience. A duty to adapt may be especially significant in this context, as regulation can be slow to update to cover novel risks, particularly in the absence of precipitating events. Fundamentally, granting a monopoly to a utility regulator can dampen incentives for innovation.[283] And even where regulators do recognize climate risk, cost-based regulation can significantly delay the deployment of new investments and practices aimed at mitigating it. Only a handful of states even require energy utilities to file climate resilience plans.[284] The duty to adapt thus serves as a responsive pathway in the absence of a regulatory response, giving redress to injury where regulation lags. Optimistically, the duty to adapt might even promote more routine regulatory updates to cover energy resilience in the same way that modern day conceptions of electric reliability owe their origins to the duty to serve.

content/uploads/2016/05/rap-lazar-electricityregulationintheus-guide-2011-03.pdf [https://perma.cc/LAU4-A8ZV].

282. *See* William Boyd, *Public Utility and the Low-Carbon Future*, 61 UCLA L. REV. 1614, 1691–92 (2014); *see also* Monast, *supra* note 20 (manuscript at 16–17); WEBB ET AL., *supra* note 10, at 18–20.

283. While some industries invest substantial amounts in R&D and new technological innovations, the energy utility industry has been a laggard. *See 6.2.1: The R&D Problem with Electric Utilities*, PENN. ST. COLL. EARTH MIN. SCIS., https://www.e-education.psu.edu/ebf483/node/682 [https://perma.cc/5GX6-KQK6] ("Historically, less than one-half of one percent of revenues for electric utilities has gone towards developing new technologies to improve the way that electricity is generated and transmitted.").

284. *See* Sara R. Gosman, *Framing Energy Resilience*, 35 J. LAND USE & ENV'T L. 1, 6 (2019) (noting that only New York, Massachusetts, and California regulators have considered requiring energy utilities to engage in climate resilience planning).

Beyond considerations specific to energy resilience, rate regulation more generally is ill-equipped to deal with the concerns that the duty to adapt addresses. Rate regulation focuses on management of legacy infrastructure without giving serious scrutiny to utility assessment of future adaptation risks.[285] Given the long-lived nature of utility assets (often fifty years or more), the tangible business risks associated with cost-recovery of past investments are prioritized over more remote forms of risks, which can present a significant transition cost as a drag on moving away from traditional practices associated with legacy assets.[286] What economists call the "Averch-Johnson effect" describes a tendency of utilities and regulators to favor inefficiently high levels of capital outlays,[287] even where there are less expensive options for addressing climate risks, such as operational standards, better planning practices, or a focus on energy storage, microgrids, or distributed energy resources.[288]

The duty to adapt may complement energy regulation's planning horizon as well. As noted earlier, prudence review is, by nature, backward-looking.[289] Other aspects of utility planning, such as integrated resource plans, can fail to account for changing conditions.[290] Forward planning, to the extent it occurs, is most often sized to time horizons that do not appropriately consider climate risks or impacts.[291] Where firms operate legacy transmission or generation investments that were built decades ago, evidence of recent industry customs (such as best practices, procedures, and available technologies) that regulators may not have yet endorsed can help inform decisions related to useful asset life and the feasibility of new investments.[292] This kind of a feedback benefit from tort law can produce important information that can help to better inform the regulators that oversee the energy industry.[293]

285. *See* Direct Testimony of Tyler Fitch on Behalf of Vote Solar at 61–92, *In re* Duke Energy Carolinas, LLC & Duke Energy Progress, LLC, Nos. 2019-224-E & 2019-225-E (S.C. Pub. Serv. Comm'n Feb. 5, 2021) [hereinafter Fitch Testimony], https://dms.psc.sc.gov/Attachments/Matter/371c2097-5be8-47af-963b-aa3b8e183fcb [https://perma.cc/5EKZ-C3UT] (noting a number of flaws in utility integrated resource plans, including forecasting oversights and an artificially low carbon price).

286. *See* Hammond & Rossi, *supra* note 130, at 661.

287. *See* Averch & Johnson, *supra* note 138, at 1066–67.

288. *See* Fitch Testimony, *supra* note 285, at 55.

289. *See* Monast, *supra* note 20 (manuscript at 20).

290. *Id.* (manuscript at 28).

291. WEBB ET AL., *supra* note 10, at 8 ("While [integrated resource plans] vary, most employ a twenty-year planning horizon, which is shorter than that recommended for climate resilience planning.").

292. *See* Hammond & Rossi, *supra* note 130, at 673.

293. We thus see the private duty to adapt as contributing to the role of regulation as an enabler of better innovation and private standards. *See generally* Barbara A. Cosens, J.B. Ruhl, Niko Soininen & Lance Gunderson, *Designing Law To Enable Adaptive Governance of Modern Wicked Problems*, 73 VAND. L. REV. 1697 (2000).

Such benefits will be more pronounced in some jurisdictions than others. In the context of the significant risks posed by climate change to the electricity industry, regulators have begun to take notice of the information and technologies that are available to industry, as is exemplified by the New York state officials' direction leading to Con. Ed.'s Climate Change Vulnerability Study.[294] But in New York, political economy variables have aligned to favor reform: a state governor focused on climate and a well-staffed regulatory agency, already engaged in a range of climate-related actions, took steps to address climate risk in the energy sector.[295] Perhaps even more significant, the state had just experienced firsthand the devastation created by Hurricane Sandy. It is not new for such "never again" moments to provide a salient focal point to drive changes in environmental law; in the wake of human disasters associated with an extreme weather event, political forces are more closely attuned to the stark reality of what was previously only considered an abstract and remote possibility.[296]

Certain state-specific legal doctrines, such as California's application of inverse condemnation, could also diminish the duty to adapt's relevance.[297] Inverse condemnation, which effectively holds the utility strictly liable for wildfire damages traceable to its equipment, is an easier burden for a potential plaintiff to meet than the duty to adapt's negligence standard. However, as is discussed above,[298] in contrast to this strict liability approach, the duty to adapt's negligence standard provides important information and gap-filling benefits while reducing moral hazards.

Wholesale replication of New York's conditions or California's inverse condemnation doctrine to forty-nine other jurisdictions may thus be unrealistic (and, for the latter, ill-advised) to the extent that this confluence of circumstances drove the Con. Ed. Climate Change Vulnerability Study or SDG&E wildfire mitigation plans. In this context, the duty to adapt might best

294. *See* WEBB ET AL., *supra* note 10, at 6–8.

295. *See 2015 New York State Energy Plan*, N.Y. ST., https://energyplan.ny.gov/ [https://perma.cc/MFN7-NQZA]; *see also Reforming the Energy Vision*, N.Y. ST., https://www3.dps.ny.gov/W/PSCWeb.nsf/All/CC4F2EFA3A23551585257DEA007DCFE2?OpenDocument [https://perma.cc/4Z2M-HHKV].

296. Hence, many of our most significant environmental laws and regulation initiatives were borne out of crisis. RICHARD J. LAZARUS, THE MAKING OF ENVIRONMENTAL LAW 58–60 (2004); Molly J. Walker Wilson & Megan P. Fuchs, *Publicity, Pressure and Environmental Legislation: The Untold Story of Availability Campaigns*, 30 CARDOZO L. REV. 2147, 2180–214 (2009); Daniel A. Farber, *Politics and Procedure in Environmental Law*, 8 J.L. ECON. & ORG. 59, 66–67 (1992); ALICE C. HILL & LEONARDO MARTINEZ-DIAZ, BUILDING A RESILIENCE TOMORROW: HOW TO PREPARE FOR THE COMING CLIMATE DISRUPTION 20 (2019); *see also* Gregg P. Macey, *Environmental Crisis and the Paradox of Organizing*, 2011 B.Y.U. L. REV. 2063, 2064.

297. *See* Gradwohl, *supra* note 212, at 596.

298. *See supra* note 212 and accompanying text.

be understood as another pathway where regulatory or statutory pathways are not viable alternatives. And for all jurisdictions, a duty to adapt can supplement the efforts of regulators even where a specific obligation related to adaptation risks has already been codified into law.[299] As a matter of tort law, such codification represents the floor for liability but does not, and cannot, displace the flexible supplemental tool that a private duty to serve provides injured parties.[300] Much like common law obligations overlap with applicable laws and regulations in other contexts, the duty to adapt will overlap with any other statute or regulation aimed at adaptation or mitigation. A fully realized carbon tax or other mitigation policy designed to completely address climate change would, for example, theoretically extinguish the need for the duty to adapt.[301] So too would a routine adaptation planning process before regulators that fully considers the costs and benefits of various adaptation measures, such as burying transmission lines to address wildfire or hurricane risks. This approach allows the common law to help reduce the lag of regulation in responding to new risks and technologies and fill enforcement gaps not well addressed by traditional regulatory or statutory oversight.[302]

B. *Some Functional Guideposts for Defenses*

If not approached with care, defenses such as the act of God defense or the filed rate doctrine can defeat a negligence claim based on the duty to adapt, even where the recognition of the duty itself is without controversy. For example, some cases involving harms to customers attributed to weather events have been dismissed because of an act of God defense. Similarly, courts often weigh interplay between tort claims and regulation and can dismiss claims on the ground that an approved regulatory tariff limits recovery, known as the "filed rate" defense. A functional approach to the duty to adapt provides some guideposts for applying these defenses.

299. For example, existing integrated resource planning requirements routinely fail to assess adaptation risks. *See* Fitch Testimony, *supra* note 285, at 36–37 (noting flaws in utility climate analysis, including forecasting oversights and an artificially low carbon price).

300. Messer v. S. Airways Sales Co., 17 So. 2d 679, 682 (Ala. 1944).

301. However, a mitigation policy of this nature would require some lever to address adaptation concerns as well, insofar as the consequences of climate change already exist. Additionally, because of the nature of GHG emissions, immediate cessation would not result in the immediate end of climate impacts.

302. *See, e.g.*, WEBB ET AL., *supra* note 10, *passim*; *see also* Fitch Testimony, *supra* note 285, at 92–100 (emphasizing ways for regulators to improve integrated resource planning to address adaptation risks, including more up-to-date forecasting approaches and more accurate carbon pricing).

1. The Act of God Defense and Extreme Weather Events

Defenses premised on emergency conditions or an act of God beyond the utility's control may potentially apply to duty-to-adapt claims.[303] Utilities are generally shielded from liability for temporary interruption or outages in emergencies, or due to forces beyond their control. Often referred to as "act of God" (in some jurisdictions "vis major"[304] or "force of nature"[305]), this defense echoes the force majeure defense, which excuses parties from contractual obligations in the face of unusually severe, unexpected weather.[306] As to emergency conditions, a utility may only interrupt energy service when necessary, with adequate notice (when possible), and not done in an arbitrary manner.[307] In an early suit in Florida, a court found no liability for a disruption of service that directly resulted from a hurricane because the act of God defense provided a legal justification for nondelivery.[308] In other circumstances, courts might deny liability where the utility's equipment malfunctions due to weather if the utility's tariff explicitly exculpates the utility from liability for disruptions caused by severe weather.[309]

Courts sometimes use such defenses as a shorthand way of concluding that no duty exists in the first place, raising an important question of when extreme

303. *See, e.g.*, Monolith Portland Midwest Co. v. W. Pub. Serv. Co., 142 F.2d 857, 859 (10th Cir. 1944).

304. *See* Goldberg v. R. Grier Miller & Sons, Inc., 182 A.2d 759, 761–63 (Pa. 1962) (emphasizing the need to instruct juries on vis major instead of act of God because the act of God defense is confusing and might encourage excusing wrongdoing due to divine intervention, while a secular verdict requires "down-to-earth, tangible, mathematical analysis").

305. In the original *Restatement of Torts* and the *Restatement (Second) of Torts*, "force of nature" is used in lieu of "act of God." For the original Restatement, see RESTATEMENT OF THE LAW OF TORTS §§ 195 cmt. e, 290 cmt. h, 302, 324 cmt. b, 338 cmt. b, 349 cmt. b, 365 cmt. a, 368 cmt. e, 377 cmt. c, 450, 451, 470 cmt. a, 510, 522, 817 cmt. l, 848 cmt. b (AM. L. INST. 1934) (giving the definition of harm). For the Second Restatement, see RESTATEMENT (SECOND) OF TORTS §§ 7 cmt. c, 25 cmt. a, 195 cmt. e, 199 cmt. b, 290 cmt. i, 302, 314A cmt. d, 324 cmt. b, 338 cmt. b, 349 cmt. b, 365 cmt. a, 368 cmt. j, 377 cmt. c, 433A cmt. a, 442A cmt. a, 442B cmt. b, 443 cmt. a, 450, 451, 504, 510, 522, 817 cmt. m (AM. L. INST. 1965). *But see id.* § 328A cmt. b. The *Restatement (Third) of Torts* actually defines an "act of God" as "a serious and unusual adverse natural event." *See* RESTATEMENT (THIRD) OF TORTS: PHYSICAL AND EMOTIONAL HARM § 3 cmt. 1 (AM. L. INST. 2015).

306. For discussion, see Jocelyn L. Knoll & Shannon L. Bjorklund, *Force Majeure and Climate Change: What Is the New Normal?*, 8 J. AM. COLL. CONSTR. LAWS., February 2014, at 1, 1, https://www.dorsey.com/-/media/file/uploads/images/force_majeure_and_climate_change_030420.pdf?la=en [https://perma.cc/NL9Z-5DGT].

307. Nat'l Food Stores, Inc. v. Union Elec. Co., 494 S.W.2d 379, 383–84 (Mo. Ct. App. 1973).

308. Fla. Power Corp. v. City of Tallahassee, 18 So. 2d 671, 675 (Fla. 1944).

309. *See* Sheffler v. Commonwealth Edison Co., 955 N.E.2d 1110, 1121 (Ill. 2011) (refusing a customer class action for service interruption where the tariff limited recovery to malfunctions "not caused by weather"). *But see* Nat'l Union Ins. Co. of Pittsburgh v. Puget Sound Power & Light, 972 P.2d 481, 482 (Wash. Ct. App. 1999) (refusing to allow an act of God defense to a windstorm-related service interruption claim based on a tariff that limits damages that "result from" circumstances beyond the utility's control).

climate events or duty-to-adapt claims should trigger such defenses. It has been questioned whether, as a practical matter, such defenses continue to apply to environmental claims under federal statutes.[310] It seems specious too that any human-induced climate event would trigger the act of God defense where the injury is avoidable, and if so, a duty to adapt triggered by anthropogenic climate change should not raise the possibility of this defense at all.[311]

To the extent that an act of God defense applies at all to duty-to-adapt tort claims, courts should exercise extreme caution in allowing defendants to invoke it—especially where there is general judicial notice of foreseeability of harms to groups of victims. To begin, as a matter of causation it is not necessary for a plaintiff to prove that a natural event is *the sole cause* of the harm, as long as the defendant's negligence contributed in some meaningful measure to the resulting harm.[312] In this sense, the act of God defense simply restates the modern doctrine of actual cause, that establishing negligence does not require the identification of a single cause of harm and allows for the attribution of responsibility to intervening causes. Where there is a preventable human cause of the harm within the control of the defendant (or where the defendant exercising reasonable care would make the harm avoidable), it is inappropriate to apply the act of God defense.[313] Some courts have foreclosed an act of God defense for extreme weather that leads to unreasonable interruptions in utility service, instead considering it as a form of concurrent cause. In *Arkansas Valley Electric Co-Operative Corp. v. Davis*,[314] the plaintiff was injured after coming into contact with a fallen electric power line after a storm.[315] Defendant utility argued that the injury was due to an act of God, but the court concluded that a jury could reasonably find that the utility had failed to replace a pole "which they knew to be deteriorated."[316] It held, in turn, that "[i]f an act of God concurs with the negligence or fault of man to proximately cause damages, the negligence or fault is not excused by the act of God."[317]

In other jurisdictions, the act of God defense is so narrow that it simply doesn't apply unless the weather event is wholly unforeseeable. According to an

310. Clifford J. Villa, *Is the "Act of God" Dead?*, 7 WASH. J. ENV'T L. & POL'Y 320, 323 (2017) (observing that not one single reported environmental liability case under federal statutes allowed an act of God defense to prevail).

311. For an argument that the act of God defense does not, see generally Kenneth T. Kristl, *Diminishing the Divine: Climate Change and the Act of God Defense*, 15 WIDENER L. REV. 325 (2010).

312. *See* Denis Binder, *Act of God? or Act of Man?: A Reappraisal of the Act of God Defense in Tort Law*, 15 REV. LITIG. 1, 27 (1996).

313. *Id.*

314. 800 S.W.2d 420 (Ark. 1990).

315. *Id.* at 421.

316. *Id.*

317. *Id.* at 423.

early California Supreme Court opinion, for an act of God defense to succeed, "[T]he earth must be convulsed, the lightning must kindle the fire, the air must blow in tempests or tornadoes, and the water must come in waterspouts or sudden interruptions of the sea . . . by the forces of nature, uncontrolled and unaided by the hand of man . . . ."[318] Further, these natural forces must be "entirely independent of human agency" and of a character that is "inevitable" and "irresistible."[319] As the California Supreme Court observed in rejecting an act of God defense based on irregularly heavy rainfall, "[t]here is nothing in the nature of the rainstorm involved in this case which makes it so totally unforeseeable as to act as a superseding cause."[320]

At the very least, the duty to adapt should serve as a reminder to courts that emergencies are not an automatic shield from liability where the risks and harm created by infrastructure in light of extreme weather are avoidable (rather than inevitable), especially where there is evidence that they resulted from the utility's own negligence. The success of an act of God defense may ultimately depend on the degree to which there are other foreseeable causal events within the control of the defendant. But a well-established caveat to the act of God defense is that the act or occurrence beyond the utility's control must be so extraordinary and unanticipated that it could not have been foreseen or prevented by the utility's exercise of reasonable care.[321] Utilities may not be liable where weather or other outside forces cause unintended outages that harm unforeseeable victims, but beyond this, the act of God defense is only applicable where a risk is not within the utility's control and the weather event is not foreseeable at all.

Though some states limit the applicability of the act of God defense to instances where the damage caused by the severe weather is physically unpreventable,[322] one implication of the cases that base an act of God defense on foreseeability is that a court could potentially accept the defense for a broader range of cases. However, where an extreme weather event is recurring over a utility's planning cycle (often five to ten years, and sometimes longer), or where the utility has not itself made planning or risk assessment efforts that go beyond what regulators require, courts should be wary about applying an act of God

318. Polack v. Pioche, 35 Cal. 416, 417 (1868).

319. *Id.* at 417–18.

320. S. Pac. Co. v. City of Los Angeles, 55 P.2d 847, 849 (Cal. 1936) (noting that "[r]ainfall is foreseeable in most places" and for this reason, there "is no point at which an expectable heavy rain becomes an act of God by reason of its unusual volume").

321. The act of God defense "applies only to events in nature so extraordinary that the history of climactic variations and other conditions in the particular locality afford no reasonable warning of them." McFarland v. Entergy Miss., Inc., 919 So. 2d 894, 903 (Miss. 2005) (citing federal cases from the 11th Circuit and Alabama precedents).

322. Nat'l Food Stores, Inc. v. Union Elec. Co., 494 S.W.2d 379, 381–82 (Mo. Ct. App. 1973).

defense to duty-to-adapt claims. Climate science continues to advance rapidly, and actors in the United States are increasingly better equipped to predict, with refined geographic and temporal specificity, impacts of climate change.[323] With climate impact tools available today tailored to areas as specific in spatial dimension as a single square mile, and data updated on a daily, hourly, and minutely basis, current science is now able to reveal the physical risks of climate change to electrical infrastructure and operation with incredible specificity and make foresight feasible.[324] Indeed, work subsequently developed by Con. Ed. and SDG&E serve as proof positive that such information is knowable, foreseeable, and actionable in the United States.[325]

A limited approach to the act of God defense in extreme weather cases is consistent with the case law. In *National Food Stores*, the utility was unable to meet increased demand for power in response to a record heat wave.[326] While the plaintiff's suit alleged negligence for failing to properly notify customers of planned shutoffs during the emergency, the court recognized that a part of the duty includes planning for foreseeable or contemplated changes in consumer demand and that it was not necessary for the utility to have knowledge of a specific customer's susceptibility to damage.[327] Likewise, a New York court upheld a lower court determination that a utility was liable for a failure to provide adequate power to a movie theater because it could have anticipated the outage.[328] The utility generated power from a dam, but when a mill upstream prevented water flow it was unable to operate the plant adequately.[329] The court concluded it was reasonable for a jury to have concluded the utility could "have anticipated or expected such a situation to arise" and "should have made provision therefor."[330] Thus, in addressing the appropriateness of an act of God defense, courts routinely encompass an obligation to properly plan to ensure

323. Note as well that climate science likewise continues to advance in specificity with respect to the relationship between patterns of increasing emissions and climate change. The study of climate change attribution is generally outside the scope of this Article, as that level of granular prediction is not necessary to support the duty to adapt. For further discussion, see generally Sophie Marjanac & Lindene Patton, *Extreme Weather Event Attribution Science and Climate Change Litigation: An Essential Step in the Causal Chain?*, 36 J. ENERGY & NAT. RES. L. 265 (2018) (noting how the science of event attribution may increasingly become a driver of climate litigation, to the extent that it shifts the understanding of what weather is expected and foreseeable).

324. *See* U.S. GLOB. CHANGE RSCH. PROGRAM, 1 CLIMATE SCIENCE SPECIAL REPORT 1 (D.J. Wuebbles, D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart & T.K. Maycock eds., 2017), https://science2017.globalchange.gov/ [https://perma.cc/K5HY-VZLM].

325. For discussion, see *supra* Section II.B.3.

326. *Nat'l Food Stores*, 494 S.W.2d at 384.

327. *Id.*

328. Curry v. Norwood Elec. Light & Power Co., 211 N.Y.S. 441, 443–44 (Cnty. Ct. 1925).

329. *Id.* at 443.

330. *Id.* at 443–44.

adequate service based on the notion of a risk of harm to foreseeable victims within the control of the utility.

Of course, in operation much may depend on how, exactly, courts set a threshold for foreseeability. This may require fact-specific assessments of predictive data in particular contexts. With respect to extreme events, courts should be mindful that uncertainty is not what matters to the determination of a duty to adapt. By definition, extreme weather events are classic low-probability, high-impact occurrences, and there is always some uncertainty about the behavior of the weather. Although a past similar event is some evidence of foreseeability, the assessment of foreseeability also should not fixate on whether there has been a past event as a touchstone for whether a future event is foreseeable. Rather, courts should consider the full range of predictive evidence that would be available to the industry, including data and forecasting techniques that can identify not only changes in average weather but also variance in weather patterns.[331] In the context of utility planning, this evidence is widely available to utilities and regulators, and is routinely used to model system peaks and plan for capital expenditures. Indeed, insurance companies and financial markets routinely offer to the industry risk-management products that assess weather evidence on a granular basis.[332] It thus would be appropriate to apply a general presumption that a defendant who is an energy grid operator has access to predictive forecasting knowledge. Given the difficulties of decoupling such evidence from evidence of a defendant's conduct in considering predictive weather risks in its operations and planning, courts should err on the side of allowing a jury to consider the reasonableness of the defendant utility's behaviors before applying an act of God defense. In practice, this means that this defense should have only a very narrow application to extreme weather cases where some predictive evidence of weather patterns would have been available to utilities before an event. If it applies to duty-to-adapt claims at all, it should be limited in its application to situations where a first-time weather event is not knowable—though to the extent the risk of harm to a victim is wholly unforeseeable there would be no duty to adapt in the first place.

331. For a similar argument in the context of force majeure and climate change, see Knoll & Bjorklund, *supra* note 306, at 21–22.

332. Like other companies, utilities can purchase weather hedges, a derivative investment that allows companies to manage the risk of financial consequences of unusually severe weather. *See* Joanne Morrison, *Managing Weather Risk: Will Derivatives Use Rise?*, FUTURES INDUS., Jan.–Feb. 2009, at 26, 27; *see also* Gabe Grosberg, *Can U.S. Utilities Weather the Storm*, S&P GLOB (Nov. 8, 2018), https://www.spglobal.com/en/research-insights/articles/can-u-s-utilities-weather-the-storm [https://perma.cc/4F4M-4THH] (noting that utilities increasingly are using innovative financial products to address extreme weather risks, "including catastrophic bonds and weather derivative bonds").

2. Tariff-Based Defenses

While strongly rooted in contractual obligations, as has been discussed throughout this Article, the duty to adapt can independently support private claims in tort. An appreciation of its functions can shed light on the scope of defenses based on regulation.

A tariff between a utility and a customer can create tort obligations (grounded in contractual privity), and a private duty to adapt can help to reinforce the reliance and expectation interests of such commercial arrangements. But like other contracts, a utility's tariff with a customer can also attempt to modify or limit tort obligations. To the extent regulators accept or approve such tariffs, utilities may be emboldened even more to rely on utility tariffs as a shield to duty-to-adapt claims. Our discussion of the functions of the duty to adapt suggests some guideposts for courts in considering these defenses.

a. When To Favor Tort over Contract

To begin, it is important to assess which tort obligations (if any) are actually modified by the contractual terms that customers may have with a utility. The terms typically are spelled out in a utility's tariff with a customer, which it routinely files with (and which is sometimes approved by) a state regulator.[333] In negligence claims where consumers are injured by business service providers, many courts look with skepticism at exculpatory clauses or express assumption of risk defenses.[334] Likewise, some courts have refused to enforce tariff provisions that have the same effects as exculpatory clauses, on the rationale that public policy favors allowing private tort enforcement to promote safety over allowing customers to contract around risks.[335] To the extent courts evaluate whether tariff provisions limiting liability are valid as a matter of public policy, the functional benefits that the duty to adapt brings to both tort and regulatory law should be considered.

Though we believe that the benefits of the duty to adapt will typically weigh against full waiver of private tort claims, special tariff provisions between a customer and utility may still be warranted in some limited circumstances. In

333. *See generally* EISEN ET AL., *supra* note 268, at 81–90.

334. Tunkl v. Regents of the Univ. of Cal., 383 P.2d. 441, 443–44 (Cal. 1963) (outlining several factors for courts to consider in evaluating whether an exculpatory agreement with a consumer is affected with the public interest and thus invalid, and refusing to enforce an exculpatory clause signed by a patient entering a defendant's hospital for surgery); Dalury v. S-K-I, Ltd., 670 A.2d 795, 799–800 (Vt. 1995) (applying the *Tunkl* factors to hold that a consumer exculpatory form agreement that released the defendant ski resort operator from all liability for negligence was invalid).

335. S.W. Pub. Serv. Co. v. Artesia Alfalfa Growers' Ass'n, 353 P.2d 62, 71–72 (N.M. 1960) (finding a contract that relieved an electric company of all liability for temporary interruptions violated public policy on the ground that a duty to furnish adequate, efficient, and reasonable service was owed and so negligently caused harm cannot be excused).

some contexts, tariffs can provide a useful contractual mechanism to address some risks and harms more effectively than a private duty to adapt. Tariffs are especially likely to be a useful risk-shifting device where the customer is sophisticated and has access to insurance, and when there are moral hazard issues related to a customer knowingly taking on unique risks that are not shared by all customers. For example, a tariff might be used to clarify that a business customer is assuming certain risks associated with interruptible service, as where a business customer has its own backup service provisions (such as local storage) or has insured against an inventory or business loss associated with power outages. A residential customer who knowingly chooses to build a home in a location that is particularly vulnerable to risks such as wildfires or hurricanes presents a more difficult case. While a tariff may serve as evidence that a specific customer has agreed to insure against harms on its own[336] (which may address some moral hazard problems by placing the risk with the party who might most cheaply mitigate it), whether shifting the risks to a customer is more desirable than holding a utility accountable for harm under a private duty to adapt will depend on customer housing mobility and widespread availability of private insurance that can cover harms.[337]

Contracts can also be used to clarify and shift risks between power suppliers and utilities. Such approaches seem appropriate, insofar as these are sophisticated parties who presumably understand risks and would be well positioned to insure for economic losses in their business operations. Power sale contracts that indemnify power suppliers from downstream climate-adaptation risks presumably would reflect a lower purchase price than contracts that do indemnify the seller, as the utility (not the supplier) would be expected to bear the costs of harm. In order for power sale (and insurance) markets to effectively price such risk-shifting, however, risk-shifting devices must still hold some party accountable for climate adaptation risks. If a utility has a tariff limiting its liability to customers and also includes liability limits in its purchase agreements with power suppliers for harms to persons or property associated with climate adaptation, risk-shifting between utilities and suppliers can extend a utility's liability shield to an upstream actor who is not subject to the same regulatory oversight. Power supply markets—such as the operation of power generators or natural gas suppliers who could not provide energy during the

336. The more specific, and in particular the more customer-specific, such tariff terms are, the more likely they are to be enforced, as this would be evidence that the terms were actually bargained for rather than imposed on the customer.

337. In California, it is not clear that the risks of wildfires are best born by homeowners, to the extent that private homeowner insurance markets are increasingly failing to insure these risks. *See* Sophie Quinton, *As Wildfire Risk Increases, Home Insurance Is Harder To Find*, PEW CHARITABLE TRS. (Jan. 3, 2019), https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2019/01/03/as-wildfire-risk-increases-home-insurance-is-harder-to-find [https://perma.cc/7WC7-54PB].

winter 2021 Texas outages—should not go without regulatory or judicial scrutiny altogether, and courts may need to police whether risk-shifting is being used as a strategic device to contract around the deterrence and compensation benefits afforded by a duty to adapt.

For this same reason, the duty to adapt should not be read to suggest that tort claims against other actors in the energy sector are unviable. Other energy firms, such as suppliers and generators, may be held liable under more general conceptions of responsibility under a general common law duty of care. Indeed, in certain circumstances, holding such entities liable rather than a public utility may have comparative advantages. The modern energy sector is typified by competitive markets and, unlike in decades past, the public utility in restructured markets is often not the owner of generation or certain retail services.[338] For this reason, the utility may not necessarily be best positioned to control risks and to ensure system reliability in all instances. Rather, generation owners, retail power providers, or upstream suppliers may have unique abilities to control for certain risks of outages. In the winter 2021 Texas event, for instance, public utilities may have had limited ability to influence natural gas supplier decisions against weatherizing equipment or retail power provider billing practices. Holding the "cheapest cost avoider" accountable is not always limited to a utility, and extending liability to suppliers, generators, and other service providers as well could help to incent the type of risk reduction the duty to adapt addresses. For this reason, and particularly in restructured states, we would expect such claims to emerge and to borrow heavily from the duty to adapt, even if the defendants are not fully regulated as public utilities.

Liability limits in customer tariffs often do not fully excuse the defendant utility, but instead limit liability to specific forms of wrongdoing. In many jurisdictions, courts have allowed utility tariffs that limit private claims against utilities to gross negligence.[339] In these jurisdictions, a customer's gross negligence claim against a utility may still proceed against a utility where there is evidence of extreme indifference to or reckless disregard of the safety of others.[340] For example, it would seem that cases involving repeat similar weather events in a rough utility planning cycle of a decade—such as the 2021 freeze in

338. FERC v. Elec. Power Supply Ass'n, 577 U.S. 260, 267 (2016) ("Since the FPA's passage, electricity has increasingly become a competitive interstate business, and FERC's role has evolved accordingly.").

339. *See, e.g.*, Sw. Elec. Power Co. v. Grant, 73 S.W.3d 211, 223 (Tex. 2002) (upholding utility tariff provisions limiting the recovery of economic damages and limiting the recovery of damages for personal injury to gross negligence or willful misconduct).

340. A careless mistake or unreasonable inadvertence can suffice for negligence. However, gross negligence requires some evidence of conscious or willful disregard of the need to exercise reasonable care. The *Restatement (Second) of Torts* and many jurisdictions do not distinguish between gross negligence and recklessness.

Texas (which followed a 2011 winter outage) or the 2017 and 2018 California wildfires—can easily raise factual questions of gross negligence, based on utility indifference to risks in operating the energy grid in light of similar events that caused similar harms in the past.[341]

As is discussed above, some utility tariffs also limit liability for harms to customers that "result from" equipment malfunction due to weather.[342] Such terms may have been accepted as a limit on liability when there were few technological options for addressing extreme weather events—serving a function akin to an act of God defense—but to the extent weather events are knowable and that utilities are expected to take this into account in their planning and operations, courts should consider whether these kinds of tariff limitations continue to be valid as a matter of public policy. Even if these kinds of terms are enforceable, reading them literally to deny customer liability for a weather-induced interruption based on such language would require some factual assessment of causation,[343] and thus the mere existence of such language should not be understood as a blanket defense to a duty-to-adapt claim.

Important too is the question of whether a tariff limits or waives liability for a noncustomer victim who is not a party to the contract. As a general rule of contract law, a party cannot waive or modify the rights or obligations of a nonparty.[344] So a utility tariff that purports to limit liability to noncustomers is not legally binding based on contract principles, since the nonparty has not assented to these terms. Thus, a utility's obligations toward a noncustomer who is injured by a utility's failure to take precautions required by a duty to adapt—such as the owner of a home destroyed in a wildfire that can be traced to the utility's unreasonable conduct—should be determined based on the compensation and deterrence benefits associated with the duty to adapt, rather

341. The Texas suit filed against ERCOT and Entergy alleges gross negligence in the death of an eleven-year-old boy, on the basis of the utilities having previous knowledge of system vulnerabilities to extreme winter weather. *See* Madani, *supra* note 168. Some of the misconduct associated with the 2019 California wildfires rose to the level of criminal charges, which certainly would be sufficient to support a gross negligence claim. *See* Ivan Penn, *PG&E Charged with Crimes in 2019 California Wildfire*, N.Y. TIMES, https://www.nytimes.com/2021/04/06/business/energy-environment/pge-kincade-fire.html [https://perma.cc/U98V-9MZ6 (staff-uploaded, dark archive)] (Apr. 30, 2021).

342. *See* Sheffler v. Commonwealth Edison Co., 955 N.E.2d 1110, 1121 (Ill. 2011) (imposing a limit on liability under similar tariff language).

343. For example, is an interruption due to equipment malfunction, or is it due to operational error or a failure to plan? And does such a provision excuse a utility from a failure to have a backup system in place where a foreseeable equipment malfunction occurs?

344. Of course, this is more of a principle than a rule; as a practical matter some contracts (like wills and arbitration agreements) do have some binding effect on third parties. For a discussion of some of the difficulties in applying this general rule to commercial agreements, see generally Mark P. Gergen, *Privity's Shadow: Exculpatory Terms in Extended Forms of Private Ordering*, 43 FLA. ST. U. L. REV. 1 (2015).

than the strict contractual terms of a tariff.[345] Commercial agreements between energy suppliers and utilities that shift risks should be evaluated similarly, with a focus on the foreseeability of risks to both contracting parties, whether one party is in a unique position to control the risks of harm, and the policy benefits associated with tort liability.

b. Limiting the Scope of the Filed Rate Defense

Under what is known as the "filed rate" defense, a utility cannot be sued for conduct contemplated by a tariff that has been filed with (and approved by) a regulator.[346] The original purpose of the filed rate defense was to protect customers from discriminatory pricing behaviors, as where a utility might secretly offer discounts to certain customers without making the same opportunity available to other similarly situated customers.[347] Some courts have applied the defense more broadly, as a shorthand shield from common law tort

345. In commercial scenarios, often involving purely economic loss (e.g., tort duties limited by contractual privity), Mark Gergen argues that the impact of privity on third parties should not be determined entirely based on contractual assets but needs to be assessed based on "how vulnerable people in the victim's position would be to the risk of such harm without negligence liability" and "the cost and risk of error in using negligence liability as a mechanism for compensation and deterrence." *Id.* at 7. For harms to a noncustomer outside of sophisticated commercial parties, this would typically favor determining obligations based on the tort duty to adapt, rather than as limited by a contract to which the customer has not assented—especially where the harms are physical or property harms (rather than economic loss).

346. Jim Rossi, *Lowering the Filed Tariff Shield: Judicial Enforcement for a Deregulatory Era*, 56 VAND. L. REV. 1591, 1598 (2003) [hereinafter Rossi, *Lowering the Filed Tariff Shield*].

347. For discussion, see Joshua C. Macey, *Zombie Energy Laws*, 73 VAND. L. REV. 1077, 1103 (2020) ("[T]he filed rate doctrine was originally designed to protect consumer interests in the era of rate-regulated utilities . . . [by] prevent[ing] utilities' customers and regulators from invoking legal rules to force utilities to deviate from the rates they filed with regulators.") and Rossi, *Lowering the Filed Tariff Shield*, *supra* note 346, at 1598–605.

claims that works as a form of regulated-industries immunity within a state[348] or, at times, as a form of federal preemption of state claims.[349]

While this defense is routinely invoked by regulated utilities, whether it applies is a complicated question. The first question a court needs to consider in approaching a filed rate defense is the basic issue of what obligations the tariff purports to modify. As with a tariff's contractual terms, as a general principle, it is controversial for a filed rate defense to modify or limit a utility's obligations to a noncustomer. In order to limit recovery to a noncustomer, a utility must invoke an independent, noncontractual legal source, such as express legislative immunity for utility conduct.[350] In addition, many of the cases that allow a filed rate defense to negligence claims acknowledge that tariff language would still allow gross negligence claims to proceed,[351] raising the possibility that utilities in some jurisdictions may be able to waive certain negligence claims but not claims for gross negligence.

Where complex regulatory issues are implicated in common law claims, courts have sometimes taken a blanket-immunity approach to the filed rate

348. Zurich Am. Ins. Co. v. S. Conn. Gas Co., 442 F. Supp. 3d 510, 517–18 (D. Conn. 2020) (applying the filed rate doctrine to preclude a property insurance company from recovering in negligence as a subrogee for harms due to a utility's negligent interruption of service, though noting too that the tariff allowed for recovery for willful misconduct or gross negligence); Oncor Elec. Delivery Co. v. Chaparral Energy, LLC, 546 S.W.3d 133, 138 (Tex. 2018) (applying the filed rate doctrine to a contract service interruption claim because of a "pervasive regulatory scheme" giving the utility regulator "exclusive [] jurisdiction over the rates, operations and services of an electric utility"); Brown v. United Water Del., Inc., 3 A.3d 272, 274 (Del. 2010) (applying the filed rate doctrine to prohibit negligence claims, based on tariff language that exempted a utility for "all claims for injury to persons or property by reason of fire, water, failure to supply water pressure, or capacity"—but allowing gross negligence claims to proceed); Hoffman v. N. States Power Co., 764 N.W.2d 34, 47 (Minn. 2009) (applying the filed rate doctrine to preclude a claim for contract compensation based on inadequate maintenance, noting "[t]he judiciary is not competent to engage in rate analysis, nor, consistent with separation of powers principles, should the courts encroach on this legislative function").

349. *See, e.g.*, California *ex rel.* Lockyer v. Dynegy, Inc., 375 F.3d 831, 853 (9th Cir. 2004) (dismissing tort actions due to their preemption under the filed rate doctrine); Tex. Com. Energy v. TXU Energy, Inc., 413 F.3d 503, 508–09 (5th Cir. 2005) ("[C]ourts have consistently applied the filed rate doctrine in a number of energy cases to preclude lawsuits against companies based on rates that were filed with a government agency." (citation omitted)); Wegoland Ltd. v. NYNEX Corp., 27 F.3d 17, 18 (2d Cir. 1994) ("[T]he doctrine holds that any 'filed rate'—that is, one approved by the governing regulatory agency—is per se reasonable and unassailable in judicial proceedings brought by ratepayers.").

350. Typically, only a legislature can extend such immunity. To the extent that state regulators may have the authority to grant immunity by regulation, this would typically require some open and transparent regulatory process in which noncustomers can participate, such as notice and comment rulemaking. This is consistent with filed rate cases that view rates utilities filed with public utility commissions as a form of legislation. *See* Tex. & Pac. Ry. Co. v. Mugg, 202 U.S. 242, 245 (1906) ("[W]hatever may be the rate agreed upon, the carrier's lien on the goods is, by force of the act of Congress, for the amount fixed by the published schedule of rates and charges . . . .").

351. *See supra* notes 339–41 and accompanying text.

doctrine as a basis for dismissing suits.[352] However, absent some clear legislative decision to limit utility liability, courts should not take such an approach in considering private torts for climate adaptation risks. Our assessment of the functional goals of the duty to adapt would suggest that a filed rate defense to a private tort is only appropriate where a regulator has the authority and institutional capacity to provide a remedy for harms associated with adaptation risks on its own.[353] If, however, a utility regulator only has limited authority to set prices and to provide for customer refunds—as is often the case with state energy price and planning regulation—the filed rate defense should not generally be allowed to limit judicial consideration of a tort claim.[354]

Finally, the rationale for using a filed rate defense as a shorthand basis for deferring to regulators on the grounds that adjudicating common law claims is outside the wheelhouse of courts[355] seems specious too, especially to the extent that the risks, wrongs, and remedies addressed by the duty to adapt are outside the jurisdiction of regulators. Even where regulators do have some jurisdiction to address these risks, wrongs, and remedies, as we argue above, judicial consideration of the duty to adapt can still provide substantial benefits to help improve the regulatory process.[356] At minimum, such concerns should only emerge in cases where a utility regulator has, with some recency and specificity, actually considered the climate concerns central to the duty to adapt.

That duty-to-adapt claims can involve complex factual issues related to predictive forecasting and utility regulation should likewise not present a bar to litigation. These issues are no more difficult to address than the tort claims involving industries that courts routinely entertain.[357] This does not require courts to meddle in the regulatory process in a way that second-guesses the decisions of regulators, though it does provide private remedies based on standards for conduct that can improve future regulatory outcomes.

352. For discussion, see, for example, Rossi, *Lowering the Filed Tariff Shield*, *supra* note 346. *See also supra* notes 348–49 and accompanying text.

353. *See supra* Section III.A.

354. *Cf.* Oncor Elec. Delivery Co. v. Chaparral Energy, LLC, 546 S.W.3d 133, 138 (Tex. 2018) (observing that a "pervasive regulatory scheme" is not based on the mere fact of some regulatory power but must give regulators the "means of remedying the problem"); *id.* at 143 (suggesting an "inadequate-remedy" exception to the application of administrative exhaustion and the filed rate doctrine).

355. Hoffman v. N. States Power Co., 764 N.W.2d 34, 47 (Minn. 2009) (noting "[t]he judiciary is not competent to engage in rate analysis" as one reason for applying the filed rate doctrine as a defense to common law claims).

356. *See supra* Section III.A.

357. *See, e.g.*, Lytton, *supra* note 3, at 1849 (making an analogy to torts against the gun industry and the clergy). To the extent it focuses on the ongoing risks of harm associated with specific infrastructure, a duty-to-adapt claim probably involves even more focused factual questions than some of these kinds of cases, perhaps making it more akin to traditional product liability claims.

CONCLUSION

We have made a historical, evidentiary, and normative case for general judicial recognition of a negligence-based tort duty to adapt, extending the traditional duty to serve to obligate public utilities to make operational and planning decisions in a manner that accounts for changing conditions in light of climate change. Negligence claims based on a duty to adapt will inevitably raise other legal issues that need to be resolved case by case, including breach, causation, and damages. This Article does not purport to address these. Of broader significance, by holding industry actors accountable for adaptation risks, judicial recognition of a private duty to adapt will necessarily result in cascading implications for the energy sector. We conclude here with some general reflections on these implications.

First, the duty to adapt provides an opportunity for a new wave of climate litigation narrower in scope and focus and without the complex causation and scientific evidence issues that have been a central challenge for many high-profile climate change cases.[358] To date, climate change litigation has relied on a loose confederation of legal theories and rationales for liability. Litigation based on the duty to adapt provides a distinct, new avenue for liability for adaptation harms from the energy grid and recognizes a form of harm distinct from many adjacent theories of climate litigation.[359] Most high-profile climate cases to date focus on climate mitigation,[360] but the duty to adapt shifts the focus from mitigation to adaptation risks. A duty to adapt for energy grid operators thus portends a new wave of climate litigation that focuses primarily on past harms to a discrete set of victims and wrongs without relying on complex scientific evidence to establish causation and harm.

Second, a duty to adapt is best understood as an extension of the longstanding and traditional common law utility duty to serve. While big regulatory decisions about infrastructure only occur infrequently, the duty to adapt allows courts to play an ongoing role in holding the industry to account. This can generate useful information about rapidly changing understandings of the climate adaptation risks related to the energy grid, as well as the feasibility of various risk reduction measures. A duty to adapt is not a roving invitation for tort juries to second-guess the judgments of regulators, but instead a way

358. *See supra* notes 9–10 and accompanying text.

359. *See* Sabrina McCormick, Robert L. Glicksman, Samuel J. Simmens, LeRoy Paddock, Daniel Kim & Brittany Whited, *Strategies in and Outcomes of Climate Change Litigation in the United States*, 8 NATURE CLIMATE CHANGE 829, 829 (2018).

360. *See, e.g.*, Joana Seltzer & Lisa C. Vanhala, *Climate Change Litigation: A Review of Research on Courts and Litigants in Climate Change Governance*, WIRES CLIMATE CHANGE, 2019, at 1, 11 (noting that most studies of high-profile climate litigation found that such cases address mitigation, not adaptation or seeking remedies for climate-related loss and damage).

for the judicial system to produce evidence and hold energy grid operators accountable for adaptation harms on an ongoing basis where regulation fails to do so. We would expect a private duty to adapt to play the most significant role in jurisdictions that have no adaptation planning laws or regulations, or where there is no evidence that a utility has considered a specific form of adaptation that could mitigate harm at all. By contrast, where there is an up-to-date record on which a regulator has affirmatively considered and rejected the exact adaptation measures alleged to have caused harm, the duty to adapt would need to cede to agency preemption. This approach fits squarely within the metes and bounds generally afforded and required of courts, and the information generated by courts adjudicating energy grid operator misconduct helps update industry and regulator decisions related to the risk trade-offs associated with legacy and new infrastructure. The duty to adapt also allows tort law to help protect against abuses of the traditional duty to serve that can emerge when utilities invoke it as a shield to limit their liability based on past regulatory decisions.

Third, since the duty to adapt focuses primarily on remedying past harms, it does not envision a court making decisions that have binding consequences beyond providing money damages for tort losses. We do not envision that a court applying the duty to adapt would use injunctive relief or mandate wholly new infrastructure expenditures in order to hold a negligent energy grid operator accountable. Rather, as in other tort cases, a court would make a narrow finding of unreasonable conduct under the circumstances, affording a harmed plaintiff compensation for its loss. If a defendant is found liable, it would be responsible to provide compensation for the plaintiff's harm, but it is not required to make a specific investment of capital. A utility subjected to an adverse tort judgment still needs to evaluate what its best course of action is to address future adaptation risks—and there are numerous ways to address these risks, such as changing customer communication and notice protocols, making capital investments to harden the grid and promote reliability, investing in grid resilience, or establishing compensation funds for future victims. Just as a court's tort judgment against a product manufacturer does not dictate a specific safety design, energy grid operators subject to a duty to adapt are held accountable for past losses but have flexibility in the future as to how they approach adaptation risks. Importantly too, decisions about planning and investment will still be overseen by regulators. For purposes of setting customer rates, the reasonableness of specific infrastructure investments and the risks and benefits they entail will vary across various geographic regions, and the ultimate assessment of the prudency of future capital expenditures will involve the

balancing of a number of factors that are better suited to regulators rather than courts.[361]

If (as we hope) regulation evolves to become more comprehensive in recognizing and rationalizing climate adaptation risks, a private duty to adapt may no longer be necessary to provide for compensation and deterrence. Indeed, viewed in one light, the private duty to adapt may ultimately be designed to diminish over time, translated into regulatory standards of resilience, just as the duty to serve incorporated early conceptions of reliability. But until that happens, a private duty to adapt is an important piece of the puzzle in holding the operators of energy infrastructure to account for the impacts of climate change.

361. Regulators will also need to examine whether it is reasonable for customers or a utility's investors to absorb the costs of litigating for recovery for past adaptation harms. In the case of SDG&E, utility regulators ultimately refused to approve cost recovery from ratepayers of a utility's settlement of tort claims with victims of the 2007 wildfires. *See supra* note 221.