MANAGING WASTEFUL COMPETITION BETWEEN WIRES AND PIPES UTILITIES

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The decision to regulate never represents a clean break with competition.[1]

- Alfred E. Kahn

[P]ermanent natural monopoly is probably a rare category. Technical change can shift cost functions so as to render competition workable. And . . . a serious deficiency of regulation seems to be that it often fails to "disappear" when the natural monopoly does.[2]

- Paul L. Joskow

Synopsis: Gas distribution utilities are facing increasingly intense and extensive competition from electrification, due to a range of factors including technological change, new policy goals, and aging gas infrastructure. But the regulatory framework that governs utilities and the utility commissions responsible for their oversight was not designed to recognize or manage this sort of competition. In particular, the existing regulatory framework exposes gas utilities to the financial consequences of eroding demand for gas but does not give energy utilities or their regulators incentives or tools to respond to the competitive pressures underlying that erosion. In combination, this pair of conditions – susceptibility and unresponsiveness – constitutes a threat to the financial viability of gas utilities and, if that viability erodes without proactive intervention, to their customers' physical safety and reliable access to energy. This article diagnoses the largely unacknowledged competitive pressures created by electrification, highlights the dangers of allowing such competition to persist unmanaged, and examines possible changes to the nature and application of the utility regulatory framework within which energy distribution utilities encounter competitive

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1. 2 ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS 113 (MIT Press 1988).

2. Paul L. Joskow, *Theory of Natural Monopoly*, *in* ECONOMICS OF REGULATION AND ANTITRUST 401, 403 (W. Kip Viscusi, Joseph Emmett Harrington, & John Mitcham Vernon eds., 4th ed. 2005).

pressure.[3] The ambitious scale of the changes considered here matches the scale of the danger facing utilities, regulators, and the public should the present approach and susceptibility persist. We aim to change how policymakers, regulators, and other stakeholders understand the origins of that framework, and to warn that the regulatory status quo could steer gas distribution utilities and their customers into crisis.

I. INTRODUCTION

Since the end of World War II, natural gas has been a dominant source of energy supply for buildings across much of the United States, fueling household appliances such as space heaters, water heaters, stoves, and dryers. Supporting

3. This develops and expands ideas earlier articulated in JOSHUA LAPPEN ET AL., THE UNSEEN COMPETITION IN THE ENERGY TRANSITION: ACKNOWLEDGING AND ADDRESSING INTER-UTILITY COMPETITION TO ACHIEVE MANAGED DECARBONIZATION 3 (2024).

this widespread use is an extensive network of 2.37 million miles of distribution pipelines that deliver gas from interstate transmission pipelines to more than seventy-nine million ratepayers, of which about sixty million are residential households.[4] The utilities that own and operate gas distribution systems constitute a $103 billion industry by annual revenues.[5] Today, however, three things that have long enabled these gas distribution utilities' growth are shifting: (1) gas distribution system costs have increased significantly after decades of holding steady, driven mainly by the replacement of aging infrastructure and secondarily by greater volatility and upward pressure on natural gas commodity prices;[6] (2) technological advancements in electric equipment and appliances, especially heat pump-based heating, ventilation and air conditioning (HVAC) systems and electric water heaters, are expanding the availability and cost competitiveness of electric substitutes for gas-fired appliances everywhere, even in cold climates;[7] and (3) policies aimed at reducing local air pollutants and greenhouse gas emissions are giving rise to direct and indirect constraints on gas service expansion.[8] These factors – rising costs, the availability of substitute technologies, and policy constraints on gas distribution system growth – are likely to persist, even in the face of significant policy changes such as the current Congress' reversal of federal Inflation Reduction Act subsidies for building electrification.[9] These factors, individually and in combination, will contribute to a rising tide of competition from electrification. How quickly and how high that tide rises will vary across and even within jurisdictions, and will depend on future policy choices, but it is very likely to rise in all regions. Its rise spells slowing and eventually falling demand for the service provided by gas distribution utilities.[10]

The utility commissions that oversee gas distribution utilities' operations and investment decisions are themselves governed by a long-lived regulatory framework, the components of which have been adopted through utility commissions' organic statutes, statutory amendments, regulations, and utility commission orders in combinations that vary across states. These components include: the basis for imposing regulation on entry and price in a given market and designating a given company as a utility to be operated as a regulated monopoly within its service territory; the obligation on a utility to offer existing and new customers with adequate service, and to do so without undue discrimination; allowance of utility cost recovery from customers based on the "prudence" of

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4. *Annual Report Mileage for Gas Distribution Systems*, U.S. DEP'T OF TRANSP. PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMIN (last updated Mar. 6, 2026), https://tinyurl.com/2tsrj8k8; *Number of Natural Gas Consumers*, U.S. ENERGY INFO. ADMIN. (last updated Feb. 27, 2026), https://www.eia.gov/dnav/ng/ng_cons_num_dcu_nus_a.htm.

5. *Annual Report of Volumes, Revenues, and Customers by Company (1997-2022)*, AM. GAS ASS'N, https://tinyurl.com/ms78raxs (last visited Oct. 16, 2024).

6. *See infra* notes 98-107 and accompanying text.

7. *See infra* notes 79-96 and accompanying text.

8. *See infra* notes 111-22 and accompanying text.

9. *Tax Bill Significantly Changes Clean Energy Credits and Incentives*, RSM (July 15, 2025), https://rsmus.com/insights/services/business-tax/obbba-tax-clean-energy.html; Julia Simon & Camila Domonoske, *Do You Want Federal Money for an EV or Home Solar? Time is Running Out – Fast*, NPR (July 16, 2025), https://www.npr.org/2025/07/16/nx-s1-5462190/trump-tax-credit-solar-ev-heat-pump.

10. *See infra* notes 125-34 and accompanying text.

proposed spending on customer-serving assets or operations; and regulators' duty to ensure that utility service is safe and reliable, and provided at rates that are just and reasonable.[11]

Legislators established the foundation for this framework in order to solve several problems, first and foremost providing certainty to investors who funded construction and maintenance of growing energy distribution networks.[12] Utility commissions then adapted the framework as those distribution networks extended from dense urban cores into more far-flung locales over time. Crucially, however, this regulatory framework was *not* designed to – and did not evolve to – deal with competition that drives down total demand for gas service and thereby threatens the financial viability of gas utilities faster than the remaining gas customers can secure access to alternatives.[13] This article calls the resulting competitive pressure on gas distribution service "wires-vs-pipes competition."[14] Ignoring the distribution utility regulatory framework's blind spot for wires-vs-pipes competition risks serious, and potentially disastrous, consequences for energy affordability and safety.

The danger presented by wires-vs-pipes competition today owes to two basic features of gas distribution utilities' business model. First, for these utilities, profits (or their absence) are a result of investments in capital assets, such as pipes, with which they serve the bulk of their customers – namely residential and small commercial end-users. The returns a utility is authorized to recover from its customers are multiplied by its asset base, so more capital spending means greater shareholder value and less capital spending produces the opposite effect. Second, gas utilities' capital plans are generally inflexible in the face of declining demand for gas. Unless that decline takes the form of contiguous blocks of customers

11. *See infra notes* 31-44, 162-99 and accompanying text.

12. *See e.g.*, John M. Eshleman, *Introduction*, *in* PUBLIC UTILITIES ACT OF CALIFORNIA 13, 13 (Eugene R. Hallett ed., San Francisco: Louis Sloss & Co., Investment Securities 1912) ("The public utilities act . . . is to be the best interest of the financier, who must advance capital, the corporation, who should utilize it, and the people at large, who must ultimately repay it."); *see also* Gregg A. Jarrell, *The Demand for State Regulation of the Electric Utility Industry*, 21 J. LAW & ECON. 269, 270-71 (1978); William J. Hausman & John L. Neufeld, *The Market for Capital and the Origins of State Regulation of Electric Utilities in the United States*, 62 J. ECON. HIST. 1050 (2002).

13. *See infra* notes 39-44 and 203-05 and accompanying text. Likely alternatives already in widespread adoption include utility-provided electric distribution service, distributed energy resources located behind the meter, and, in some instances, delivered fuels.

14. It is important to distinguish the wires-vs-pipes competition discussed in this paper from competition among large-scale power generation resources, such as renewables and combined cycle gas turbines, and the electric and gas transmission systems that link power generation facilities and gas supplies to electric and gas load centers. Decisions about investments in these upstream segments of the energy system are formally and economically separate from decisions about investments in the distribution systems that sit downstream of them – and are generally not subject to the same utility regulatory regime. Indeed, to the extent that greater investment in gas-fired electric generation capacity in a given region has any impact on the economics of a gas distribution system, it will be expressed through commodity prices, which electric and gas distribution utilities both pass through to their customers. Unless the gas distribution utility's financial viability hangs on continued consumption by another anchor-customer, such impacts do not bear upon that utility's financial profile, which depends almost entirely on capital spending. For more on how interdependencies between fossil system components can constrain overall system performance and stability, *see generally* Joshua Lappen & Emily Grubert, *Fossil Energy Minimum Viable Scale*, 391 SCIENCE 449 (2026).

ending their use of gas altogether, gas utilities will generally not reduce the extent – or cost – of their pipeline network. This inability to match the contraction of a customer base with contraction of a network means utilities' overall costs persist even as their customer counts fall, forcing them to make up for lost revenues with higher per-customer rates.[15] As explained in section III.B.3, these features make gas utilities susceptible but generally unresponsive to the declining demand that follows from more intense and extensive wires-vs-pipes competition. The consequences of this combination are likely to vary across jurisdictions, but in general, wires-vs-pipes competition increases the risk of serious financial distress for gas distribution utilities in the absence of intervention by regulators. As this paper demonstrates, because that competition sits in regulators' blind spot, they are currently ill-positioned to intervene proactively to address it.

Now that this wires-vs-pipes competition is intensifying, the inability of the American model of distribution utility regulation to enable and manage such competition should be a cause for concern to utility regulators and other policymakers.[16] Policymakers in all United States jurisdictions, even where key drivers of competition from gas alternatives are relatively weak, should look ahead and prepare for potential disruptions from wires-vs-pipes competition by updating the utility regulatory framework. One reform program considered here would unleash competition, leaving gas utilities without the risk-inducing protection of economic regulation. The second reform program would manage the competitive pressure gas utilities face by facilitating integration of planning and operations across electric and gas utilities with overlapping service territories. The third reform approach addresses the challenge of managing the likely decline of gas systems by taking gas utilities into public ownership, removing them from the counterproductive aspects of utility regulation while allowing utility managers to respond to a wider range of public policy priorities. Notably, although multiple states have enacted economywide greenhouse gas emissions limits through legislation, those laws have generally not caused regulators to update the utility regulatory framework in ways that would address wires-vs-pipes competition—and in the few states where regulators have gone further, they have done so only pursuant to additional legislation expressly directing them to act.[17]

This paper discusses the foregoing points in four sections. The first examines the historical origins of the American model of energy utility regulation, and how those historical circumstances produced systematic regulatory "blind spots." The second section describes the subsequent century of unaddressed competition between electric and gas services under that regulatory framework, which grants electric and gas utilities monopoly status within their respective but overlapping service territories. That description brings us to the present and explains why policymakers ought to be concerned about competition between electric and gas

15. *See infra* notes 200-05 and accompanying text.

16. Many jurisdictions outside the United States are also dealing with wires-vs-pipes competition, and some are reconsidering aspects of their approaches to distribution utility regulation. This article discusses a few of those other jurisdictions briefly but does not characterize the particular circumstances or activities there in detail. *See infra* notes 155, 205-07 and accompanying text.

17. *See infra notes* 210-30 and accompanying text.

service becoming increasingly extensive and intense. The third section examines how the regulatory framework steers utility commissions away from addressing growing competition proactively, even though it promises to become a source of increasing instability. The fourth section considers potential reforms to the utility regulatory framework, namely deregulation of the gas distribution business, integration of co-located electric and gas utility operating units, and various forms of public ownership. As sections three and four show, policymakers face a vital set of choices: first, whether to leave the existing regulatory framework in place, notwithstanding the risks, or to reform it; and second, whether to reform it by enabling or managing the percolating competition between electric and gas utilities.[18]

II. FOUNDATIONS OF MODERN GAS UTILITY REGULATION

The framework for state-level public utility regulation that emerged in the U.S. in 1907 was, and has since continued to be, the product of an evolutionary process. Its initial adoption was not a constitutional moment of forward-looking institutional design, but rather the synthesis of its most prominent backers' contemporary concerns and priorities, built on top of and within legacy institutions. As such this 1907 framework has always been one that satisfices rather than optimizes,[19] leaving important gaps in its regulatory coverage of interactions among utilities and their customers. This section briefly describes the origins of this framework, its key features, and how wires-vs-pipes competition emerged as an enduring blind spot.

A. Origins and key features

Wires-vs-pipes competition forms the unexamined cornerstone of modern gas utility regulation. State utility regulation of networked energy services as a category stems from the many disruptive consequences of the growth of electric distribution companies, which emerged during a historical moment of regulatory innovation, growing state capacity, and anti-monopoly politics.[20] During their initial decades of rapid growth in the 1880s and 1890s, electric systems quickly expanded beyond municipal boundaries, exposing electric companies to a

18. Competition, which is at the heart of this article, arises in different circumstances and takes different forms. There is competition, for instance, between electric and gas utilities – "wires-vs-pipes" – and also between utilities and non-utility solutions, such as various configurations of distributed energy resources (DERs). Further, utilities and non-utilities compete both for electric and gas system customers and for a share of new and changing markets. These dimensions relate to each other and interact in several respects. Throughout this article, we take care not to make "competition" a weasel word – a term that is employed in different places to signify different things while seeming to be self-consistent – by specifying the entities and objectives involved in a given instance.

19. Herbert A. Simon, *Satisficing*, *in* THE NEW PALGRAVE DICTIONARY OF ECONOMICS, 11933, 11933-35 (3d. ed. 2018).

20. For more information on regulation, monopoly politics, and state capacity at the turn of the century, see Richard White, *From Antimonopoly to Antitrust*, *in* ANTIMONOPOLY AND AMERICAN DEMOCRACY 83 (Daniel A. Crane & William J. Novak eds., 1st ed. 2023); William J. Novak, *The Public Utility Idea and the Origins of Modern Business Regulation*, *in* CORPORATIONS AND AMERICAN DEMOCRACY 139 (Naomi R. Lamoreaux & William J. Novak eds., 2017); Werner Troesken, *The Institutional Antecedents of State Utility Regulation: The Chicago Gas Industry, 1860 to 1913*, *in* THE REGULATED ECONOMY: A HISTORICAL APPROACH TO POLITICAL ECONOMY 55 (Claudia Goldin & Gary D. Libecap eds., 1994).

patchwork of different municipal regulations and franchise agreements. Turn-of-the-century franchise negotiations were infamous as opportunities for municipal graft and corporate malfeasance – a reality that benefited some energy companies but threatened others, and which also intensified rising customer frustration with the cost and reliability of service.[21] Attempting to weaken corporate control of government, lower rates, and tie rates to performance, Progressive reformers and industrial boosters alike innovated a wide variety of municipal regulatory structures.[22] This proliferation satisfied no one: while electric companies found it burdensome to conform to multiple municipal regulatory regimes across different portions of their service territories, reformers generally found municipal jurisdiction too limited to govern large utilities that extended well beyond any one city's borders.[23] Reformers' mounting frustrations helped to drive a surging municipal ownership movement in thousands of American cities, a threat which motivated electric industry executives to seek state regulation as a source of both reform and protection.[24] The electric industry also saw that state financial oversight could lower its borrowing costs, both by eliminating the prospect of competition, and by creating a system of tacit government endorsement of utility debt.[25]

As early as 1898, electric executive Samuel Insull publicly proposed that electric companies accept – and even promote – state utility regulation as a means of solving two conjoined problems: increasingly burdensome municipal regulation, and the rising threat of municipalization.[26] By 1907, the electric industry's trade group, the National Electric Light Association, had formally endorsed state utility regulation.[27] At the same time, a critical mass of local ratepayers and reformers across the country had adopted the policy of state utility regulation as a solution to the inadequacy of municipal regulation – and to the corruption that often attended it.[28] With both electric companies and their chief

21. One example is San Francisco's 1906 prosecution of "Boss" Abraham Ruef, who accepted bribes from Pacific Gas & Electric Company in exchange for arranging for more accommodating municipal rate regulation. Ruef's conviction made the political career of prosecuting attorney Hiram Johnson, who soon ran successfully for governor on a platform of state utility regulation. *See* Walton E. Bean, *Boss Ruef, the Union Labor Party, and the Graft Prosecution in San Francisco, 1901-1911*, 17 PAC. HIST. REV. 443, 443-55 (1948); SPENCER C. OLIN, JR., CALIFORNIA'S PRODIGAL SONS: HIRAM JOHNSON AND THE PROGRESSIVES, 1911-1917, at 8-10, 36-41 (1968).

22. *See generally* Troesken, *supra* note 20. While moderate municipal reformers sought municipal regulation, more radical movements drew on the longstanding American antimonopoly tradition to argue for more fundamental opposition to expanding energy corporations. For more information on that tradition and its usurpation by forms such as municipal utility regulation, see White, *supra* note 20.

23. Gail Radford, *From Municipal Socialism to Public Authorities: Institutional Factors in the Shaping of American Public Enterprise*, 90 J. AM. HIST. 863 (2003); Forrest McDonald, *Samuel Insull and the Movement for State Utility Regulatory Commissions*, 32 BUS. HIST. REV. 241, 241 (1958).

24. Radford, *supra* note 23; McDonald, *supra* note 23, at 241.

25. Jarrell, *supra* note 12, at 270-71; Hausman & Neufeld, *supra* note 12.

26. McDonald, *supra* note 23, at 241-42.

27. *Id*. at 248–49.

28. *See* Bean, *supra* note 21; OLIN, *supra* note 21 and accompanying text. For analysis of these historical dynamics in California, see also Joshua Lappen, Cultures of Power: Electrification, Politics, and Visibility in Greater Los Angeles (2024) (Ph.D. Dissertation, University of Oxford). Such corruption remains a structural

critics in support, energy utility laws sailed through state legislatures across the country.[29]

The state utility regulatory structure that emerged from this moment was constructed around three tenets that have endured to the present day. First and most fundamentally, state utility laws designated energy delivery companies as monopolies within specified territories, granting them the exclusive right to develop and operate their form of energy distribution system there.[30] Second, those monopoly utilities were to provide service that was adequate – a term that legislatures did not define with specificity.[31] And third, these newly created utilities were made subject to rate regulation, which stood in for market-based competition by providing oversight of the utilities' operation, borrowing, and investments. Crucially, state commissions set rates for each utility company independently, creating a siloed regulatory environment that prevented ready cross-comparison of the services offered by co-located energy utilities.[32]

These tenets did not constitute some sort of rigid and comprehensive social contract,[33] but instead emerged from a set of earlier attempts at regulation of so-called public services – most notably, railroads.[34] From that broad regulatory tradition also came the mandate to prevent "wasteful duplication" of investments and services.[35] Such duplication arises where regulators fail to recognize an

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problem of the investor-owned public utility framework – for more, see generally Joshua Macey & Aneil Kovvali, *The Corporate Governance of Public Utilities*, 40 YALE J. REG. 569 (2023).

29. Between 1907 and 1922, almost 30 states adopted broadly similar legislation that, among other things, established state-level public utility commissions. Jarrell, *supra* note 12, at 270-71.

30. *See, e.g.*, 1911 Wis. Sess. Laws 14-15 ("All licenses, permits and franchises to own, operate, manage, or control any plant or equipment for the production, transmission, delivery, or furnishing of heat, light, water, or power in any municipality, heretofore granted or attempted to be granted to any public utility by or by virtue of any ordinance pending or under consideration in the municipal council of any municipality at the time of the obtaining of an indeterminate permit by any other public utility operating therein, are hereby validated and confirmed and shall not be affected by the provisions of subsection 1 of section 1797m-74 of the statutes.").

31. Note, *The Duty of a Public Utility to Render Adequate Service: Its Scope and Enforcement*, 62 COLUM. L. REV. 312, 313-14 (1962) [hereinafter *The Duty of a Public Utility*].

32. This siloing is consistent with the regulatory principle of "beneficiary pays," which holds that only beneficiaries of a given utility's investments made in order to provide a particular service should bear the costs of providing that service. JAMES C. BONBRIGHT, PRINCIPLES OF PUBLIC UTILITY RATES 22–24 (1961) (contrasting a utility that provides a single service with a city that provides various services).

33. This set of tenets is sometimes today called the "regulatory compact," a term that construes them as a sort of multi-party agreement among utilities, their customers, and regulators. Ari Peskoe has shown that utilities popularized this term and its underlying framing in the early 1980s as part of a broader effort to justify recovery of costs amid inflation and the cancellation of numerous nuclear projects. ARI PESKOE, SUMMARY OF COMMENT: UTILITY REGULATION SHOULD NOT BE CHARACTERIZED AS A "REGULATORY COMPACT," (Harv. Envtl. Pol'y Initiative, comment on U.S. Dep't of Energy Quadrennial Energy Review Stakeholder Briefing Memo) (2016). Scott Hempling has likewise criticized the "regulatory compact" characterization of actual practical and legal relationships between utilities, their regulators, and utility customers for being "artificially narrow," "incumbent-protective," and "legally wrong." SCOTT HEMPLING, WHAT "REGULATORY COMPACT"? 1-3 (2015), https://tinyurl.com/3chbr38y.

34. *See generally* Novak, *supra* note 20.

35. *See, e.g.*, HOWARD C. FORBES, PUBLIC SAFETY AND THE INTERURBAN ROAD VS. THE RAILROAD MONOPOLY IN MASSACHUSETTS 29 (1905) ("Why, in times when monopoly seems rampant and uncontrollable, does Massachusetts actively protect it? . . . It was to prevent the wasteful duplication of investment resulting

instance of "natural monopoly," meaning that a single firm is better able to deliver the lowest unit costs for a given service than multiple competing firms, in part because of the capital-intensive nature of the business.[36] This conclusion that energy distribution systems should be treated as natural monopolies, much as railroads were, was often solidified by state laws that assigned regulation of gas and electric companies to pre-existing State Railroad Commissions, and their institutional cultures came to embody particular interpretations of their regulatory mandates.[37] With relatively limited input from their municipal regulatory predecessors, state utility regulators and regulated utilities together translated the core tenets of energy utility law into rules and processes on the basis of their understanding of present conditions – and their expectations about the future.

B. The blind spot obscuring wires-vs-pipes competition

Though state utility regulation of energy systems covered gas companies as well as electric companies, the gas industry played a far smaller role in shaping the regulatory model or advocating for its adoption than did the electric industry. Whereas electric companies sought state utility regulation to facilitate their continued growth, gas companies were facing mass customer loss as electric companies continued their takeover of public and private lighting markets, and were as likely to view new utility obligations as "legislative interference" as state support.[38] Over the last decades of the nineteenth century, gas companies had responded to this competitive crisis in a variety of ways, including by acquiring, merging with, or launching their own electric companies in an attempt to better control the pace of market transition, or by consolidating with neighboring gas companies in an effort to reduce competition and build financial stability.[39] Others attempted to compete by investing in new gas-lighting technologies and more

therefrom that the public would have to support. . . . No doubt it has prevented wasteful duplication."); *see also* RICHARD T. ELY, MONOPOLIES AND TRUSTS 148-49 (1912).

36. On the origins and implications of "natural monopoly" as a term, see Adam Plaiss, *From Natural Monopoly to Public Utility: Technological Determinism and the Political Economy of Infrastructure in Progressive-Era America*, 57 TECH. & CULTURE 806 (2016). Definitions of natural monopoly generally begin with reference to whether, in a given market, economies of scale make one firm better able to satisfy demand at least cost than two or more competing firms, see e.g., Richard Posner, *Natural Monopoly and Its Regulation*, 21 STAN. L. REV. 548, 548 (1969), which economists characterize mathematically as a state of "subadditivity." *See* Paul L. Joskow, *Regulation of Natural Monopoly*, *in* 2 HANDBOOK OF LAW AND ECONOMICS 1227, 1244-45, 1248 (A. Mitchell Polinsky & Steven Shavell, eds., 2007) (emphasizing that "[a] case for price and entry regulation based on a natural monopoly rationale . . . requires both significant increasing returns <u>and</u> long-lived sunk costs that represent a significant fraction of total costs.") (emphasis in original). Here, "sunk costs" refers to "costs . . . associated with investments made in long-lived . . . assets whose value in alternative uses . . . or at different locations . . . is lower than in its intended use." *Id*. at 1240-41.

37. Wisconsin, Washington, Georgia, Texas, and California are all examples of states that built energy utility regulation on a foundation of state railroad regulation. New York and Massachusetts, by contrast, are examples of states where regulation of gas and electric companies emerged in parallel to or independent of state railroad regulation. *See* Max Thelen, *Leading Railroad and Public Service Commissions*, *in* PUBLIC UTILITIES ACT OF CALIFORNIA 35, 35-154 (Eugene R. Hallett ed., San Francisco: Louis Sloss & Co., Investment Securities 1912).

38. *Regulation of Rates*, 24 PROGRESSIVE AGE 22 (1906).

39. CHRISTOPHER J. CASTAÑEDA, INVISIBLE FUEL: MANUFACTURED AND NATURAL GAS IN AMERICA, 1800-2000, at 62 (1999).

robust advertising campaigns. Still others sought new applications for gas that were safer from electricity's competitive pressure.[40] The new services that eventually saved gas companies from collapse – cooking and space heating – allowed gas to move into markets long dominated by wood and coal but not yet targeted on a large scale by electric companies. Between 1907 and 1912, though, using gas for heating in buildings was still relatively uncommon, leaving gas companies facing challenging future prospects. Despite bullish public assertions about their performance "notwithstanding the competition from electricity," within industry gatherings executives admitted daunting challenges.[41]

This retreat in the face of the rising electric juggernaut is the key feature of the economic and technological context in which gas companies were incorporated into states' new utility frameworks. As the utility regulatory model's competition-limiting strictures were applied to energy companies, electricity was comprehensively outcompeting gas in gas' main market sector. As a result, regulators seem to have generally assumed that direct competition between electricity and gas would be short-lived. Either gas companies would develop and retain new market sectors isolated from electricity, creating two separate categories of utility service, or gas distribution service would fade away, supplanted by a superior new technology. These tacit assumptions showed themselves in regulators' early choices about how to set the boundaries of monopoly service. Many state Public Utility Acts contained language clarifying that utility monopolies should be set by "service" – often described as "furnishing of heat, light, water or power" – rather than by fuel type.[42] Despite this mandate, regulators did not identify the competitive provision first of light and later of heat by parallel gas and electric systems as an instance of wasteful duplication. State utility regulators did not act to halt or mitigate competition between gas and electric companies, nor did they establish systems for preventing new instances of competition between energy types from emerging in the future.

This blind spot in utility law, this failure to anticipate the potential for wasteful competition between gas and electric utilities, was the product of regulators' assumptions at a particular moment in energy history and has never been directly addressed.

The 1907 framework for energy utility regulation spread remarkably rapidly across the United States. Within seven years of the prototypical laws' passage in Wisconsin and New York, well over half of the states in the union had adopted a similar framework of statewide regulation for electric and gas companies.[43] After seven more years, more than two-thirds of states had done so.[44] Utility regulation was not designed, and has never been updated, to structure or manage competition in energy services between different forms of energy provision.

40. *Id*. at 60-62.

41. George B. Cortelyou, *Commercial and Financial Aspects of the Gas Industry*, *in* LECTURES DELIVERED AT THE CENTENARY CELEBRATION OF THE FIRST COMMERCIAL GAS COMPANY TO SELL GAS AS AN ILLUMINANT 67, 79 (Am. Gas Inst. ed., 1912); A. H. HUMPHREY ET AL., REPORT OF THE COMMITTEE ON OUTDOOR LIGHTING 5, 33-34 (Nat'l Com. Gas Ass'n 1913).

42. *See e.g.*, 1907 Wis. Sess. Laws 449, 1130.

43. Jarrell, *supra* note 12, at 270-71.

44. *Id*.

III. Patterns and Consequences of Wires-vs-Pipes Competition

Over the subsequent 110 years, competition between gas and electricity for a shared set of energy market sectors and an overlapping customer base has shifted in form, extent, and intensity, but it has never resolved into wholly separate spheres of service. Amid persistent competition, both electric and gas utilities have maintained the operational and financial viability of their respective enterprises, lending credence to the mistaken assumption that they represent separate natural monopolies and can therefore be regulated separately. This section first traces the arc of competition over the past century, noting that such competition was driven by utility-industry trade groups, fuel-specific equipment manufacturers, and appliance marketers as well as utilities themselves. This section then turns to the present moment, when asymmetrical competition from electrification is growing in ways not seen before, and considers what this means for the future of wires-vs-pipes competition.

A. Competition within the confines of the 1907 model

The largely asymmetric competition present at the advent of state-level energy utility regulation remained intense over the decade following 1907, as gas utilities sought variously to develop new market sectors and to win back old ones. As the state utility regulatory model spread, many in the gas industry remained determined to "hold their own against competition" in pursuit of "the great future of gas lighting," periodically reclaiming market share from electric utilities with the development of increasingly sophisticated gas-mantle and -arc technologies.[45] These resurgences, though, proved brief, and the gas lighting market entered more permanent decline in the 1910s – but gas utilities saved themselves from collapse by developing new market sectors.

To sidestep damaging competitive pressure from electricity, gas utilities targeted energy services still widely provided by coal, fuel oil, and wood – especially cooking, building heating, and industrial processes. Gas cooking and heating appliances had languished in obscurity throughout the nineteenth century thanks to their high cost and custom designs (much like heat pumps throughout the twentieth century[46]), but around the turn of the century, concerted gas-industry research, development, and marketing campaigns began to succeed in introducing gas appliances into mass markets.[47] In some markets, gas utilities' competitive

45. These new gas-lighting technologies consumed gas more efficiently, while improving the brightness, steadiness, and (under some conditions) reliability of gas light. C. B. Babcock, *Gas Lighting at the Panama-Pacific International Exposition, San Francisco*, 4 GAS INST. NEWS 347, 347 (1915); Van Rensselaer Lansingh, *Gas as an Illuminant*, *in* LECTURES DELIVERED AT THE CENTENARY CELEBRATION OF THE FIRST COMMERCIAL GAS COMPANY TO SELL GAS AS AN ILLUMINANT 126, 136 (Am. Gas Inst. 1912); HUMPHREY ET AL., *supra* note 41, at 5, 33-34.

46. *See, e.g.,* John F. Sandfort, *The Heat Pump*, 184 SCIENTIFIC AM. 54, 54 (May 1951).

47. *See, e.g.*, E. B. Rosa, *The Use of Gas for Heat and Power; The Testing of Gas*, *in* LECTURES DELIVERED AT THE CENTENARY CELEBRATION OF THE FIRST COMMERCIAL GAS COMPANY TO SELL GAS AS AN ILLUMINANT 143, 147-51 (Am. Gas Inst.1912).

revival was also bolstered by the availability and adoption of natural gas, which had a higher energy density and burned cleaner than manufactured gas.[48]

Throughout this period, gas utilities oriented their business strategies to the challenges arising from wires-vs-pipes competition. Gas stove manufacturers advertised themselves to gas utilities on the basis of "competition," while gas utilities themselves transitioned from describing their services in terms of candlepower to the Btu as part of an effort to prove to ratepayers that gas had uses beyond lighting, and to parallel electric utilities' service-agnostic unit of consumption.[49] Early indications suggested that new uses were indeed taking hold: the volumetric market for gas as a heating fuel grew far faster than the illuminating market shrank between 1908 and 1912.[50] By 1919, gas industry investors were confidently asserting that, thanks to new markets, "the effect of competition in … lighting, has been fully discounted and any setback which the industry might have suffered … is already behind us."[51] Nonetheless, gas utility regulators and executives remained concerned, both because of widespread perceptions among customers that gas was being outcompeted by electricity, and because of the rapid pace of innovation in the electric sector.[52]

For the next two decades, gas and electric utilities competed intensely for market share in a wide variety of end uses. Both gas and electric utility industries were laying claim in advertisements and in business practices to the entire domain of "light, heat, and power," inaugurating an era of wide-reaching bidirectional competition between categories of utility energy service.[53] Electric utilities funded the development of countless electrified kitchen appliances to contest gas' growing dominance in the cooking market, while gas utilities fought back with gas-fired refrigeration.[54] Utilities, manufacturers, and their trade associations ran competing sales campaigns and closely tracked each other's performance and selling points.[55]

In California and western Pennsylvania, gas utilities had fueled their competitive recoveries by adopting cleaner-burning and higher-heating value natural gas in place of manufactured gas. Beginning in 1938 with passage of the Natural Gas Act and continuing for the next fifteen years, federal administrators

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48. For one example of how early adoption of natural gas helped fuel gas utilities' competitive resurgence in the late 1910s, see DOUGLAS R. LITTLEFIELD & TANIS C. THORNE, THE SPIRIT OF ENTERPRISE: THE HISTORY OF PACIFIC ENTERPRISES FROM 1886 TO 1989 79 (1990).

49. *"Lorain" Oven Heat Regulators Will Multiply Your Gas Range Sales*, 19 THE GAS INDUS. 613 (Aug. 1919); CASTAÑEDA, *supra* note 39, at 81–82.

50. Edward W. Parker, *Gas, Coke, Tar, and Ammonia*, *in* MINERAL RESOURCES OF THE UNITED STATES: PART II – NONMETALS 1161, 1164-73 (1913).

51. Comm. on Pub. Serv. Sec., Inv. Bankers Ass'n of Am., *Interim Report No. 10*, 2 AM. GAS ASS'N MONTHLY 604, 605 (Oct. 1920).

52. *See, e.g.*, *id.* at 604.

53. For example, *The Gas Industry* magazine, ran a masthead of "Heat Light Power" – a close cognate to "Light, Heat, & Power" in the corporate name of many electric utilities. 20 THE GAS INDUS. 3 (Jan. 1920).

54. On gas and electric refrigerators, see RUTH SCHWARTZ COWAN, MORE WORK FOR MOTHER: THE IRONIES OF HOUSEHOLD TECHNOLOGY FROM THE OPEN HEARTH TO THE MICROWAVE 128–45 (1983). On electric-industry efforts to enter the kitchen, see S. M. KENNEDY, WINNING THE PUBLIC 69-70, 113-14 (1921).

55. *See* Jane Busch, *Cooking Competition: Technology on the Domestic Market in the 1930s*, 24 TECH. & CULTURE 222 (1983).

poured funding into pipeline technology development, granted gas pipeline builders extraordinary powers to accelerate natural gas' spread, and fixed gas prices at the wellhead to stabilize costs for utilities and ratepayers.[56] In the postwar era, as utilities across the country made the transition to more energy-dense, reliable natural gas and wartime oil pipelines were repurposed to transport gas to the East Coast, gas utilities became dominant cold-climate heat providers.[57] In response, electric utilities collaborated with General Electric and the construction industry to develop one of the nation's largest marketing efforts: The Live Better Electrically campaign used corporate research programs, model building codes, and bundling discounts to push for all-electric construction.[58] Especially in Sunbelt regions where winter heating costs were comparatively light and homebuilding was booming, this competition became intensely asymmetrical, with gas utilities excluded from entire new neighborhoods where gold medallions signaled gas-free homes.[59] As a result, a national divergence emerged: gas solidified its market share in the north, but failed to expand to much of the south.

Even as its active advertising campaign wound down, the Live Better Electrically campaign yielded a generation of homebuilders and consumers familiar with and confident in all-electric designs. Because of the promotional rates the program delivered to all-electric homebuyers, Live Better Electrically also reinforced consumer perceptions that electricity was affordable in the midst of periodic mid-century inflation.[60] By comparison, many gas utilities requested repeated rate increases in the latter half of the 1960s, largely in response to the growing difficulty of securing adequate and affordable gas supplies.[61] As oil and gas fields tapped under emergency conditions during the 1940s ran dry, federal wellhead price controls disincentivized widespread third-party exploration for new sources of gas, while proven fields in places like northern Texas and Alberta required extremely long-distance pipelines to supply most major markets.[62] At the same time, those new pipelines and their operators became a new source of competitive threat to vertically integrated gas utilities. New gas transmission companies offered bulk gas supply at lower rates than gas utilities could, spurring the largest industrial gas consumers – including electric utilities – to solicit their own long-distance pipelines or sign direct supply contracts with transmission companies, depriving gas utilities of large and often flexible blocks of demand.

56. Alison Gocke, *Public Utility's Potential*, 133 YALE L.J. 2773, 2795-96 (2024).

57. After 1940, when 11.3% of households surveyed by the U.S. Census reported using "utility gas" as their primary heating fuel, that percentage climbed steadily: in 1950 it was 26.6%, in 1960, 43.1%, and in 1970 – its peak – 55.2%. *Historical Census of Housing Tables: House Heating Fuel*, U.S. CENSUS BUREAU (last updated Oct. 8, 2021), https://www.census.gov/data/tables/time-series/dec/coh-fuels.html.

58. This program had deep roots in earlier electric-industry advertising and coordination programs. *See generally* RONALD C. TOBEY, TECHNOLOGY AS FREEDOM: THE NEW DEAL AND THE ELECTRICAL MODERNIZATION OF THE AMERICAN HOME (1996).

59. *See* RICHARD HIRSH, TECHNOLOGY AND TRANSFORMATION IN THE AMERICAN ELECTRIC UTILITY INDUSTRY 51-55 (1989). Despite its impact, little research has been conducted on the Live Better Electrically campaign. On its role in the Southwest, see ANDREW NEEDHAM, POWER LINES: PHOENIX AND THE MAKING OF THE MODERN SOUTHWEST 249 (2014).

60. HIRSH, *supra* note 59, at 51-52.

61. *E.g.*, LITTLEFIELD & THORNE, *supra* note 48, at 141-60.

62. CASTAÑEDA, *supra* note 39, at 163-79.

As gas utilities fought to retain their industrial customers, they also attempted to generate more value from their own fixed infrastructure. Many gas utilities vainly sought to increase summertime gas consumption – and take market share from electric utilities – by pushing summer-load products such as gas-fired air conditioners.[63]

Even as gas supply problems developed into a crisis in the early 1970s, asymmetrical competition garnered little attention from regulators – likely because it took place in the context of growing gas shortages. Under increasingly constrained supply conditions, allowing market share to shift from gas to electric utilities served the public interest. By 1970, both pipeline companies and gas utilities had begun to suspend gas delivery to some large customers.[64] The OPEC oil crisis of 1973 exacerbated this emergency as electric utilities attempted to switch en masse from fuel oil to gas, pushing prices higher and introducing new competition for scarce gas supplies.[65] The worsening supply crunch peaked during the unusually cold winter of 1976-1977, when gas demand so far outstripped supply that several governors declared states of emergency.[66] That year's heating crisis achieved what Live Better Electrically had not, turning heat pumps into mass-market appliances for the first time: supply limitations trumped questions of cost, and with many gas utilities declining new customers, electricity overtook gas as the largest source of heat for new homes.[67]

Though the energy crises of the 1970s helped to transfer some market share from gas to electricity, their longer-term impact was to lay the groundwork for a competitive truce between wires and pipes. Emergency deregulation of federal controls on gas production led to a prospecting bonanza and a subsequent gas glut in the 1980s, dropping gas prices and helping gas utilities not only meet new demand but also stabilize their competitive position.[68] The energy crises also resulted in a wide array of energy conservation and efficiency policies which, together with macroeconomic declines in domestic heavy industry, helped to inaugurate several decades of stable gas and electricity consumption. With lawmakers, regulators, and utilities themselves focused on reducing energy costs and responsibly shepherding resources, competition decreased as well, allowing consumers and intermediaries like vendors and equipment installers in many regions to settle into the then-existing apportionment of regulated energy services.

Over the past fifteen years, that détente has come to an end. In its place, pervasive competition has returned the energy utility sector to conditions reminiscent in some ways of the appliance innovation and shifting boundaries of the 1930s, and in others of the regulatory constraints of the 1960s. The shale boom of the 2010s produced an abundant supply of natural gas, creating low commodity

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63. *E.g.*, LITTLEFIELD & THORNE, *supra* note 48, at 161-62.

64. CASTAÑEDA, *supra* note 39, at 163-66.

65. *Id*. at 164.

66. *See, e.g.*, Robert D. McFadden, *Carey Issues Order*, N.Y. TIMES, Jan. 28, 1977, at 1 (reporting on emergency declarations by governors of New Jersey and New York amid severe cold weather and deficient gas supplies).

67. Ralph E. Winter, *Sales of Heat Pumps for Homes Spurred by Gas Shortage, High Electricity Rates*, WALL STREET J., Aug. 16, 1977, at 48.

68. CASTAÑEDA, *supra* note 39, at 184.

prices that have masked gas utilities' rising capital spending,[69] while diverse factors – including climate-driven natural disasters[70] – have caused electricity prices to rise in some states.[71] These price trends are accompanied by strategic threats to gas utilities' profitability and market share: an array of newly competitive electric heating appliances, aging infrastructure, and climate policy. Over the past five years, heat pumps and induction technologies have made steady gains in efficiency, cost, and consumer appeal relative to gas counterparts.[72] Meanwhile, efforts to develop and promote alternative fuels like renewable natural gas and hydrogen for residential and small commercial consumption have shown little promise for utility distribution at scale.[73] At the same time, natural gas itself has suffered reputational harm over the past decade, due to growing research into and public awareness of both its climate impacts and its significant pre- and post-combustion effects on indoor air quality for end users.[74]

The main consequence of the end of détente has so far been a new decline in gas utilities' market share. American Consumer Survey data show that electricity has once again overtaken natural gas as the primary heating fuel in new single-family homes for the first time since the energy-crisis decades.[75] The percentage

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69. *See infra* notes 103-07 and accompanying text.

70. Madalsa Singh, Alison Ong & Rayan Sud, *Wires and Fire: Wildfire Investment and Network Cost Differences Across California's Power Providers*, 38 ELEC. J., Sep. 2025, at 1, 8 (identifying network investments related to wildfire resilience and rebuilding following wildfire damage as key drivers of cost); Nicholas Crowley & Daniel McLeod, *Trends and Drivers of Distribution Utility Costs in the United States: A Descriptive Analysis from 2008 to 2022*, 37 ELEC. J., Apr. 2024, at 1, 2-3 ("We find that uncommon distribution utility *cost* increases have occurred in all regions of the United States. However, we also found that . . . retail electricity *price* increases likely have more to do with exogenous forces like fuel and other input prices than distribution utility management." (emphases added)).

71. Ryan Wiser et al., *Factors Influencing Recent Trends in Retail Electricity Prices in the United States*, 38 ELEC. J., Dec. 2025, at 1, 1, 6-8 (noting diverse changes in electricity prices and identifying key drivers, including: capital spending on distribution systems; renewable portfolio standards; gas price volatility; destruction caused by storms, flooding, and wildfires); SYDNEY FORRESTER ET AL., RETAIL ELECTRICITY PRICE AND COST TRENDS: 2024 UPDATE 19, 21 (2024), https://eta-publications.lbl.gov/sites/default/files/2025-01/retail_price_and_cost_trends_2024_update_final_v3.pdf (noting increases in distribution system operating and maintenance costs as well as capital investments since 2019) [hereinafter 2024 UPDATE].

72. The major exception to this trend is the condensing boiler, which offers substantial efficiency improvements but has thus far seen more robust adoption outside the United States.

73. MICHAEL E. BLOOMBERG & MICHAEL J. WALSH, BLDG. DECARBONIZATION COAL., THE FUTURE OF GAS IN NEW YORK 28, 30-35 (2023) (describing compound challenges to making use of RNG in buildings at scale); John Carey, *While Some Tout "Renewable Natural Gas" as a Way to Mitigate Climate Change, Others See a False Solution*, 120 PNAS, July 5, 2023, at 1, 3-4 (describing limited potential volumes of RNG relative to demand for natural gas); Jan Rosenow, *A Meta-Review of 54 Studies on Hydrogen Heating*, 1 CELL REPS. SUSTAINABILITY, Jan. 26, 2024, at 1, 1 (finding that no study of alternatives to heating buildings with natural gas indicates that hydrogen-fired solutions would be viable or cost-effective).

74. Paul Hope, *Is Your Gas Range a Health Risk?*, CONSUMER REPORTS (last updated Mar. 27, 2023), https://www.consumerreports.org/appliances/indoor-air-quality/is-your-gas-range-a-health-risk-a6971504915/?msockid=3e04c8e6e47766f7381bde6be5346742 ("In multiple instances, we recorded elevated levels of nitrogen dioxide with a single burner set to low. And while using a range hood or downdraft hood helped lower levels, in a number of tests we still recorded levels that exceeded 1-hour guidelines set by the World Health Organization.").

75. *Type of Heating Fuel Used in New Single-Family Houses Completed*, U.S. CENSUS BUREAU, https://www.census.gov/construction/chars/xls/heatingfuel_cust.xls (last visited Apr. 27, 2025). Utility-delivered natural gas predominated from 1986 to 2022.

of total units of residential housing for which gas is the primary source of heating has fallen modestly but steadily, from 50% in 2010 to 47% in 2024, while the share for which electricity is primary has grown from 34% to 42%.[76]

Moreso than at any time since the early decades of energy utility regulation, gas and electric distribution networks are providing substitutable services. The increasing substitutability of electric appliances for core gas services of space and water heating does more than bear upon utility margins: it threatens to undermine the longstanding gas utility business model. Unlike in some past periods of pervasive and asymmetrical competition, though, the structural factors working against gas utilities today – upward pressure on rates from heavy investments in gas networks, electric technology advancements, and climate policy – show no prospect of abating.

B. Present and future

Competition of the sort described above is present in every market served by a gas utility in the U.S.[77] This subsection describes the basic reasons why this competition is likely to grow in extent and intensity, and how that growth will affect several aspects of demand for gas service. Having set out the causes and immediate effects of growing competition, this subsection then explains why gas utilities will struggle to deal with steady declines in demand by residential and small commercial end-users – particularly after a decade-long capital spending spree has made fixed costs a larger and growing proportion of gas rates. Finally, it considers how utility commissions are likely to respond to a situation where gas utilities slide toward financial collapse, and argues that, faced with such a situation, commissions and other policy makers would probably intervene to maintain the availability of gas service.

The upshot of these dynamics is consequential: leaving competition between electric and gas service providers unmanaged is likely to eventually result in the rescue of gas utilities on an emergency basis. And that action would likely yield worse safety, cost, reliability, and equity outcomes than would result from more proactive measures.

1. Competition is likely to grow in extent and intensity

The degree of competition for existing and would-be gas customers will continue to vary with energy prices, climatic zone, and policy prescriptions, but

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76. *Electricity Use is Becoming More Common for Residential Heating*, U.S. ENERGY INFO. ADMIN. (Oct. 10, 2025), https://www.eia.gov/todayinenergy/detail.php?id=66324 (indicating modest drops in heating oil, from 6% to 4%, and wood, from 2% to 1%); *Selected Housing Characteristics*, U.S. CENSUS BUREAU, tbl. DP04, https://data.census.gov/table/ACSDP5Y2023.DP04 (last visited July 24, 2025) (capturing the same shifts through a different data set); *see also* Mini Malhotra et al., *Heat Pumps in the United States: Market Potentials, Challenges and Opportunities*, 41 HEAT PUMPING TECHS. MAG. 27, 29 fig. 3 (2023) (discussing trends in heat pump installation).

77. *See* Eric J.H. Wilson et al., *Heat pumps for All? Distributions of the Costs and Benefits of Residential Air-Source Heat Pumps in the United States*, 8 JOULE 1000, 1005 fig. 3, 1009 fig. 5 (2024) (estimating economic outcomes – energy bills and net present value of HVAC systems – for how relative energy prices, equipment and installation costs, climate, and other factors on outcomes of HVAC electrification for residential customers; mapping prospective energy bill savings from electrification of heating under different sensitivities).

current information suggests that no jurisdiction in the United States will see a decrease in competition between gas and electric alternatives in the coming years.[78] The three factors described below – relative performance potential of electric and gas technologies, gas utility capital spending, and policy measures – are likely to continue driving competition across the United States, albeit to varying degrees.

The core factor underlying the growing competitive threat posed to gas by electrification is the physical and operational capabilities of electric HVAC and water-heating devices. Modern electric heat-pump appliances are generally more energy efficient than combustion-based heating (whether gas, oil, or wood-fired) due to the fundamental physics of the technology. Whereas a furnace or boiler *generates* heat by combusting a primary fuel, a heat pump merely moves heat from one location to another. Measured using the average coefficient of performance (COP) – a metric that captures the ratio of energy inputs to outputs – the point is unmistakable: the maximum theoretically possible COP for a gas furnace that generates heat from a primary fuel is less than one-to-one, meaning that – even under optimal conditions and operating at peak efficiency – it cannot produce more energy than is put in.[79] For heat pumps, which can deliver heat without generating it, average COPs tend to range from three-to-one to five-to-one, meaning that between three and five units of heat energy are delivered for each unit of electric energy input.[80] Heat pumps' performance is sensitive to several factors, including the availability of heat energy in the reservoir they draw upon, whether air, water,

78. *See, e.g.*, Alex DeMarban, *Energy-Efficient Heat Pumps are Being Embraced in the Lower 48. But Do They Work in Alaska?*, ANCHORAGE DAILY TIMES (Sep. 1, 2024), https://tinyurl.com/yvv8hcz5 ("Heat pumps are already fairly common in Juneau, where they operate efficiently in the area's relatively warm conditions. And their numbers are also growing in Northwest Alaska, where they replace costly heating oil.").

79. In the United States, conventional gas furnaces generally achieve a COP of at least 80%; highly efficient condensing furnaces can achieve a COP of 96%. *See* James A. Mathias, Kimberly M. Juenger & Jennifer J. Horton, *Advances in the Energy Efficiency of Residential Appliances in the US: A Review*, 16 ENERGY EFFICIENCY 34, 5 (2023). Since the late 1970s, energy efficiency requirements and energy efficiency and conservation programs have blunted the growth of gas demand. *See Four Decades of Progress: How Efficiency Has Cut Gas Bills and Emissions in Half*, Am. Gas Ass'n, https://www.aga.org/research-policy/resource-library/four-decades-of-progress-how-efficiency-has-cut-gas-bills-and-emissions-in-half/ (last visited Mar. 10, 2026) ("After adjusting for weather, average household consumption has declined 1.1% per year, a consequence of tighter buildings, more efficient appliances, and consumer energy conservation.").

80. Dmitrii Bogdanov, Rasul Satymov & Christian Breyer, *Impact of Temperature Dependent Coefficient of Performance of Heat Pumps on Heating Systems in National and Regional Energy Systems Modelling*, 371 APPLIED ENERGY, Oct. 1, 2024, at 1, 2 ("The COP is dependent on the temperature of the source and the sink. Based on the Carnot efficiency, an ideal HP would have a COP of 8.8–10.1 to deliver 30–35°C when the source is 0°C, but a real-world HPs tend to have a COP between 3 and 5 for the same conditions and depends on many aspects including type of source (air, water, ground, heat recovery), type of sink (air, water), and type of energy carrier within the system.") (internal citations omitted); *see also* Tobias Brudermueller et al., *Estimation of Energy Efficiency of Heat Pumps in Residential Buildings Using Real Operation Data,* 16 NATURE COMMC'NS, Mar. 22, 2025, at 1, 6 figs. 1(a) & (b) (assessing real-world performance of over 1020 heat pumps over two years); Louise Bernard et al., *Decarbonizing Heat: The Impact of Heat Pumps and a Time-of-Use Heat Pump Tariff on Energy Demand* 4 (Nat'l Bureau of Econ. Rsch. Working Paper No. 33036, 2024), https://tinyurl.com/55e39bh3 (finding that empirical outcomes are "broadly in line with engineering estimates of heat pumps having approximately 300% efficiency of a gas boiler.").

or the ground.[81] The COPs of all air source heat pumps (ASHPs) fall as temperatures decline,[82] because more electricity is needed to achieve a given heat output. Recent technological advancements yield a higher COP from "cold climate" ASHPs even at extremely cold temperatures,[83] and manufacturers continue to pursue further improvements.[84] Heat pumps that tap heat from bodies of water or from shallow or deep bores into the ground see less fluctuation in inputs and can therefore generally achieve higher overall COPs than those of ASHPs.[85] While the relative physical capabilities of electric versus gas-fired technologies for HVAC and water heating, abstracted from institutional and economic context, do not wholly determine whether consumers install them,[86] heat pumps' energy-

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81. Andreas V. Olympios, Maria Justo Alonso & Antonio M. Pantaleo, *Heat Pumps in Europe: Perspectives and Innovation Challenges*, 7 PROGRESS ENERGY, July 11, 2025, at 1, 2 ("The cost and performance of heat pumps depend heavily on operating principles (e.g. vapour-compression, absorption, solid-state technologies), heat sources (e.g. air, water, ground), components (compressors, expansion valves, heat exchangers), refrigerant selection, and operational strategies.") (internal citation omitted).

82. Mary Elizabeth Konrad & Brendan D. MacDonald, *Cold Climate Air Source Heat Pumps: Industry Progress and Thermodynamic Analysis of Market-Available Residential Units*, 188 RENEWABLE & SUSTAINABLE ENERGY REVS., Dec. 2023, at 1, 1 ("standard VCASHPs face numerous performance issues when ambient outdoor temperatures drop too low (near or below 0°C), so adoption of this technology in cold climate regions has been limited.") (internal citation omitted).

83. *Id*. at 5 tbl. 2 (listing rated capacities and COPs for commercially available cold climate heat pumps operating at -15°C); JON WINKLER & GREG SHOUKAS, NAT'L RENEWABLE ENERGY LAB., COLD CLIMATE AIR-SOURCE HEAT PUMP DEMONSTRATION AND ANALYSIS: EXPERIMENTAL STUDY ON COLD TEMPERATURE PERFORMANCE viii–xi, 19-21 (2024) (finding that central cold climate heat pumps achieve a COP of about 2.0 at 5°F and at an elevation of 5,000-6,000 feet above sea level; also, that mini-splits perform less well, achieving a COP of about 1.0 in similar conditions); *see also* Nick Samuel, Performance and Viability of Air Source Heat Pumps for Residential Heating in Cold Climates 33-35 (May 2025) (M.S. thesis, University of Alaska Fairbanks), https://scholarworks.alaska.edu/bitstream/handle/11122/15988/Samuel_N_2025.pdf?sequence=1 (testing commercial and prototype ASHP models in Fairbanks, Alaska, and identifying -22.5°C as the threshold temperature beyond which the ASHPs struggled to maintain the ambient indoor air temperature).

84. *See* VRUSHALI MENDON ET AL., PERFORMANCE RESULTS FROM DOE COLD CLIMATE HEAT PUMP CHALLENGE FIELD VALIDATION 41 (2025) (reporting that four of the eight manufacturers that participated in the Challenge had made the cold climate ASHP models tested in the field validation commercially available, and that the other four had plans to do so); *see also* Omar Alsotary, Hamza Alnawafah & Ryoichi S. Amano, *Investigation of the Potential of Air-Source and Hybrid-Source Heat Pumps in Cold Climates*, 1 J. ENERGY RES. TECH. PART A, July 2025, at 042103-1, 042103-8 ("This study successfully demonstrated the potential for improving the performance of ASHP in cold climates by integrating an electrical heating coil as part of a HSHP system.") (note that "hybrid" refers here to a combination of two electric technologies). For a description of recent technical advancements that have been embodied in commercialized heat pumps, see SAMMY HOUSSAINY ET AL., DECARBONIZING BUILDING THERMAL SYSTEMS: A HOW-TO GUIDE FOR HEAT PUMP SYSTEMS AND BEYOND 16, 21, 96-98 (2024), www.nrel.gov/docs/fy24osti/87812.pdf.

85. *See* Bogdanov, Satymov & Breyer, *supra* note 80, at 4-5, fig. 2 (comparing frequency and size of changes to air, water, and ground temperatures across months of the year and hours of the day in southeast Finland); *see also* Hyunjun Oh et al., *Techno-Economic Feasibility of Borehole Thermal Energy Storage System Connected to Geothermal Heat Pumps for Seasonal Heating Load of Two Buildings in Fairbanks, Alaska*, 345 ENERGY & BLDGS., Oct. 15, 2025, at 1, 20 (finding that borehole thermal energy storage system, charged in part by waste heat from a nearby thermal power plant, could cover heating loads in two buildings in Fairbanks for 15-20 years without intervention).

86. Narasimha D. Rao, Mohammad R.K. Siam & Tami C. Bond, *A Critical Review of Heat Pump Adoption in Empirical and Modeling Literature*, 28 ISCIENCE, Jan. 17, 2025, at 1, at 2 (2025) ("Our main contribution is to show that what may be viewed as a limitation in energy models to adequately reflect decision-making behavior may in large part be a reflection of the lack of sufficient generalizable evidence in the empirical literature on

saving potential is meaningful. Where building owners replace a gas furnace or boiler with a similarly sized heat pump, they consume less energy overall.[87] And in cases where heat pumps supplement instead of replacing a furnace or boiler, their partial displacement of demand for gas also reduces net energy consumption.[88] In both of these types of cases, heat pump adoption reduces gas demand,[89] and no technological advancements appear poised to make gas-fired devices competitive in energy efficiency terms.

Growing demand for cooling also weighs in favor of electrification because electricity can readily support integrated air heating and cooling systems. In recent decades, demand for space cooling has spread to places where summer had not previously been hot and humid enough to warrant installation of cooling devices;[90] a warming global climate ensures that this trend will continue for decades to come.[91] In addition to being more energy efficient than furnaces, heat pumps used in HVAC applications can also perform both heating and cooling functions, and thereby enable customers to avoid purchasing and maintaining two systems (and paying two bills) for heating and cooling.[92] Replacing a gas-fired HVAC system eliminates the biggest source of gas demand in the average U.S. residential building that is served by gas: in such buildings, 65.6% of gas demand is due to space heating, 26.6% to water heating, and 7.7% to other uses like cooking and

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heating equipment adoption, specifically in how households incorporate known factors such as cost, awareness, comfort and reliability in different contexts.").

87. Bernard et al., *supra* note 80, at 4, 23-24 (identifying an average reduction in total energy use of 40% following residential adoption of a heat pump instead of replacement of a gas furnace among sample of 1,321 residential users in Britain).

88. *Id*. at 22 tbl. 1, 23-24.

89. This point holds at the system level as well, even if the analysis includes electricity generation and that generation involves the combustion of a primary fuel, such as natural gas. Jordan D. Kocher et al., *The Levelized Cost of Exergy: A Technoeconomic Framework for Energy System Comparison*, 19 ENERGY & ENV'T. SCI. 460, 469 (2026) ("As is the case with cooling, it is generally more exergetically efficient to generate electricity at a centralized power plant and then use that electricity to drive a heat pump than it is to burn natural gas to provide the low-grade heat needed in buildings.").

90. Ross Beall & Bill McNary, *Nearly 90% of U.S. Households Used Air Conditioning in 2020*, U.S. ENERGY INFO. ADMIN (May 31, 2022), https://www.eia.gov/todayinenergy/detail.php?id=52558 (reporting, based on Residential Energy Consumption Survey data, large increases in use of AC in between 2001 and 2020 in climatic regions of the U.S. coded as cold, dry, and marine).

91. *Climate at a Glance Regional Time Series*, NAT'L CTRS. FOR ENV'T INFO: NOAA, https://tinyurl.com/3ejm3us3 (last visited Sep. 20, 2025); Hongliang Zhang & Shang Xu, *Climate Change, Air Conditioning Adoption, and Household Electricity Use: Evidence from the Northwestern United States*, 88 ENV'T. RES. ECON. 2469, 2471 (2025) ("Our projections suggest that moderate and intense warming will increase the AC adoption rate among single-family homes in the study region by approximately 20 and 27 percentage points, respectively, by the mid-21st century."). Some jurisdictions are imposing requirements on building owners to furnish cooling capacity as a climate adaptation measure. *See, e.g.*, Jill Webb, *U.S. Legislators Push Mandates for Cooling Regulations in Rental Housing*, PRISM (Sep. 19, 2024), https://prismreports.org/2024/09/19/cooling-ordinances/ (listing examples of state and local cooling requirements for buildings).

92. *See* PAIGE JADUN ET AL., ELECTRIFICATION FUTURES STUDY: END-USE ELECTRIC TECHNOLOGY COST AND PERFORMANCE PROJECTIONS THROUGH 2050, at 48 (2017), https://www.nrel.gov/docs/fy18osti/70485.pdf ("Because ASHP technologies can provide both space heating and cooling services, we only associate 50% of the installed cost of ASHPs (and ccASHPs) to the heating service—assuming that approximately half of the capital cost is associated with the cooling application.").

clothes drying.[93] Integrated heating and cooling also means fewer temporary window AC units, which tend to have inferior energy efficiency profiles and often decrease the effectiveness of building insulation.[94] The potential benefits of integrated heating and cooling are significant to a growing number of households as climate change causes warmer summers everywhere,[95] as well as more frequent and intense heat waves in climatic zones that did not previously experience them.[96]

Another factor affecting the competitive profile of gas service is the shifting pattern of gas utilities' capital spending and a consequent upward pressure on rates. Under state utility regulation, energy utilities make money not by selling gas – that cost is just passed through to customers without significant adjustment[97] – but rather by investing in capital projects that utility commissions deem "prudent"[98] and then recovering the cost of those projects, along with the rate of return earned on that incremental capital investment.[99] In short, energy utilities function as infrastructure companies where profitability depends mainly on the undepreciated book value of the infrastructure they own and operate.[100] This creates a strong bias for utilities to invest in capital projects, regardless of

93. *Residential Energy Consumer Survey*, U.S. ENERGY INFO. ADMIN., tbl. CE4.6.NG.ST (last updated Mar. 2024), https://www.eia.gov/consumption/residential/data/.

94. CHUCK BOOTEN, JON WINKLER & RAMIN FARAMARZI, NAT'L RENEWABLE ENERGY LAB., ASSESSMENT OF LOW-COST MINISPLIT HEAT PUMP CONNECTION SYSTEM 23 (2021) (reporting 20-29% gains in energy efficiency from simulation of replacing window AC units with mini-split heat pumps in 22,574 homes across 15 counties in Southern California); *see also* MONISHA SHAH ET AL., PUERTO RICO ENERGY EFFICIENCY SCENARIO ANALYSIS TOOL (PREESAT) 11-12 fig. 10 (2021) (indicating expected savings from stepwise improvements to window AC unit efficiency, and from replacement with a mini-split heat pump system).

95. WENYING SU ET AL., FIFTH NATIONAL CLIMATE ASSESSMENT 2-11 (Carolina P. Normile eds., 2023) ("Temperatures in the contiguous United States . . . have risen by 2.5°F . . . since 1970") [hereinafter CLIMATE ASSESSMENT].

96. *Id*. at 2-11, 2-12, 2-24; ME. CLIMATE COUNCIL, MAINE WON'T WAIT: 2024 UPDATE 24-27 (2024), https://www.maine.gov/climateplan/sites/maine.gov.climateplan/files/2024-11/MWW_2024_Book_112124.pdf (describing facts and effects of warming climate on ambient temperatures in Maine).

97. *See, e.g.*, 220 ILL. COMP. STAT. 5/9-220 (2025); N.C. GEN. STAT. § 62-133.4 (b) (2021) ("From time to time, as changes in the cost of natural gas require, each natural gas local distribution company may apply to the Commission for permission to change its rates to track changes in the cost of natural gas supply and transportation.").

98. Justice Brandeis famously articulated the theory underlying the "prudence" standard for valuing utility assets in a concurring opinion. *See* Missouri *ex rel*. Sw. Bell Tel. Co. v. Pub. Serv. Comm'n, 262 U. S. 276, 294 n. 6 (1923) (Brandeis, J., concurring) ("Historical cost, i.e., the proper cost of the existing plant and business, estimated on the basis of the price levels existing at the respective dates when the plant and the additions were constructed. . . . is the amount which normally should have been paid for all the property which is usefully devoted to the public service. It is, in effect, what is termed the prudent investment."); *see also* John Bauer, *The Establishment and Administration of a "Prudent Investment" Rate Base*, 53 YALE L.J. 495, 506 (1944) ("The idea of 'prudent' signifies only the reasonableness of the various plant expenditures from the standpoint of original foresight, not present hindsight."). Bauer also explains that this approach assigns value to an asset used to serve customers by taking its original cost and subtracting depreciation for wear and tear as well as obsolescence. *Id*.

99. ARTHUR ABAL ET AL., PRIMER ON RATE DESIGN FOR COST-REFLECTIVE TARIFFS 10 (U.S. Agency Int'l Dev. 2021), https://tinyurl.com/4f35u44h.

100. Other components, such as "riders" authorized by utility commissions to recovery particular types of cost, also affect profitability to a modest but not insignificant degree. *See, e.g.*, N.C. UTILS. COMM'N PUB. STAFF, ANNUAL REPORT TO THE GENERAL ASSEMBLY 17-18 (2023) (describing nature and amount of Piedmont Natural Gas Company integrity management rider).

consumption trends among customers.[101] In addition to this general bias, gas utilities' capital expenditures over the past fifteen years have increased as the industry has undertaken an intensive campaign to replace aging pipes, and pipes made from cast iron and bare steel especially.[102] The growth of residential and commercial gas customer counts nationwide has slowed alongside this jump in spending,[103] meaning that gas utilities' capital expenditures have shifted towards replacement of existing network segments and away from network expansion. This shift has two important effects. First, it is placing upward pressure on rates by adding significant new capital costs without also adding as many new customers or intensifying per-customer gas consumption.[104] Second, it is changing the composition of gas rates, pushing the distribution portion of rates higher in percentage terms relative to the commodity portion that reflects commodity costs. As shown in Figure 1 below, whereas in 1985 the pipes accounted for about one-third and gas two-thirds of average rates nationally, in 2023 (the most recent year for which data are available) that proportion flipped: the pipes now account for 71% of the total, on average.[105]

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101. *See infra* notes 191-99 and accompanying text.

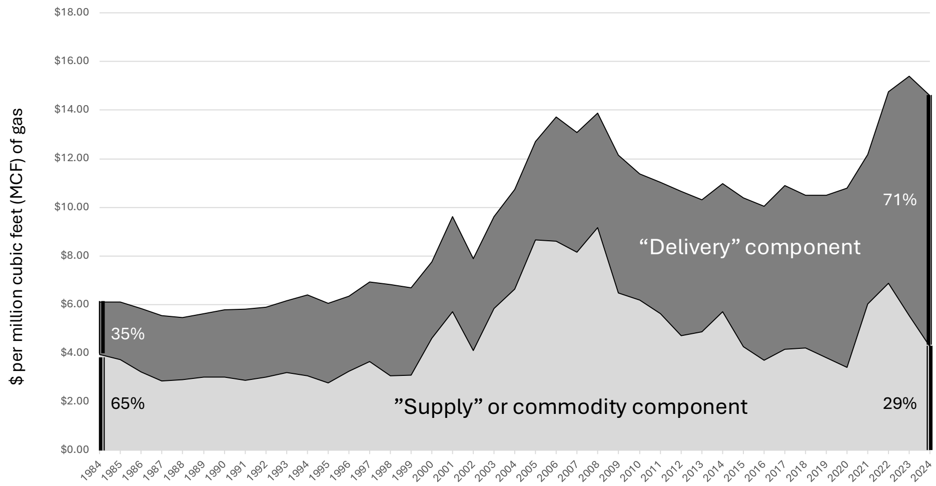
102. See *Gas Utility Construction Capital Expenditure*, AM. GAS ASS'N, https://tinyurl.com/3u3znpw9 (last visited Sep. 24, 2025) (reporting steady climb of annual distribution system capital spending since 2011, from just below $7 billion in 2011 to $14.9 billion in 2017, and to $28.5 billion in 2023); *see also* DORIE SEAVEY ET AL., FUTURE OF HEAT INITIATIVE, CALL TO ACTION 2.0 (forthcoming 2026).

103. From 1987 (the first year when data are available) to 2005, residential gas customer counts nationwide grew 33% (from 47.7 to 63.6 million); from 2005 to 2024, they grew just 15% (to reach 73.7 million). *See Natural Gas: U.S. Natural Gas Number of Residential Consumers*, U.S. ENERGY INFO. ADMIN. (Mar. 31, 2026), https://www.eia.gov/dnav/ng/hist/na1501_nus_8a.htm. For commercial customers the first period saw 30% growth (4.0 to 5.2 million), the second 8.6% (to reach 5.7 million). *Natural Gas: U.S. Natural Gas Number of Commercial Consumers*, U.S. ENERGY INFO. ADMIN. (Mar. 31, 2026), https://www.eia.gov/dnav/ng/hist/na1531_nus_8a.htm.

104. The trendline for residential gas consumption flattened after the first oil crisis in 1973; for commercial consumption, the trendline has reflected growth for decades, but that growth has slowed since the late 1990s. *Natural Gas: Natural Gas Consumption by End Use*, U.S. ENERGY INFO. ADMIN. (Mar. 31, 2026), https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm.

105. *Natural Gas: Natural Gas Prices*, U.S. Energy Info. Admin. (Mar. 31, 2026), https://tinyurl.com/4h9xp349 (providing "City Gate Price" data that reflect commodity prices and "Residential Price" data that reflect total costs paid by residential ratepayers).

Figure 1. Delivery and supply components of residential gas rates (national average, nominal dollars) since 1984.[106]



This shift in the components of overall gas rates has not been driven by wholesale natural gas becoming cheaper. As Figure 1 shows, the primary source of increasing rates has instead been the gas utility industry's steadily rising investment in replacement of existing network segments, primarily justified by concerns about system safety.[107] Because the assets underlying these capital expenditures – new pipes – are typically depreciated over a useful life of more than sixty years, this spending will continue to put upward pressure on gas rates for decades. Comparing this pattern to the drivers of electric rates highlights two meaningful differences. First, multiple drivers with diverse timeframes for incidence and cost recovery are driving the present rises in electric rates in some (but not all) states.[108] And second, while capital spending by electric utilities on distribution systems has certainly risen over the past few years, it has not eclipsed

106. Chart created by the authors using U.S. EIA data.

107. SEAVEY ET AL., *supra* note 102. Citygate gas prices rose rapidly in the late 1990s and 2000s, before plummeting again over the course of the late 2000s and 2010s thanks primarily to the shale boom. See *Natural Gas: U.S. Natural Gas Citygate Price*, U.S. ENERGY INFO. ADMIN. (Mar. 31, 2026), https://www.eia.gov/dnav/ng/hist/n3050us3a.htm. The data shown in Figure 1 does not reflect the impact on prices of the conflict in the Middle East that, as of this writing, appears likely to have severe and potentially enduring effects on the supply of natural gas internationally. *See* Maha El Dahan, Andrew Mills & Yousef Saba, *Exclusive: Iran Attacks Wipe Out 17% of Qatar's LNG Capacity for Up to Five Years, QatarEnergy CEO Says*, REUTERS (last updated Mar. 20, 2026), https://www.reuters.com/business/energy/iran-attack-damage-wipes-out-17-qatars-lng-capacity-three-five-years-qatarenergy-2026-03-19/.

108. One recent examination of electric rates by researchers at the Lawrence Berkeley National Laboratory identified several drivers of electric rates, which are rising in some states but not all. *See generally* Wiser et al., *supra* note 71. Those drivers include renewable portfolio standards; gas price volatility; and destruction caused by storms, flooding, and wildfires. *Id*. at 1, 6-8. Those researchers also recognized other work that has identified rising utility spending on electric grid operations and maintenance as well as capital investments. *See* 2024 UPDATE, *supra* note 71, at 19, 21 (noting increases in distribution system operating and maintenance costs as well as capital investments since 2019).

other drivers of rates.[109] Given that the spark gap (the difference in price between gas and electricity commodities) is often the dominant factor in determining customers' choice of energy service over the medium- to long-term,[110] the compositional shift in gas rates (unmatched by a similar shift in electric rates) is likely to become another important and persistent factor in the competitive position of gas service.

In recent years, increasing political salience and polarization have made public policy measures focused on global and local air pollution more contentious and subject to reversal,[111] but in the jurisdictions where such measures persist, they generally add to the competitive pressure on gas service from electrification.[112] The most prominent policies aimed at reducing gas consumption have been adopted by state and local jurisdictions seeking to reduce activities that emit the greenhouse gases that contribute to global warming.[113] Concerns about the impact

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109. Crowley & McLeod, *Trends and Drivers of Distribution Utility Costs in the United States: A Descriptive Analysis from 2008 to 2022*, *supra* note 70, at 2-3 ("We find that uncommon distribution utility *cost* increases have occurred in all regions of the United States. However, we also found that . . . retail electricity *price* increases likely have more to do with exogenous forces like fuel and other input prices than distribution utility management.") (emphases added). Parts of California that have recently seen devastating wildfires are an exceptional case. Singh, Ong & Sud, *supra* note 70, at 8 (identifying network investments related to wildfire resilience and rebuilding following wildfire damage as key drivers of cost). The costly wildfire-mitigation measures being undertaken by electric utilities in some ways parallel gas utilities' pipeline-replacement campaign. In both cases, the escalating rate impact of these safety strategies could be mitigated by cheaper alternative approaches, but few utilities or their regulators have seriously considered those alternatives to date.

110. Lucas W. Davis, *What Matters for Electrification? Evidence from 70 Years of U.S. Home Heating Choices*, 107 REV. ECON. & STATS. 668, 674-75 (2025).

111. *See, e.g.*, Austyn Gaffney, *The Clean Heat Standard is Dead. What Comes Next?*, VT DIGGER (June 30, 2025), https://vtdigger.org/2025/06/30/the-clean-heat-standard-is-dead-what-comes-next/ (reporting the back-and-forth of legislative and regulatory planning measures related to a clean heat standard – an incentive structure that encourages electrification and discourages reliance on heating oil and piped gas); Climate Solutions v. Washington, No. 24-2-2863-6, at 17 (Wash. Super. Ct. King Cnty. May 9, 2025), https://cdn.kingcounty.gov/-/media/king-county/depts/superior-court/documents/judge-staff/climate_solutions_et_al_v_state_of_washington.pdf?rev=f4fab7db29ec4d229d719536a53122df&hash=555251A9B50173CF8EB53BAA28FC1D45 (overturning as unconstitutional Initiative 2066, a ballot measure that would preempt local bans on gas access); Cal. Rest. Ass'n v. City of Berkeley, 65 F.4th 1045, 1048 (9th Cir. 2023) (holding that Berkeley's prohibition on gas appliances in new construction is preempted by the federal Energy Policy and Conservation Act).

112. *E.g.*, Craig LeMoult, *Brookline Ban on Fossil Fuels in New Buildings Becomes Official, 5 Years After Initial Vote*, GBH (Feb. 20, 2024), https://www.wgbh.org/news/local/2024-02-20/brookline-ban-on-fossil-fuels-in-new-buildings-becomes-official-5-years-after-initial-vote ("New developments and major renovations in Brookline may no longer use fossil fuels for heating or cooking. . . "); *LL97 in Focus: Jumpstarting Multifamily Building Upgrades*, URB. GREEN COUNCIL (Nov. 8, 2023), https://www.urbangreencouncil.org/ll97-in-focus-jumpstarting-multifamily-building-upgrades/ ("Our analysis shows that [New York City's fee schedule for emissions from fossil fuel use from large buildings] LL97 is set to drive about 25,000 building retrofit projects in 5,500 prewar, low-rise multifamily buildings by 2030.").

113. Leading examples include state and local all-electric building requirements in California, Colorado, New York, and Washington. *See Zero Emission Building Ordinances*, BLDG. DECARBONIZATION COAL. (last updated Oct. 1, 2025), https://buildingdecarb.org/zeb-ordinances. For a broader view of the number, locations, and nature of climate measures adopted across the U.S., see *State Climate Policy Maps*, CTR. FOR CLIMATE & ENERGY SOLS., https://www.c2es.org/content/state-climate-policy/ (last visited Oct. 1, 2025) (listing climate policies by state); *see also Quantified Climate Action Measures Directory – Local Directory*, EPA (last updated Apr. 21, 2026), https://www.epa.gov/statelocalenergy/quantified-climate-action-measures-directory-local-directory (listing incomplete list of climate-related policy measures undertaken by local governments).

of gas consumption on indoor air quality and public health have helped motivate adoption of many of these measures.[114] Notably, those measures, which generally favor electrification,[115] have prompted a backlash in some states in the form of state-level measures prohibiting localities from limiting residents' and local businesses' access to gas service.[116] While it is difficult to predict the future path of public policy with precision, it appears at present that states that have adopted policies that favor electrification will pursue retrenchment and recalibration rather than abandonment of those policies.

The factors noted above contribute to but do not wholly determine outcomes in a context where technological change, distinct climate zones, and layers of institutional features – relating to utilities, the available workforce, and other intermediaries in between equipment manufacturers and customers – are all at play. As described below, at present, those contextual features sometimes also put meaningful dampers on competitive pressure.

Electric heating has been favored in warm climatic zones for decades,[117] but improvements to heat pump technologies have made the electrification of HVAC and water heating increasingly viable, and increasingly cost-effective in colder climates as well.[118] The translation of technological changes into consumer

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114. JENNIFER ELWELL & ERIC LARA, FINAL STAFF REPORT: PROPOSED AMENDMENTS TO BUILDING APPLIANCE RULES – REGULATION 9, RULE 4: NITROGEN OXIDES FROM FAN TYPE RESIDENTIAL CENTRAL FURNACES AND RULE 6: NITROGEN OXIDES EMISSIONS FROM NATURAL GAS-FIRED BOILERS AND WATER HEATERS 1–2 (2023) (explaining rule change as responsive to local public health impacts of NOx emissions); Rebecca Leber, *The Gas Stove Wars are Far from Over*, VOX (Mar. 21, 2023), https://www.vox.com/policy/2023/3/21/23593644/gas-stove-pollution-science-health-risks; Mark Specht, *Why Berkeley Banned Natural Gas in New Buildings*, UNION OF CONCERNED SCIENTISTS: ENERGY BLOG (July 31, 2019), https://blog.ucs.org/mark-specht/why-berkeley-banned-natural-gas-in-new-buildings/ ("One study found that, during a typical winter week, millions of Californians could be exposed to unhealthy levels of indoor air pollutants when cooking with a gas stove without proper ventilation."). For examples of the underlying research, see, e.g., Yannai S. Kashtan et al., *Gas and Propane Combustion from Stoves Emits Benzene and Increases Indoor Air Pollution*, 57 ENV'T SCI. & TECH. 9653 (2023) (identifying harmful levels of hazardous air pollutants in emissions from natural gas that leaks from connections to kitchen appliances); Eric D. Lebel et al., *Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes*, 56 ENV'T SCI. & TECH. 2529 (2022) (estimating volumes of combusted and uncombusted methane related to residential stoves and cooktops, and noting related harms).

115. Examples include all-electric or electrification-ready requirements for new construction, building code-based emissions reduction requirements, and equipment-replacement requirements that steer toward electrification and integrated heating and cooling systems. *See, e.g.*, HOWARD CTY., MD., BILL NO. 24-2025 (2025), https://tinyurl.com/yr4hnjpr (requiring new buildings to be "electric-ready," i.e., wired to support all-electric appliances and electric vehicle charging); N.Y.C., N.Y., ADMIN. CODE § 28-320.3.2 (2019) (imposing increasing price on carbon dioxide emissions from buildings with more than 25,000 square feet of floor space). *See also Zero Emission Building Ordinances*, *supra* note 113.

116. Mika Travis, *Gas Bans Gain Steam Despite Industry Wins*, E&E NEWS (Dec. 20, 2024), https://www.eenews.net/articles/gas-bans-gain-steam-despite-industry-wins/ ("Republican lawmakers in 26 states have passed laws prohibiting gas bans."); *see also* Vincent Nolette, *Climate Preemption and Fossil Fuel Entrenchment*, 43 PACE ENV'T. L. REV. 220, 233-45 (2026) (cataloguing varieties of state-level preemption of local climate policy).

117. Davis, *supra* note 110, at 670 fig. 1.

118. The U.S. Department of Energy launched the Cold Climate Heat Pump Technology Challenge in 2021, defining the threshold performance standard for qualifying "cold climate" heat pumps to be full heating capacity at 5°F. MENDON, *supra* note 84, at 1, tbl. 1 (listing specifications for technology challenge). Twenty-two prototypes, produced by eight participating manufacturers, met the threshold. *Id*. at 2. Each manufacturer

adoption, however, involves overcoming a wide variety of barriers, ranging from capital costs, slow payback rates from energy cost savings, utility rate structures, physical factors (e.g., limited electric panel capacity), and receptivity to electric appliances by the various "middle actors"[119] who hold unique influence over how energy consumers interact with equipment manufacturers and policy measures.[120] Some states and a number of localities have adopted policy measures that seek to address these barriers; other states have adopted policies intended to prevent adoption of such measures.[121]

Many of the states and localities that are most supportive of electrification, however, possess colder climates,[122] bigger spark gaps between high electricity, and low gas rates,[123] more widespread reliance on gas, and bigger gas utilities. Of the roughly 1,200 utilities nationwide that deliver gas to customers, a very small number of large utilities serve the majority of customers, and a very large number of small utilities serve the rest: just six are responsible for 20% of gas delivered by volume, and just fifty are responsible for 69%.[124] Of those fifty, nineteen are located in a state with a statutory greenhouse gas emissions reduction target and twelve more in a state where an executive order directs agencies to pursue greenhouse gas emissions reductions. And so, the states that have adopted policy measures to facilitate fuel-switching tend to be home to both a customer base long accustomed to gas and large, well-resourced gas utilities that are capable of

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indicated plans to commercialize at least one model. *Id*. at 41. Electric resistance water heating has been widespread for decades but is being improved upon by being integrated with heat pump technology. *See How it Works — Heat Pump Water Heaters (HPWHs)*, ENERGY STAR, https://www.energystar.gov/products/heat_pump_water_heaters/how-it-works (last visited Mar. 10, 2026) ("During periods of high hot water demand, HPWHs switch to standard electric resistance heat (hence they are often referred to as 'hybrid' hot water heaters) automatically.").

119. Yael Parag & Kathryn B. Janda, *More than Filler: Middle Actors and Socio-Technical Change in the Energy System from the "Middle-Out"*, 3 ENERGY RESH. & SOC. SCI. 102, 103 (2014) ("middle actors [are] more than intermediaries between government and energy consumers and between technology and end-users: they are active participants in the system, capable of creating (and sometimes preventing) change above, below, and across other actors.").

120. Noah Sandoval et al., *Achieving Equitable Widespread Residential Building Electrification – Examining Barriers, Strategies, and Opportunities Using Los Angeles as a Case Study*, 384 APPLIED ENERGY, Apr. 15, 2025, at 1, 3, 9-11; Evan Mills, *Market Spoiling and Ineffectual Policy Have Impeded the Adoption of Heat Pump Water Heating for US Buildings and Industry*, 15 ENERGY EFFICIENCY 22, 14-17 (2022) (examining decades of heat pump water heater development and commercialization and identifying failures to facilitate market uptake of technically competitive appliances); *see also* Robbe Decuypere et al., *Transitioning to Energy Efficient Housing: Drivers and Barriers of Intermediaries in Heat Pump Technology*, 161 ENERGY POL'Y, Feb. 2022, at 1, 5-8 (identifying key factors of receptivity to heat pump technologies among intermediaries in European context).

121. *Gas Task Force: State Policies*, NAT'L ASS'N OF REGUL. UTIL. COMM'RS (last updated Dec. 2025), https://tinyurl.com/2f4fjnc7 (listing state-level policies designed to prevent or enable gas distribution system expansion).

122. Gavin Mouat et al. *State-Led Climate Action Can Cut Emissions at Near-Federal Costs but Favors Different Technologies*, 16 NATURE COMMC'NS., May 19, 2025, at 1, 3 fig. 1.

123. *See* Wilson et al., *supra* note 77, at 1006 fig. 4.

124. Authors' analysis of data from *Natural Gas Annual Respondent Query System (EIA-176 Data through 2024)*, U.S. ENERGY INFO. ADMIN. (last updated Feb. 2026), https://www.eia.gov/naturalgas/ngqs/#?year1=2024&year2=2024&company=Name.

advocating for measures that preserve their share of the market for energy distribution services.

To sum up this subsection's key conclusion: multiple factors promise, over the long-term, to bring greater competition to bear on gas service from electrification, but those factors, in the short-term, face hurdles whose height and durability vary across jurisdictions.

2. Greater competition is likely to reduce demand for gas

More extensive and intensive competition from electric heating solutions and the persistent availability of delivered fuels and distributed energy resources (DERs) will affect demand for gas service everywhere. In some places it will likely mitigate the rate of growth without turning it negative, while in others it could tip demand for gas service into steady decline. Notably, among the drivers of electrification, the "spark gap" – the cost difference between gas and electric service – ranks first.[125] Other drivers also matter, including regional climate and geography,[126] building types and age,[127] end-user income and demographics,[128] and institutional factors like laws and policies. But each appears to be subordinate to the spark gap.

The effects of the price ratio between electricity and gas service in different European countries on heat pump sales clearly dominate the effects of different climatic zones: Scandinavian countries all see relatively high levels of heat pump sales in spite of also experiencing colder average and extreme temperatures.[129] Davis finds a similar relationship in data recorded by the U.S. Energy Information Administration's 2020 Residential Energy Consumption Survey. Using regression analysis, Davis shows that the difference between electricity and gas prices has a clear and statistically significant relationship to heat pump adoption, whereas climate (measured using heating or cooling degree days) has a clear directional relationship but one that is not statistically significant.[130] This suggests

125. Lucas W. Davis, *The Economic Determinants of Heat Pump Adoption*, 5 ENV'T & ENERGY POL'Y & ECON. 162, 176-78 (2024). Most versions of this metric reflect the differential between average monthly rates for comparable volumes of energy delivered in the form of gas or electric service. Some also incorporate consumers' capital, installation, and operating costs. *E.g., id*. at 169-70.

126. *Id*. at 172-76.

127. Xingchi Shen, Jiehong Lou & Morgan R. Edwards, *Old Homes, New Inequities: Building Stock Drives Racial Disparities in Heat Pump Use in the United States*, 126 ENERGY RSCH. & SOC. SCI., Aug. 2025, at 1, 4 tbl. 2, 7 (finding, through regression analysis, that "building age is a dominant predictor of heat pump use").

128. Morgan R. Edwards et al., *Assessing Inequities in Electrification via Heat Pumps across the US*, 8 JOULE 3290, 3296 (2024) ("[W]e find that higher percentages of racial and ethnic minority households, lower median income, and higher percentages of renters at the census-tract level all correlate with lower heat pump use").

129. GUILLAUME UGUEN & SARAH AZAU, 2025 EUROPEAN HEAT PUMP MARKET REPORT 10 figs. 8, 9, 11 (2025), https://tinyurl.com/u7nz9kzb (identifying clear relationship between 2024 gas-to-electric price ratio, reflecting the "spark gap," and heat pump purchases per 1000 households).

130. Davis, *supra* note 125, at 180, 181 tbl. 4, 182 (indicating a 10% increase in electricity prices decreases heat pump adoption by 2.0 percentage points; a 10% increase in natural gas prices increases heat pump adoption by 1.4 percentage points; and moving from a state with Florida's 600 heating degree days to Minnesota's 8400 decreases adoption by 12 percentage points).

that, in the U.S. as in the EU, the spark gap is a more consistent predictor of heat pump adoption than climate.

Growing availability of alternatives, a rising cost-floor for gas service, and, in some instances, policy measures should all be expected to lead to reduced gas consumption, primarily through partial or full electrification. Where gas demand falls, several metrics will capture the nature and extent of its decline. The first and most sensitive of these is the volume of gas consumed by existing residential and small commercial customers. Due to steady efficiency gains in both building construction practices and various types of gas-fired equipment, the multi-year trendline for residential per-customer gas consumption has stayed flat since 1970,[131] and commercial per-customer consumption has grown only modestly.[132] Even partial electrification is likely to pull downward on this metric.[133] Further, declining volumes of gas consumed will increase the portion of gas rates comprising the fixed costs incurred in maintenance and operations. And, as noted above, a decade of increasing capital investment in gas distribution systems has pushed delivery costs higher.

Two other important demand metrics are the headcounts of new gas customers and overall customer count. Historically, adding new customers has helped to keep rates low by spreading out the costs of building and operating the existing system – in effect, enlarging the denominator (customers) by which the numerator (system costs) is divided to yield the delivery portion of gas rates.[134] Overall customer count is arguably the most important and telling demand metric. Should the number of gas customers decline, it would not just end the positive scale economies that have historically kept gas rates low, but reverse those effects, likely driving utility revenues down without reducing fixed system costs. Especially in the context of rising capital expenditures, utilities facing declining revenues would likely compensate by increasing rates for remaining customers. As described more fully in the next subsection, such negative or diseconomies of scale could produce accelerating upward rate spirals.

3. Gas utilities will struggle amid steadily falling demand

It has been widely understood for decades that declining demand for the services provided by a network utility industry can present particular

131. *Natural Gas: U.S. Natural Gas Residential Consumption*, U.S. ENERGY INFO. ADMIN., (Mar. 31, 2026), https://www.eia.gov/dnav/ng/hist/n3010us2a.htm.

132. *Natural Gas: Natural Gas Deliveries to Commercial Customers (Including Vehicle Fuel through 1996) in the U.S.*, U.S. ENERGY INFO. ADMIN. (Mar. 31, 2026), https://www.eia.gov/dnav/ng/hist/n3020us2a.htm.

133. Order Regarding Long-Term Natural Gas Plan and Requiring Further Actions, No. 24-G-0147, at 16-18 (N.Y. Pub. Serv. Comm'n 2024) (describing a 3.4% annual decline in gas consumption from 2023 to 2043 in Con Edison and Orange & Rockland's service territory under a hybrid scenario); SOL DELEON ET AL., MINNESOTA BUILDING DECARBONIZATION ANALYSIS 54 tbl. 18 (2024); BLOOMBERG & WALSH, *supra* note 73, at 47 (estimating reduction of 50-75% of gas consumption by volume by 2050 in hybridization scenario).

134. The "subadditivity" criterion for identifying an instance of economies of scale is broadly consistent with this simplification. *See* Joskow, *supra* note 36, at 1233.

challenges,[135] but empirical studies of the nature of those challenges and options for meeting them are few. A clear and highly relevant exception is Davis and Hausman's 2022 article, *Who Will Pay for Legacy Utility Costs?*, which identifies an asymmetrical relationship between demand for gas service and gas utility investments: when demand rises, utilities invest in new capital stock; but when demand falls, utilities do not tend to prune or otherwise reduce their capital stock.[136] The authors put it this way:

> A 10% increase in the number of residential customers leads to a 4% increase in the length of the distribution network. However, when utilities are shrinking, they do not remove pipelines. A 10% decrease in the number of residential customers has a precisely estimated 0% effect on the length of the distribution network. Utilities add pipelines but rarely remove them, even when the customer base from which to recover costs is shrinking.[137]

The declines in customer count identified by Davis and Hausman "are associated with net migration patterns" and instances where the remaining customer base has falling or lower average incomes,[138] not with instances of a stable local population opting for alternatives to gas amid increasing competition. But the pattern they identify is nonetheless instructive. Most fundamentally, it reveals an inflexibility in investor-owned gas utilities' business model which, under the 1907 regulatory model, receives compensation based on capital investments. In addition, the circumstances in which Davis and Hausman spot their pattern are closely analogous – from the perspective of a gas utility – to a context in which a utility faces growing competition but has limited or no growth opportunities with which to offset the erosion of demand for gas.

As customers electrify, whether partially or fully, they use less gas or none at all, less gas flows through distribution pipes, and less revenue flows to the gas utility. Falling customer counts will have especially significant impacts on revenue because customers that consume even modest amounts of gas still pay delivery charges to cover the system's fixed costs, whereas departed customers do not. If migration away from the gas system is not coordinated, the gas segments that served departing customers will still be needed to serve the smaller number of customers who remain,[139] and higher rates will become necessary to keep revenues and expenses (maintenance and depreciation) in balance.[140] Davis and Hausman

135. *See* Christoph Decker, *Regulating Networks in Decline*, 49 J. REGUL. ECON. 344, 347, 353-54 (2016) (observing that declining demand should prompt re-examination of and possibly changes to the existing regulatory framework).

136. Lucas W. Davis & Catherine Hausman, *Who Will Pay for Legacy Utility Costs?*, 9 J. ASS'N ENV'T & RES. ECONOMISTS 1047, 1049 (2022).

137. *Id*. at 1048-49.

138. *Id*. at 1048, 1069-71.

139. Daniel Then et al., *Impact of Natural Gas Distribution Network Structure and Operator Strategies on Grid Economy in Face of Decreasing Demand*, 13 ENERGIES, Feb. 4, 2020, at 1, 11-12 (2020) (describing effect of more or less coordinated customer exits and remaining number and length of pipe segments). This dynamic also holds where gas consumption falls but customer counts remain stable.

140. Jared Garibay-Rodriguez et al., *Effects of Uncoordinated Electrification on Energy Burdens for Natural Gas Customers*, 15 SCI. REPS., July 27, 2025, at 1, 7 (2025) ("ongoing investment in gas infrastructure, coupled with uncoordinated electrification at the household level, could lead to substantial increases in energy costs for remaining residential gas consumers."); *see also* Then et al., *supra* note 139, at 16-18 (estimating

find that, as a gas utility's customer count falls but its network's extent and much of the cost of operating it persist, "remaining customers make up about half of the lost revenue through increased prices."[141] Rising rates for gas service affect the spark gap, weakening the gas utility's competitive position and raising the specter of a financial "death spiral."[142]

Notably, this means that the financial aspects of growth and contraction of a gas customer base are not symmetrical: when growing, a gas network can add users in an unplanned, even haphazard way to a given gas segment, and remain financially healthy; but when the customer base contracts, unless customers exit in coordinated local groups that enable the cost-reducing pruning of gas system segments, falling revenues will not be matched by falling expenses.[143] And so, whereas gas utilities and their customers benefited for decades from the cost-spreading effect of a growing customer base and prospective stability of demand, inverting those features promises to concentrate rather than spread costs, driving rates higher and usage lower among the customers that remain, pushing them harder and harder to seek alternatives. Economies of scale are replaced by diseconomies.

Apart from raising rates, cutting back on spending, or hypothetically coordinating its own loss of customers, there is relatively little a gas utility can do to prevent a financial slide from accelerating in the face of negative network effects.[144] Many gas utilities have complemented these steps with tactical efforts to more aggressively acquire new customers, retain existing ones, and oppose policy measures that support electrification.[145] These measures, though, do nothing to change the underlying competitive dynamics. To succeed, marketing and lobbying efforts would need to persuade not just customers and market intermediaries like HVAC technicians but also regulators and investors that it is possible to re-establish a durable equilibrium between demand for gas and the costs utilities must shoulder to serve that demand.

Whether a secular decline in gas demand begins and, if so, how steep it becomes will depend on how much of a sea wall is in place to protect gas utility market share from the rising tide of competition. As described above in sections III.B.1 and III.B.2, competition is currently shaped by the spark gap, climatic zone, and geography, as well as institutional factors like regulatory and legal actions and

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economic effects of different patterns of customer exit as well as different gas utility responses to declining demand).

141. Davis & Hausman, *supra* note 136, at 1049.

142. For a description of this pattern that draws on utility data, see DORIE SEAVEY ET AL., THE FUTURE OF GAS IN ILLINOIS 76-82 (2024).

143. Garibay-Rodriguez et al., *supra* note 140, at 7; *see also* Then, et al., *supra* note 139, at 11 figs. 5(a)-(c) (deriving estimator for mismatched pace of customer exits and system contraction).

144. Then et al., *supra* note 139, at 18-20 (describing strategies available to gas distribution utilities).

145. *See, e.g.*, LAPPEN ET AL., *supra* note 3, at 3; Susan Phillips, *PGW Spends Millions to Promote Natural Gas. Advocates Accuse the Utility of 'Greenwashing'*, WHYY (Sep. 22, 2025), https://why.org/articles/pgw-natural-gas-campaigns-greenwashing/ ("PGW spokesman Dan Gross said in an email that, 'like all companies, both for profit and nonprofit, PGW works to broaden its base of users. This growth is critical to lowering the costs of our residential customers, including many struggling to afford the cost of energy.'"); Rebecca Leber, *The Gas Industry Is Paying Instagram Influencers to Gush Over Gas Stoves*, MOTHER JONES (June 17, 2020), https://www.motherjones.com/environment/2020/06/gas-industry-influencers-stoves/.

regional appliance installers' receptivity to electrification.[146] In places where the sea wall is too low to protect gas utilities from rising competition, durable financial disequilibrium is highly likely to follow.

4. In the short run, regulators may decide that gas utilities are "too big to fail"

Analyses that anticipate a gas utility "death spiral" as a result of the factors described above generally note its potentially dire effects but stop short of asking what will happen once the utility, its regulator, and other policymakers perceive that such a spiral is underway.[147] Because gas utilities' collapse would very likely create imminent threats to public safety, the regulators and political leaders overseeing them would likely not let them fail – in effect extending them a free insurance policy that covers even risky investments and mismanagement.[148] Incorporating recognition of this status into an assessment of the risks arising from intensifying competition for gas utilities highlights that, ultimately, utility commissions simply cannot avoid intervening to address the competitive effects of electrification. The question for policymakers is not whether commissions ought to intervene in the face of rising competition, but whether they should do so on a proactive or reactive basis.[149]

Two factors in combination make it very unlikely that utility commissions – watched closely and possibly pushed by elected officials – would simply stand by as a gas utility spirals into financial failure. The first factor relates to the potential pace of fuel-switching by customers that rely on gas service. Although gas service can be replaced by alternatives, including electric heating and delivered fuels, it

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146. *But see* Rao, Siam & Bond, supra note 86, at 2 ("Our main contribution is to show that what may be viewed as a limitation in energy models to adequately reflect decision-making behavior may in large part be a reflection of the lack of sufficient generalizable evidence in the empirical literature on heating equipment adoption, specifically in how households incorporate known factors such as cost, awareness, comfort and reliability in different contexts.").

147. *See, e.g.*, Garibay-Rodriguez et al., *supra* note 140, at 2-3, 13; GRIDWORKS CALIFORNIA'S GAS SYSTEM IN TRANSITION: EQUITABLE, AFFORDABLE, DECARBONIZED, AND SMALLER 4-5 (2019). One exception to this is Heather Payne, *The Natural Gas Paradox: Shutting Down a System Designed to Operate Forever*, 80 MD. L. REV. 693, 712-27 (2021) (considering options for managing wind down of gas distribution systems).

148. *See* David A. Moss, *An Ounce of Prevention: Financial Regulation, Moral Hazard, and the End of "Too Big to Fail"*, HARV. MAG., Sept.-Oct. 2009, at 25. Several analyses have identified instances of this status beyond the financial sector. *See, e.g.*, Joshua Viers & Daniel Nover, *Too Big to Fail: Limiting Public Risk in Hydropower Licensing*, 24 HASTINGS ENV'T L. J. 143 (2018); *see also* Juho Vuojela & Alberto Rascon, *Too Big to Fail Applied to Non-Financial Companies*, *in* RESILIENZ DURCH ORGANISATIONSENTWICKLUNG [RESILIENCE THROUGH ORGANIZATIONAL DEVELOPMENT] 315, 318-22, 332 (Jochen Schellinger, Kim Oliver Tokarski & Ingrid Kissling-Näf eds. 2022) (proposing generic criteria for applying "too big to fail" concept and recommending that regulators "prevent[] [such firms'] failure through special regulation or by preventing them from becoming so big."); Shlomit Azgad-Tromer, *Too Important to Fail: Bankruptcy Versus Bailout of Socially Important Non-Financial Institutions*, 7 HARV. BUS. L. REV. 159, 164-68, 181-82 (2017) (identifying PG&E as an example of a "socially important non-financial institution" and describing "excessive leverage and risk taking" that often follows from SINFI status).

149. *Cf.* Jan Rosenow, Marc Stobbe & Sibylle Braungardt, *Gas Grid Regulation in the Context of Net Zero Transitions: A Review of Seven European Countries*, 122 ENERGY RSCH. & SOC. SCI., Apr. 2025, at 1, 1 (2025) ("As the number of customers connected to the gas network declines, policymakers must rethink consumer protection.").

cannot necessarily be replaced immediately at scale.[150] At present, about 4% to 5% of residential furnaces and gas-fired boilers are replaced annually.[151] That rate of replacement can likely be accelerated by changes in pricing and policy support for fuel-switching, but acceleration could test the capacity of the available workforce.[152] Further, shifting communities en masse onto electric heating solutions is likely to require either upgrades to electric grid capacity or the strategic and coordinated deployment of demand-side solutions, both of which involve processes that can take years to plan and execute.[153] Recent experiences with gas supply shocks in the European Union illustrate this point quite clearly. Decisions there related to the war in Ukraine resulted in sharply reduced imports of Russian natural gas,[154] but policy measures aimed at reducing reliance on gas altogether contemplate periods of ten years or more for transition.[155] These long durations

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150. There are notable exceptions to this general point. For instance, several Los Angeles neighborhoods destroyed by wildfire in 2024 and slated for rapid rebuilding were in the unusual position of seeing their gas infrastructure, appliances, and homes – that had been designed for fossil-fired energy distribution systems – suddenly eliminated, making it possible to quickly replace the full array of assets with alternatives that did not rely on gas at all. Joshua Lappen, *The Los Angeles Fires Accelerated the Looming Natural Gas Crisis*, HEATMAP (Jan. 22, 2025), https://heatmap.news/ideas/la-fires-natural-gas.

151. *National Residential Efficiency Measures Database: Space Conditioning: Gas Furnace*, NAT'L LAB'Y OF THE ROCKIES, https://remdb.nrel.gov/measures?group_id=Space%20Conditioning&component_type_id=Furnaces (last visited Sep. 22, 2025) (estimating average useful life of furnaces to be 21.4 years, such that, each year, 4.7% of units are replaced, on average).

152. CHRIS BADGER ET AL., CALNEXT, EMERGENCY REPLACEMENT HEAT PUMP WATER HEATER MARKET STUDY ii (2024) (noting that 87% of water heaters in California single-family homes are gas-fired and identifying urgency of replacement upon failure among leading reasons for predominantly like-for-like replacements); Nate Adams, *Emergency! Most HVAC Replacements are Emergencies, Don't Miss a Key Opportunity!*, NATE THE HOUSE WHISPERER: HOUSE WHISPERER BLOG (Nov. 2, 2023), https://www.natethehousewhisperer.com/blog/emergency-most-hvac-replacements-are-emergencies-dont-miss-a-key-opportunity; DONOVAN WOOLLARD & JAMES GLAVE, STUCK: WHY HOME ELECTRIFICATION IS LAGGING IN BRITISH COLUMBIA AND WHAT MUST BE DONE TO BREAK THE DEADLOCK ON RESIDENTIAL CARBON RETROFITS 14-23 (2022).

153. *See* Priyadarshan et al., *Distribution Grids May Be a Barrier to Residential Electrification*, 2 CELL REPS. SUSTAINABILITY, Nov. 21, 2025, at 1, 4-7 (estimating significant distribution grid reinforcement requirements for full electrification of residential heating with ASHPs and resistance backup, then adjusting estimates to incorporate strategically deployed energy efficiency investments, device coordination through virtual power plant arrangements, and GSHPs instead of ASHPs).

154. *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions: Roadmap towards Ending Russian Energy Imports*, at 3, COM (2025) 440 final (June 5, 2025) ("Between 2021 and 2023, the EU reduced Russian gas imports by over 70%, from 150 bcm to 43 bcm. In 2024 this downward trend stopped and imports from Russia increased. LNG imports grew by 12% compared to 2023, from 18 bcm to 20 bcm and pipeline by 26% from 25 bcm to 32 bcm."); Ana Maria Jaller-Makarewicz, *EU Gas Imports to Fall 25% by 2030 as Demand Reduction Target Exceeded Once Again*, INST. FOR ENERGY ECON. & FIN. ANALYSIS (June 4, 2025), https://tinyurl.com/33sxc63x (reporting changes in gas consumption since 2022 by EU member states and noting that EU-wide average exceeds REPowerEU target of 15% set by EU Commission).

155. Jürgen Schmidt, *Mannheim will Erdgasnetz bis 2035 abschalten – bisher ein Einzelfall im Südwesten* [*Mannheim Wants to Shut Down Natural Gas Network by 2035 – So Far an Isolated Case in Southwest*], STAATSANZEIGER [STATE GAZETTE] (July 2, 2025), https://www.staatsanzeiger.de/nachrichten/wirtschaft/mannheim-will-bislang-als-einiger-sein-netz-abschalten/ (reporting that the utility serving the city of Mannheim is uniquely ambitious in the region of Baden-Wurtemburg for setting a 2035 end-date for its gas distribution network); Marcel Wickart & Muriel Beaud, *Stilllegung der*

are broadly indicative of the number of assets and dependencies there are to untangle – and the political sensitivity of the steps involved – in order to wind down a gas distribution system without visiting physical or financial harm on those it serves. Until that untangling is completed, utility regulators will face strong incentives to maintain the gas system.[156]

The second factor that makes a death spiral unlikely to unfold without intervention relates to public safety. Gas utilities own and operate about 1.5 million miles of pipelines in the U.S.,[157] through which they deliver an explosive fuel, usually under public streets, to millions of buildings. Over the past decade, deadly or injurious explosions linked to gas distribution systems have happened, on average, about twenty-six times per year.[158] If undercapitalized gas utilities cut maintenance budgets to maintain financial stability, disasters could become more frequent or more dangerous. Notably, this second factor relates to the first. Gas utilities and regulators could accept heightened operational risks in order to continue serving customers who lack immediate access to alternative sources of heat and hot water. In such a situation, mitigating that risk to customers could potentially heighten the risk to public safety.

In short, because a gas utility can collapse faster than its customer base can be switched onto an alternative source or sources of energy distribution services, regulators will very likely conclude they are compelled to intervene to avert collapse, regardless of the cost to ratepayers or other policy priorities. Because in declining systems, the rate base is increasingly incapable of supporting critical services, such a crisis could also draw policymakers with the power of the public purse into pledging public credit or drawing on public coffers to stave off collapse.

Though it is tempting to think that the crisis of a gas utility sliding toward financial collapse could create an opportunity to productively coordinate difficult decisions about that utility's assets and the service it provides to customers, such a crisis is more likely to create rigidity than flexibility, and more likely to provoke short-term patches than long-term, durable solutions to gas utilities' decline. Decisions about the design and composition of energy systems and the energy

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Gasverteilnetze in der Stadt Zürich [*Decommissioning of the Gas Distribution Networks in the City of Zurich*] 9-11 (2024) (discussing Zurich's 2022 heat supply ordinance, which makes 2040 the deadline for eliminating reliance on natural gas).

156. *Cf.* KATHRIN KAESTNER ET AL., FOKUSREPORT WÄRME UND WOHNEN: ZENTRALE ERGEBNISSE AUS DEM ARIADNE WÄRME- & WOHNEN-PANEL 2024 [Focus Report Heat and Housing: Key Results from the Ariadne Heat & Housing Panel 2024] 2-3 (2025) (observing a jump in heat pump installations by German homeowners in 2022, followed by reversion to a lower rate of electrification thereafter); Thomas Vahlenkamp et al., *Erdgas in Deutschland: Vom Auslaufmodell zum Dauerbrenner?* [*Natural Gas in Germany: From Phasing Out Model to Long-Lasting Hit?*], 75 ENERGIEWIRTSCHAFTLICHE TAGESFRAGEN [ENERGY ECONOMICS DAILY QUESTIONS] 10, 13 (2025) ("Ende der Erdgas-Ära verschiebt sich" [End of the Natural Gas Era is Being Postponed]).

157. *Pipeline Miles and Facilities 2010+*, U.S. DEP'T OF TRANSP.: PIPELINE & HAZARDOUS MATERIALS SAFETY ADMIN., https://portalpublic.phmsa.dot.gov/analytics/saw.dll?PortalPages (last visited Dec. 4, 2025).

158. *Serious Incidents: Pipeline Serious Incident 20 Year Trend*, U.S. DEP'T OF TRANSP.: PIPELINE & HAZARDOUS MATERIALS SAFETY ADMIN., https://portalpublic.phmsa.dot.gov/analytics/saw.dll?PortalPages&PortalPath=/shared/PDM%20Public%20Website/_portal/SC%20Incident%20Trend&Page=Serious (last visited Sep. 22, 2025) (reporting 10-year average count of "serious incidents," meaning those resulting in at least one fatality or injury that requires in-patient hospitalization).

profiles of the buildings they serve involve multiple parties with diverse perspectives, capacities, and schedules. Optimizing in such circumstances means reconciling all those potential differences through a more or less coordinated process of planning and procurement. Short and pressurized timeframes might force decisions and break through gridlock, but in doing so they are likely to miss key and potentially safety-critical considerations, while imposing constraints and costs that could harm ratepayers and nonetheless fail with respect to other policy priorities.

IV. COMPETITION SITS IN REGULATORS' BLINDSPOT

Competition between electric and gas service is growing and is highly likely to continue growing, with serious consequences for ratepayers. Nonetheless, the 1907 regulatory framework leads regulators to treat the causes and effects of this competition as falling outside the scope of their regulatory responsibilities.[159] While that framework does not formally prohibit regulators from treating the causes and effects of wires-vs-pipes competition as cognizable when determining the prudence of utilities' proposed capital plans, it also does not compel them to consider that competition – much less to enable or manage it. Further, it makes proactive regulators susceptible to responsive opposition via legal challenge and political recourse.

The binding economywide decarbonization targets enacted in seventeen states have profound implications for gas utilities, which are in the business of delivering methane – a greenhouse gas – to ratepayers for the purpose of combusting it and venting the resulting emissions of carbon dioxide – another greenhouse gas – into the atmosphere.[160] Nonetheless, these targets have not been interpreted as modifying the features of the regulatory framework that prevent regulators in those jurisdictions from recognizing and addressing competition between wires and pipes utilities. A few states have bridged this divide by expressly connecting their climate laws to the laws that govern commissions and utilities.[161] But in those states that have not done so, utility law remains formally unchanged and neither utility regulators nor the courts have read emissions limits as amending utility law or regulators' obligations by implication.

159. *See supra* footnotes 20-45 and accompanying text.

160. *State Climate Policy Maps*, *supra* note 113 (listing the following states as having adopted emissions reduction targets legislatively: California, Colorado, Connecticut, the District of Columbia, Maine, Massachusetts, Minnesota, Maryland, Nevada, New Jersey, New York, North Carolina, Oregon, Rhode Island, Vermont, Virginia, and Washington).

161. *E.g.*, 2024 Mass. Acts 75 (updating statutory basis for utility's obligation to serve by adding cross-reference to statute establishing sectoral targets for greenhouse gas emissions reductions); *see also* Michael J. Barrett, Comment Letter on D.P.U. 25-40 through 25-45: Legal Issues Associated with Electrification Demonstration Projects by Gas Local Distribution Companies, at 2 (Oct. 3, 2025), https://fileservice.eea.comacloud.net/V3.1.0/FileService.Api/file//aegbeabde?6kzAXF7TOzwXGdLhpWPdvgPJ5/8CVYih3Bx1LYi4M9CPcSxI+blU344Khxm+qpOeg0hKFj9M9l/xQR8+/8GqPvdGgrFe6XR6ngIfa80wd3rxFD8G4j981M2Rna9aVTXA ("In revising section 92 and making a good number of other changes in state law, the Legislature unambiguously expressed its intention to see the Commonwealth curb certain competitive advantages granted to the gas industry by earlier Legislatures. We chose instead to accelerate the state's transition towards cleaner energy alternatives, and we appreciate the Department's desire to honor these new policy directives.").

This section considers three types of reforms of the existing regulatory framework that would – in one way or another – cure its blind spot for wires-vs-pipes competition: deregulation of entry and pricing with respect to natural gas service; integration of electric and gas utility operating units; and public ownership of gas (and potentially also electric) utilities. Although these approaches differ in obvious ways, they are similar in a basic respect: they all substantially undo the regulatory silos within which electric and gas utilities currently operate.

A. The existing framework invites passivity and discourages action

The present state-level utility regulatory framework generally does not support and in some respects directly impedes utility commissions' ability to deal with growing competition between electric and gas service. This is the result of several features that operate in combination. After briefly describing those factors, this section explains how their combined operation makes it difficult for utilities or utility commissions to match falling gas demand and gas utility revenues with contraction of the gas distribution system.

1. Components of the framework

Nearly all of the components of today's utility regulatory framework would be familiar to a state utility regulator of the 1910s. Another, cost of service regulation, was not fully formulated and universally applied until the 1940s but has since been integrated into the framework in all U.S. jurisdictions.[162] All of these components have co-evolved over decades and alongside changes in technologies and consumer preferences. The descriptions here summarize the logic and function of each.

Property and process rights of a "natural monopoly." Based on the premise that each is a distinct natural monopoly,[163] governments treat electric and gas utilities that operate in the same territory – and thus compete for customers – as separate entities with distinct rights.[164] Local governments grant co-located electric and gas utilities separate, exclusive franchises to access public rights of

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162. *See infra* notes 192-95 and accompanying text.

163. *See, e.g.*, San Isabel Elec. Ass'n v. Pub. Utils. Comm'n, 487 P.3d 665, 674 (Colo. 2021) ("Colorado has long been dedicated to the principle of 'regulated monopoly' in the conduct of public utilities operations. The doctrine is designed to prevent duplication of facilities and competition between utilities, and to authorize new utilities in a field only when existing ones are found to be inadequate. Adopting the reasoning of the commissioner, this court has asked: 'Why should the consuming public pay for, and maintain, two sources of power if one will do. . .?'") (internal quotations and citations omitted).

164. *See* Produce Terminal Corp. v. Ill. Com. Comm'n *ex rel*. Peoples Gas Light & Coke Co., 112 N.E.2d 141, 146 (Ill. 1953) ("The fixing of utility rates by public authority is a necessity arising out of the monopoly of the public service companies."); *see also* Commonwealth Edison Co. v. Ill. Prop. Tax Appeal Bd., 882 N.E.2d 141, 144-45 (Ill. App. Ct. 2008) (explaining persistence of ComEd's ownership of electric grid under restructuring in terms of "natural monopoly"); People *ex rel*. Madigan v. Ill. Com. Comm'n, 25 N.E. 3d 587, 596 (Ill. 2015) (explaining reason for gas utility's entitlement to cost recovery with reference to "natural monopoly"). *Compare Electric Utilities and Power Plants in Illinois with Senate and Hose Representative Boundaries*, ILL. ENERGY ASS'N, https://ilenergyassn.org/electric-utilities-illinois-map/ (last visited Sep. 20, 2025), *with Natural Gas Utilities in Illinois with Senate and House Representative Boundaries*, ILL. ENERGY ASS'N, https://ilenergyassn.org/illinois-natural-gas-utilities-map/ (last visited Sep. 20, 2025) (showing non-coterminous and overlapping gas and electric utilities' service territories).

way.[165] State utility commissions likewise grant them separate certificates of public convenience and necessity to build and operate their networks.[166] Commissions also approve additions to utilities' rate bases and recovery of costs separately for electric and gas utilities the service territories of which overlap.[167] And, under state laws and the Fifth and Fourteenth Amendments to the United States Constitution, each entity has access to protections with respect to the regulatory process, legal process more generally, and property rights, all of which might be vindicated should a regulator make a determination that is unreasoned or unsupported by evidence in the record,[168] or that results in a rate low enough relative to the utility's costs that it can be deemed "confiscatory."[169] Although this treatment holds, in formal terms, even if a single corporate parent owns both the electric and gas utility operating units in a given territory, in practice, common ownership makes for a more porous boundary between co-owned operating units, especially in rate cases through which utility commissions adopt revenue requirements and authorize cost recovery.[170]

Obligation to serve. Electric and gas utilities and their regulators have long read statutory directives regarding the adequate provision of service as a duty to serve any customers within their service territory who want to begin, resume, or continue receiving service.[171] Utilities also may not cease operating in that

165. *See, e.g.*, STATE COLLEGE, PA. CODE § 16-256 (2025) (defining "utilities" to mean "[a]ny water, sewer, gas, drainage, or culvert pipe and any electric power, telecommunication, signal, communication, or cable television conduit, fiber, wire, cable, or operator thereof.").

166. *See, e.g.*, Application of Ohio Valley Gas Co., Cause No. 46240, at 4 (Ind. Util. Regul. Comm'n 2025), https://www.in.gov/iurc/files/ord_46240_073025.pdf (granting certificate of public convenience and necessity for extension of Ohio Valley Gas Corporation's service territory in Highland Township). Note that Northern Indiana Public Service Company is the electric utility that provides Highland Township with electric service.

167. *See, e.g.*, *Our State's Current Energy Profile: Utility Service Territories*, CO. ENERGY OFF., https://energyoffice.colorado.gov/current-energy-profile (last visited Mar. 31, 2026) (showing, as of 2023, boundaries of electric and gas utilities).

168. *E.g.*, N.C. *ex rel*. Utils. Comm'n v. Va. Elec. & Power Co., 873 S.E.2d 608, 628 (N.C. 2022) (describing arbitrary and capricious standard and citing N.C.G.S. § 62-94(b)(6), which makes it relevant to utility commission decisions).

169. Duquesne Light Co. v. Barasch, 488 U.S. 299, 311-12 (1989) (describing conditions indicative of an impermissibly confiscatory rate).

170. *See, e.g.*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plans with Additional Requirements, Nos. 22-E-0064 & 22-G-0065, at 70 (N.Y. Pub. Serv. Comm'n 2023) ("we note that several provisions recommended by parties in their litigated cases that were rejected by Con Edison are included in the JP [Joint Proposal] to the benefit of customers. To promote electrification, the JP includes terms that would expand the availability of the SC 1 Rate IV Optional Demand-Based Rate to all SC 1 customers, provides customers with a risk-free trial period under the rate, requires outreach and education, and requires data to be provided to evaluate the program in the future."); Joint Proposal, Nos. 22-E-0064 & 22-G-0065, at 53-54 (N.Y. Pub. Serv. Comm'n 2023) (including allocation of "common expenses" and "intercompany shared service expense" across operating units). *See also* Consol. Edison, Inc. & Consol. Edison Co. of N.Y. Inc., Annual Report (Form 10-K) (Feb. 16, 2023) (containing filings of ConEd. Inc., the corporate parent or holding company of ConEd Co. of New York and the Orange & Rockland electric and gas utilities, as well as ConEd Co. of New York, which owns and operates both electric and gas utility operating units).

171. CHARLES F. PHILLIPS, JR., THE REGULATION OF PUBLIC UTILITIES: THEORY AND PRACTICE 109-10 (2d ed. 1988); *The Duty of a Public* Utility, *supra* note 31, at 313 ("[the duty to serve] delimits the areas of the community to which, and the particular individuals to whom, service must be rendered. . ."); *see also, e.g.*, New York *ex rel*. N.Y. & Queens Gas Co. v. McCall, 245 U.S. 345, 349-51 (1917) (affirming utility commission's order directing utility to extend gas service to customers seeking it, even though the investment would yield a

territory without authorization.[172] A variety of exceptions to this obligation have been established in different jurisdictions – for instance, where extending service would adversely affect existing customers, or constitute a clear financial loss to the utility,[173] because requiring investment in such a circumstance could amount to a taking of property.[174] The obligation to serve is generally implemented in a fuel-specific way, meaning that providing electric service in response to a request for gas service does not generally meet a utility's obligation.[175] However, the relevant statutory language, which varies from state to state, does not necessarily provide a clear legal basis for this interpretation. A recent analysis of the relevant statutory language and judicial precedents in California, for instance, concludes that the obligation in that state can be read as fuel-neutral.[176] And in states like Arizona,[177] Idaho,[178] Maryland,[179] or Pennsylvania,[180] a court would struggle to find an unambiguous statutory basis for overturning a utility commission's

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low rate of return, because doing so would not undermine profitability of the utility as a whole). For a discussion of the origins of the obligation in common law and its evolution in the context of U.S. utility regulation, 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, 1244-60 (1998).

172. Columbus Ry., Power & Light Co. v. City of Columbus, 253 F. 499, 504-05 (S.D. Ohio 1918), *aff'd*, 249 U.S. 399 (1919). As Scott Hempling has put it: "A utility is responsible for meeting its service territory's entire needs, now and in the future" and is obligated to build the infrastructure and resources "necessary to support its service territory's economy." SCOTT HEMPLING, REGULATING PUBLIC UTILITY PERFORMANCE: THE LAW OF MARKET STRUCTURE, PRICING, AND JURISDICTION § 2.B.3 (2d ed. 2021).

173. *See, e.g.*, MASS. GEN. LAWS ch. 164, § 92 (2021) ("such order shall not be made where it appears that compliance therewith would result in permanent financial loss to the corporation."); State *ex rel*. Ozark Power & Water Co. v. Pub. Serv. Comm'n, 229 S.W. 782, 786 (Mo. 1921) ("The evidence shows that the furnishing of the service will not entail even a present financial loss; that the gross revenue derivable from it will be sufficient to . . . afford . . . an adequate return on its investment.").

174. R.R. Comm'n v. E. Tex. R.R. Co., 264 U.S. 79, 85 (1924) ("if at any time it develops with reasonable certainty that future operation must be at a loss, the company may discontinue operation. . . [t]o compel it to go on at a loss, or to give up the salvage value would be to take its property without just compensation which is a part of due process of law."); *see also The Duty of a Public Utility*, *supra* note 31, at 315-18.

175. *See, e.g.*, Alison Gocke, *The Law of the Mid-Transition*, 125 MICH. L. REV. (forthcoming 2026) (manuscript at 21-22), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5387156 (discussing utilities' interpretation of obligation and noting legislative measures in several states that modify it).

176. *See generally* NICHOLAS WALLACE ET AL., REMOVING LEGAL BARRIERS TO BUILDING ELECTRIFICATION (2020) (arguing that California law does not prevent a utility from satisfying its obligation to serve a given customer by offering a substitute for the specific fuel requested by that customer); *see also* Olivia Bonner & Amanda Zerbe, *What Should We Do When The Natural Gas Company Leaves Town?*, STAN. L. SCH. BLOG: ENV'T & NAT. RES. L. & POL'Y PROGRAM (May 21, 2023), https://law.stanford.edu/2023/05/21/what-should-we-do-when-the-natural-gas-company-leaves-town/.

177. ARIZ. REV. STAT. ANN. § 40-361(B) (2016) ("Every public service corporation shall furnish and maintain such service, equipment and facilities as will promote the safety, health, comfort and convenience of its patrons, employees and the public, and as will be in all respects adequate, efficient and reasonable.").

178. IDAHO CODE § 61-302 (2025) ("Every public utility shall furnish, provide and maintain such service, instrumentalities, equipment and facilities as shall promote the safety, health, comfort and convenience of its patrons, employees and the public, and as shall be in all respects adequate, efficient, just and reasonable.").

179. MD. CODE ANN., PUB. UTIL. § 5-303 (2025) ("A public service company shall furnish equipment, services, and facilities that are safe, adequate, just, reasonable, economical, and efficient, considering the conservation of natural resources and the quality of the environment.").

180. 66 PA. CONS. STAT. § 1501 (2025) ("Every public utility shall furnish and maintain adequate, efficient, safe, and reasonable service and facilities, . . . [s]uch service also shall be reasonably continuous and without unreasonable interruptions or delay.").

determination that the obligation on utilities is fuel-neutral.[181] In New York, by contrast, section 31 of the Public Service Law clearly assigns distinct obligations to utilities based on the type of fuel or energy they deliver – "gas, electric and steam."[182] But in all states, as a legal matter, a utility commission has the authority to define – or redefine – the nature and extent of utilities' obligation to provide service, so long as the definition they adopt stays within the bounds of the relevant statutory provisions and is supported with appropriate reasoning and evidence.

Nondiscrimination. Utilities may not vary access or terms and conditions of service (including rates) across different customers in a way that is unduly preferential or discriminatory,[183] and not otherwise authorized by statute.[184] As the Arkansas Supreme Court put it, "[r]ates and other charges must be designed as nearly as possible to assess costs on the class of customers which creates them."[185] Variation is permissible across certain customer classes, or if there is a rational basis for offering different terms of service – such variation is discriminatory, strictly speaking, but not unduly so.[186] The key question is whether a rate varies across customers who are "similar," "alike," or "similarly situated."[187] Thus, a

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181. The authors could not find a case that has tested whether a commission might reverse the apparent drift toward a fuel-specific reading of the obligation with respect to energy distribution utilities even though the relevant statutory language is arguably fuel-generic. Perhaps this is because no dispute has come before a court or commission over whether an energy distribution utility could satisfy its obligation to serve a customer by providing service of a different type than what was requested.

182. N.Y. PUB. SERV. LAW §§ 30-31 (Consol. 2026).

183. PHILLIPS, JR., *supra* note 171, at 109-10; *see also, e.g.*, N.Y. PUB. SERV. LAW § 65(3) (Consol. 2026) ("No gas corporation, electric corporation or municipality shall make or grant any undue or unreasonable preference or advantage to any person, corporation or locality, or to any particular description of service in any respect whatsoever, or subject any particular person, corporation or locality or any particular description of service to any undue or unreasonable prejudice or disadvantage in any respect whatsoever."); Cap. Improvement Bd. of Managers v. Pub. Serv. Comm'n, 375 N.E.2d 616, 634 (Ind. App. 1978) ("In refusing to adjust the rate charged to [a steam utility], the Commission cited basic facts to support its conclusion that rate discrimination was reasonable, but then presented no such facts to support the rate charged. The rate differential involved here is substantial, . . . In light of these circumstances, we must remand this case to the Commission for further findings in support of its conclusion that the rate specified in the contract is not unduly discriminatory.").

184. *E.g.*, N.Y. State Elec. & Gas Corp. v. Pub. Serv. Comm'n, 753 N.Y.S.2d 332, 340 (Sup. Ct. 2002), *aff'd*, 763 N.Y.S.2d 352 (N.Y. App. Div. 2003) ("With the amendment of PSL § 66 to add (12–b)(a), the Commission's authority was expanded to include the authority to establish *special* rates or tariffs charged by utilities.").

185. Coffelt v. Ark. Power & Light Co., 451 S.W.2d 881, 882 (Ark. 1970).

186. 38A C.J.S. *Gas and Oil* § 76 (2026) ("not all differences in rates are improper, and only unreasonable and unjust discriminations are held unlawful by the courts.") (internal citations omitted); *see also, e.g.*, CF Indus. v. Tenn. Pub. Serv. Comm'n, 599 S.W.2d 536, 544 (1980) ("a public utility may impose differing rates among customer classes").

187. *See, e.g.*, Mass. Mun. Wholesale Elec. Co. v. City of Springfield, 726 N.E.2d 973, 977 (Mass. App. Ct. 2000) ("Like customers, located in a utility provider's franchise area, are entitled to nondiscriminatory treatment in the matter of rates."). This standard, which applies to the *factual* question of whether benefits received by a ratepayer relate appropriately to the costs borne by that ratepayer, is distinct from the "equal protection" standard that applies to the *legal* question of whether a utility commission has applied statutory directives similarly to similarly situated individuals. 14 FLETCHER CYCLOPEDIA OF THE LAW OF CORPORATIONS § 6681 (Morton S. Wolf rev. ed., 1966) ("The test used for deciding whether a difference in rates is valid has been distinguished from the test used to determine a claim of denial of equal protection of the law. In the latter case, the test applied, whether a classification scheme is rationally related to a legitimate legislative purpose, is

residential or commercial customer located at the periphery of a utility's network should pay the same as a customer in the same rate class who is located at the core.

Adequate service. The gas service offered to residential and small commercial customers must satisfy various standards relating to safety and "adequacy," which generally connotes reliability and efficiency.[188] While compliance with this standard must be uniform across a utility's service territory, the costs of compliance are not, and maintenance of segments located at the network periphery generally does not pay for itself as quickly – assuming it does at all – as maintenance of segments at the core. Consider the "design day" rubric that gas utilities and their regulators use to specify capacity requirements for the coldest possible day of the year – the day when demand will be highest.[189] Comparing available system capacity to the design day specification for prospective demand identifies locations potentially at risk for local or cascading underpressurization.[190] Because segments near the network's core will tend to support pressurization elsewhere, the costs of maintaining those segments are offset by greater and more widespread benefits. The reverse is true of far-flung segments that cost as much or more to maintain but support operation of few or no other segments further downstream.

"Rate of return regulation." As noted in section III.B.1 above, gas utilities are, fundamentally, infrastructure companies; their earnings depend on how much undepreciated infrastructure they own and operate. Because commissions authorize utilities to earn a rate of return on undepreciated capital investments that are deemed prudent, making more investments generally means higher earnings for the business.[191] Until the watershed Supreme Court decisions of the 1940s,[192] disputes over rates adopted by utility commissions tended to focus on whether the

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always a question of law, while the question of whether the difference in rates is reasonably related to a difference in the costs of providing the service is one of fact.").

188. PHILLIPS JR., *supra* note 171, at 109-10; *The Duty of a Public Utility*, *supra* note 31, at 313-14.

189. KEN COSTELLO, GAS SUPPLY PLANNING AND PROCUREMENT: A COMPREHENSIVE REGULATORY APPROACH 6 (2008) ("Design day demand is a 24-hour period of demand applied by gas utilities for planning capacity requirements. Many gas utilities use the coldest day in the past twenty years or longer to determine design day demand.").

190. Restoring gas service after curtailments – such as might be imposed due to dangerous levels of underpressurization – can involve days or even weeks of painstakingly slow steps. *See* Order Regarding Long-Term Natural Gas Plan and Requiring Further Actions, Case No. 24-G-0248, at 63-65 (N.Y. Pub. Serv. Comm'n 2025), https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A0AD5D99-0000-C813-8D15-675F257642CA}&DocTitle=Order%20Regarding%20Long-Term%20Natural%20Gas%20Plan%20and%20Requiring%20Further%20Actions (describing service restoration process after a widespread outage).

191. For a description of how utilities' rate of return and cost of capital interact – conceptually and concretely – under standard rate of return regulation, see MARK LEBEL ET AL., IMPROVING UTILITY PERFORMANCE INCENTIVES IN THE UNITED STATES: A POLICY, LEGAL AND FINANCIAL FRAMEWORK FOR UTILITY BUSINESS MODEL REFORM 18-27 (2023).

192. *See* Fed. Power Comm'n v. Hope Nat. Gas Co., 320 U.S. 591, 602 (1944) ("It is not theory but the impact of the rate order which counts. If the total effect of the rate order cannot be said to be unjust and unreasonable, judicial inquiry under the Act is at an end. The fact that the method employed to reach that result may contain infirmities is not then important."); Fed. Power Comm'n v. Nat. Gas Pipeline Co., 315 U.S. 575, 586 (1942) (declaring that the Constitution does not require utility commissions to use any particular analytical approach when establishing rates).

commission had valued a utility's assets correctly, and secondarily on whether the rate of return authorized to a utility by a commission was consistent with constitutional and statutory requirements.[193] Thereafter, courts eased up in their scrutiny of utility commissions' valuation of assets,[194] and utilities and commissions increasingly faced off over the adequacy of a particular rate of return instead.[195] Economists Averch and Johnson famously identified a strong "regulatory bias" for firms operating under this rate of return regulation in favor of over-investing in assets on which they are granted a rate of return.[196] "The firm," they found, "has an incentive to substitute between factors [i.e., to invest in capital assets instead of allocating money to any other factor of production] in an uneconomic fashion that is difficult for the regulatory agency to detect."[197] Recent research identifies empirical evidence of the so-called Averch-Johnson Effect from patterns of investment by regulated energy distribution utilities between 1997 and 2017.[198] Utilities use subtle tactics, including carefully timing the filing and conclusion of rate cases, to boost capital spending and rates of return.[199] This bias deserves mention here because, just as it incentivizes utilities to overinvest, it also strongly disincentivizes them to forego new investments or accelerate the depreciation of old ones.

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193. The line of cases from which *Hope* clearly departed begins with *Smyth v. Ames*, 169 U.S. 466, 546 (1898) ("We hold, however, that the basis of all calculations as to reasonableness of rates to be charged . . . must be the fair value of the property being used by it for the convenience of the public."). *See also* G. Stanley Joslin & Arthur S. Miller, *Public Utility Rate Regulation: A Re-Examination*, 43 VA. L. REV. 1027, 1053 (1957) ("The importance . . . of the *Smyth* case was to emphasize the evaluation of property and thus cause that area to be emphasized in rate cases generally and specifically when constitutional objections were raised.") (internal citations omitted).

194. James C. Bonbright, *Utility Rate Control Reconsidered in the Light of the Hope Natural Gas Case*, 38 AM. ECON. REV. 465, 479 (1984) ("The Court, in the *Hope* case, was throwing upon commissions the primary responsibility for developing methods by which to measure reasonable rates.").

195. Joslin & Miller, *supra* note 193, at 1052 ("The greatest contention in the past centered on evaluation of property. However, in view of the *Hope* case, it is probable that this order has been inverted so that the rate of return will be the most frequent area of contention, with the property evaluation only in direct dispute in final constitutional determinations.").

196. Harvey Averch & Leland L. Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AM. ECON. REV. 1052, 1053-54 (1962) ("a path along which market cost is not minimized for any given output [is] advantageous simply because it is along that path that the firm is able to maximize total profit given the constraint on its rate of return.").

197. *Id*. at 1068.

198. Karl Dunkle Werner & Stephen Jarvis, *Rate of Return Regulation Revisited* 6-7 (Energy Inst. at Haas, Working Paper No. 329R, 2025) ("Our findings therefore provide new potential evidence for the Averch–Johnson effect in the utility sector. This is of particular interest because to date the empirical evidence for this phenomenon has been viewed as quite weak.") (internal citations omitted); Gautam Gowrisankaran, Ashley Langer & Mar Reguant, *Energy Transitions in Regulated Markets* 4 (Nat'l Bureau of Econ. Rsch., Working Paper No. 32088, 2024) ("Energy transitions further complicate the regulator's task of determining prudence. . . When combined with a used-and-useful standard, these transitions may create perverse incentives for utilities, such as causing them to overuse legacy capital to ensure that it fully contributes to the rate base . . . . Our model captures these features of RoR regulation."); *see also* David C. Rode & Paul S. Fischbeck, *Regulated Equity Returns: A Puzzle*, 133 ENERGY POL'Y, Oct. 2019, at 1, 1; Stuart C. Myers & Lynda S. Borucki, *Discounted Cash Flow Estimates of the Cost of Equity Capital – A Case Study*, 3 FIN. MKTS., INSTS. & INSTRUMENTS 9-45 (1994).

199. Werner & Jarvis, *supra* note 198, at 26-27.

2. The framework in operation

In combination, the components described above make it difficult for a utility commission to interrupt the self-reinforcing pattern described in section III.B.3. Gas utilities are bound by an obligation to serve, incentivized to make new investments in infrastructure and to preserve existing investments, required to provide similar service at non-discriminatory rates across their entire network, and enjoy strong legal protections against any revision to what they may recover from their customers to cover the costs of their rate base, including depreciation expense. Thus, as Davis and Hausman find, even amid falling demand, gas utilities will tend not to remove assets from service and thereby continue to recover a rate of return on those assets rather than winding down the financially nonviable segments of their network.[200] Further, where maintaining safety and reliability arguably require it, gas utilities will seek to make further investments in such segments.

To illustrate where this leads amid falling gas demand, consider two simplified hypothetical situations. In the first, customers located along a given gas network segment adopt hybrid solutions, installing heat pumps for space and water heating and to handle 90% of the heating hours in an average year, but retaining a gas stove and gas-fired furnace instead of upgrading the energy efficiency of the building envelope or installing electric resistance heating for the fraction of heating hours when the heat pump performs at a low COP. Electrifying water heating and the bulk of space heating means radically changing the pattern and volume of gas consumption on that segment over the course of an average year. In most months, customers might consume 5% of the previous amount – just enough to cook with – and in the coldest six to twelve weeks of the year, the percentage might rise to 30% or even 50%. Notably, as the nationwide average breakdown between delivery (pipes) and supply (gas) costs is about 70-30 today, this change would mean that customers would see only a relatively small reduction in their gas bills even though they sharply reduce their consumption.[201] From the utility's perspective, let us posit that this change pushes the economic profile of that segment from revenue-positive to net-costly. Even so, the utility still has strong incentives to continue serving the remaining customers there because it can still recover significant revenue from those customers and can continue to increase its rate base by making capital investments in that distribution segment. At the same time, the utility arguably lacks clear authority to cease providing those customers with service. Faced with these incentives, a utility is highly likely to respond by continuing to operate the segment in question, while raising rates across its entire service territory to make up for the reduction in revenue flowing from the segment.

Under the second scenario facing this hypothetical segment, one-third of the customers electrify fully. Demand falls in this instance as well, but somewhat

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200. Davis & Hausman, *supra* note 136, at 1048-49.

201. A utility might respond to this situation by changing the rate design to make it less volumetric – the historic norm for gas utilities nationwide – and to instead recover a higher proportion of service costs through fixed fees. That shift would not prevent a rise in rates but could prevent some remaining gas customers from seeing *as steep* a rise in their bills as would occur under a volumetric rate design.

differently. The volume of gas demanded declines, albeit less than in the first situation, but so does the number of customers paying a delivery charge for use of the segment, which the utility must continue to operate. Indeed, even the service lines to the electrified homes will not necessarily be decommissioned, because the obligation to serve in that jurisdiction might require the utility to extend service to the same property if a future resident wants gas. Here again, the segment becomes net-costly, as its cost of maintenance remains unchanged amid a sharp decline in revenues from the customers it serves.

Should situations like these occur throughout even a fraction of the utility's network, they could push the utility into a financial slide without reshaping its short-term incentives or its obligations to its remaining customers. The effects of this pattern will be felt most acutely and painfully by lower-income gas customers, for whom the investments required to electrify are out of reach.[202]

Now consider the options that are available to a utility commission faced with a utility experiencing uncoordinated declining demand on one or more system segments. Pruning segments that turn net-costly in order to preserve the economic viability and safe operation of the rest of the gas network would require *coordinating* the departure of the customers who remain on a given segment *as a group*. Such pruning would necessarily involve a local non-pipe alternative (NPA) project which would decommission local networked gas service and consist of some combination of energy efficiency and electrification measures – and, potentially, delivered fuels – that can provide viable and cost-effective substitutes for gas service. But if the remaining gas customers – or just a small subset of them – refuse to go along, they would thereby pit the utility's assumed obligation to serve against the viability, cost-effectiveness, and long-term fiscal necessity of the project.[203] Moving ahead despite their refusal would require regulators to justify, on legal and policy grounds, taking away piped gas service from customers who previously had it.

Even in jurisdictions where the statutory basis for the obligation to serve leaves the commission discretion or special grounds to overrule a holdout's preference, a decision by the commission to end gas service would still present challenges. In addition to establishing a legal basis for depriving new or existing gas customers of access to gas service, the commission and responsible elected officials would need to justify the decision politically. In that political context, opponents would likely cast *the commission's action* – not the background conditions of asymmetrical competition and declining demand – as the cause of

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202. Garibay-Rodriguez et al., *supra* note 140, at 6 fig. 4 (showing greater scale and extent of energy burden across customers remaining on gas system in scenarios where gas customer exits are uncoordinated – and particularly where high-income customers exit first).

203. ABIGAIL LALAKEA ALTER ET AL., NON-PIPELINE ALTERNATIVES: EMERGING OPPORTUNITIES IN PLANNING FOR U.S. GAS SYSTEM DECARBONIZATION 11, 21-22 (2024); *see also NPA Working Group Meeting #2 – Meeting Minutes*, NPA WORKING GRP. (Nov. 6, 2024), https://tinyurl.com/4dz7wfuu [hereinafter *NPA Working Group Meeting #2*] ("The challenges around customer engagement are great – it will be difficult to get 100% of customers on board with an NPA.").

disruption to the status quo. Such an argument might not move a court,[204] but it would not need to in order to resonate politically.

It is notable also that utility commissions generally have no direct authority over the companies that supply delivered fuels like propane and fuel oil to customers, nor the infrastructure involved in their operations. This is significant because, although delivered fuels could substitute quite readily for gas in many cases, a utility commission would have only indirect means available to make access to such fuels part of an NPA project, and *no* direct means available to manage the costs involved in that substitution.

In contrast to jurisdictions like Australia, where gas demand appears to be falling due at least in part to electrification,[205] and Denmark, where district heating and electrification are steadily displacing gas distribution,[206] in the United States it is not clear that electrification has reached critical mass in any gas utility service territories. Indeed, recent upward pressure on electric rates from various sources – among them, the inflation of input costs, the massive push by data center developers to secure access to power, and transmission and distribution grid investments to accommodate now-rising demand for power from consumers more broadly – may, in the near-term, slow or even reverse consumer trends toward electrification.[207] The closest most regulators have come to confronting the

204. The Supreme Court's decision in the 1945 *Market Street Railway* case answered constitutional questions raised by a private streetcar and bus company. *See* Mkt. St. Ry. Co. v. R.R. Comm'n of Cal., 324 U.S. 548 (1945). The company argued that its regulator, the California Railroad Commission, had violated the company's right to due process when it refused the company's requested rate increase – a refusal that sealed the company's fate financially. *Id*. at 553-54. In explaining its rejection of the company's claims, the Court presented two potential roles for government vis-a-vis a regulated business in a context where the business's assets are losing value – a permissible role and an impermissible one. *Id*. at 567. The permissible role involves providing the company with an opportunity to earn a healthy rate of return, which does not mean guaranteeing such a return by "insur[ing] or [] restor[ing] values that have been lost by the operation of economic forces." *Id*. at 567. The impermissible role involves intervention by the government that results in "destruction of existing economic values." Mkt. St. Ry. Co., 324 U.S. at 567. Thus, the Court put it beyond a regulator's authority to proactively undermine a viable enterprise but affirmed a regulator's authority to stand aside as "the operation of economic forces" undermines a once-viable enterprise. *Id*.

205. Josh Runciman, *Slump in Eastern Australia Gas Demand Shows No Signs of Easing*, INST. FOR ENERGY ECON. & FIN. ANALYSIS (Sep. 11, 2025), https://ieefa.org/resources/slump-eastern-australia-gas-demand-shows-no-signs-easing ("The decline in residential gas demand is relatively new. . . . [The Australian Energy Market Operator] attributed this to increasing residential electrification, particularly of heating load, and high gas prices in the context of broader cost of living pressures.").

206. Malte Bei der Wieden et al., Connecting Reality with Climate Goals: Case Studies of Gas Distribution System Planning and Regulation: Country Report Denmark, REGUL. ASSISTANCE PROJECT, at 3 (2024) ("Denmark has actively promoted the use of district heating, heat pumps, and the production of biomethane. By 2030, all households will have been disconnected from the gas grid, and the remaining gas demand of the country will be met through the production of biomethane for domestic use."); Rosenow, Stobbe & Braungardt, *supra* note 149, at 3 fig. 1 (showing stepwise decline in Danish gas demand since 2012).

207. Josh Saul et al., *AI Data Centers Are Sending Power Bills Soaring*, BLOOMBERG (Sep. 29, 2025), https://www.bloomberg.com/graphics/2025-ai-data-centers-electricity-prices/; Alex Brown, *Lawmakers Fear AI Data Centers Will Drive Up Residents' Power Bills*, STATELINE (Apr. 10, 2025), https://stateline.org/2025/04/10/lawmakers-fear-ai-data-centers-will-drive-up-residents-power-bills/; Ahmad Faruqui, *Uphill Battle: How to Electrify When Electricity is Expensive*, *in* ELECTRIFICATION AND THE FUTURE OF DECENTRALIZED ELECTRICITY SUPPLY 215, 218 (Fereidoon Sioshansi ed., 2025) ("the ultimate barrier to electrification in high-cost regions is high rates, and unfortunately there is no easy way to lower rates without eroding utility revenues, which creates financial challenges for the utilities").

systemic threat of competition is the launch of long-term gas planning proceedings, in all instances prompted by the climate laws discussed below.[208] Those proceedings consider future scenarios involving lower levels of demand for gas but, as of this writing, have yet to result in major changes to the regulatory components discussed above.[209]

B. Climate laws have not altered the utility regulatory framework

Seventeen states' legislatures have adopted economywide decarbonization targets,[210] which are all broadly incompatible with continued operation of existing gas distribution systems at their present scale; in several of those states, that incompatibility is a mathematical certainty.[211] Nonetheless, where utility commissions have moved to make changes to the components or application of the utility regulatory framework summarized above, they have generally done so based upon *additional* legislation that supplements statewide emissions limits with specific and concrete directives.[212] Simply put, laws that impose statewide decarbonization targets have likewise not amended the utility regulatory framework that governs gas utilities. Various utility commissions have acknowledged the broad relevance of emissions limits to decisions about gas distribution system investments,[213] but no commission has read a climate law as implicitly amending or repealing a utility law.[214] Rather, commissions generally

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208. *See generally* KIERA ZITELMAN, NAT'L ASS'N OF REGUL. UTIL. COMM'RS CTR. FOR P'SHIPS & INNOVATION, LONG-TERM PLANNING AMONG REGULATED NATURAL GAS UTILITIES: A REVIEW OF STATE REQUIREMENTS (2025) (listing dockets and actions taken).

209. As Zitelman's survey of long-term gas planning proceedings notes, long-term planning dockets have prompted analysis that has in several instances informed target legislation but have not themselves yielded changes to core features of the regulatory framework that governs gas utilities. *Compare, e.g.*, *id*. at 4-5 (describing Washington's proceeding and discussing changes effectuated by separate Washington Decarbonization Act for Large Utilities), *with id*. at 9-10 (describing New York and listing no basic policy or regulatory changes).

210. *U.S. State Greenhouse Gas Emissions Targets*, CTR. FOR CLIMATE & ENERGY SOLS. (last updated Aug. 2025), www.c2es.org/document/greenhouse-gas-emissions-targets/.

211. Washington State offers a clear example. According to that state's greenhouse gas emissions inventory, in 2021, the state's buildings were responsible 23.7 mmt CO2e. This amount, which does not reflect emissions from transportation, the power sector, or industrial processes, is five times the volume of the economy-wide 2050 limit of 4.7 mmt CO2e. *See* GREENHOUSE GAS INVENTORY UNIT, WASHINGTON STATE GREENHOUSE GAS EMISSIONS INVENTORY: 1990-2021 8, 36-37 (2025). Other examples include Colorado, Maryland, Massachusetts, and New York.

212. *See infra* notes 220-26 and accompanying text.

213. *E.g.*, Application of Connecticut Natural Gas Corporation and the Southern Connecticut Gas Company to Amend Their Rate Schedule, No. 23-11-02, at 149 (Conn. Pub. Utils. Regul. Auth. 2024) (directing company to file, in its *next* rate case, two sets of depreciation schedules: one reflecting "business as usual" and "a separate set … that factor in the impact of the Connecticut Global Warming Solutions Act GHG reduction targets when calculating its annual depreciation accruals."); Decision on Test Year 2023 General Rate Case for Pacific Gas and Electric Company, Decision No. 23-11-069, at 667 (Cal. Pub. Utils. Comm'n 2023) ("[I]t is by no means clear, nor compellingly demonstrated in the record, that the entire gas mains asset class will be retired early at a consistent rate due to our decarbonization goals. For these reasons, the Commission does not adopt PG&E's recommendation.").

214. *See, e.g.*, Order Adopting Terms of Joint Proposal and Establishing Rate Plans, Nos. 24-E-0322 & 24-G-0323, at 93 (N.Y. Pub. Serv. Comm'n 2025) ("Notably, in connection with all such action [to comply with the Climate Leadership and Community Protection Act of 2019] referenced below, the Commission has regularly

appear to have taken climate laws as a reason to initiate gas planning proceedings that explore the potential effects of emissions limits on gas systems.[215] In those proceedings, which are underway in thirteen of the seventeen jurisdictions subject to legislated economywide emissions targets,[216] commissions have directed utilities to do some or all of the following: develop load forecasts that look beyond the time horizon customarily used in rate cases;[217] explore the effects of employing alternative methods of depreciation for some or all gas utility assets;[218] consider, under specified circumstances, non-pipe alternative (NPA) projects before expanding or repairing portions of the gas system;[219] and revise line extension policies so that the cost of extending gas mains and services to new customers is no longer masked and shifted to existing customers.[220] This list does not, as of

reiterated that its core mission is to ensure the continued provision of safe, reliable and adequate utility service at just and reasonable rates."); Initiation of Proceeding to Examine the Future of Natural Gas and Issues Associated with Decarbonization of the Gas Distribution System, No. 24-0158, at 1-2 (Ill. Com. Comm'n 2024) ("The Final Orders note that Public Act 102-0662 … codified Illinois' … goal of economy-wide 100% clean energy by 2050. The Commission also recognized in its Final Orders, however, that P.A. 102-0662 is silent on authority to pursue decarbonization in the gas sector. . . . Nonetheless, to reach the goals of P.A. 102-0662, the gas distribution system must change.") (internal citations omitted). For a discussion of an implied repeal analysis based on provisions of climate and utility laws in New York State, see Justin Gundlach & Elizabeth B. Stein, *Harmonizing States' Energy Utility Regulation Frameworks and Climate Laws: A Case Study of New York*, 41 ENERGY L.J. 211, 242-45 (2020).

215. *See generally* ZITELMAN, *supra* note 208 (listing dockets and actions taken).

216. *See* Dan Aas, *Crystal Clear? Progress and Next Steps on the Future of Gas*, ENERGY + ENV'T ECONS. 5 (Jan. 1, 2025), https://www.meeaconference.org/sites/meeaconference.org/files/Jan30_D2_Aas_Dan.pdf (listing jurisdictions where proceedings are underway). Note, first, that some states conduct these proceedings in multiple dockets, not all of which are listed here; and second, that Illinois has opened a gas planning proceeding even though its legislature has not adopted any economywide greenhouse gas emissions reduction requirements.

217. *E.g.*, N. Shore Gas Co. & Peoples Gas Light & Coke Co., Nos. 23-0068 & 23-0069 (Ill. Com. Comm'n 2023).

218. *E.g.*, OR. PUB. UTIL. COMM'N, NATURAL GAS FACT FINDING: FINAL REPORT, No. UM 2178, at 2 tbl. 2, 21, 38 tbl. 13 (2023) (recommending studies of effects of accelerated depreciation on rates); GANNETT FLEMING, CONSOL. EDISON CO. & ORANGE & ROCKLAND UTILS., INC: DEPRECIATION STUDY: ANALYSES OF GAS PLANNING SCENARIOS, at II-3, II-4 (2022) (describing analytical scenarios prescribed by Public Service Commission in May 2022 gas planning order).

219. *E.g.*, 4 COLO. CODE REGS. §§ 723-4-4552, 723-4-4553(c)(I)-(P) (LexisNexis 2023) (directing utilities to periodically file a "gas infrastructure plan," which is to include "an analysis of alternatives, including non-pipeline alternatives"); Cascade Nat. Gas Co., Order No. 24-158, app. A, at 15 (Or. Pub. Util. Comm'n 2024) ("Future distribution system planning should include an NPA framework in Oregon.").

220. California, Maryland, Massachusetts, and Washington State have adopted changes to their line extension policies, eliminating (in Washington's case, limiting) the cross-subsidies paid to cover the cost of extending gas mains and services to new customers. *See* Decision Eliminating Electric Line Extension Subsidies for Mixed-Fuel New Construction and Setting Reporting Requirements, Decision No. 23-12-037 (Cal. Pub. Utils. Comm'n 2023); Order on Stakeholder Proposals for Revision of Gas Policy, No. 9707, at 7-11 (Md. Pub. Serv. Comm'n 2025); Interlocutory Order on Policies and Practices for Line Extension Allowances and Contributions in Aid of Construction for Gas Local Distribution Companies, No. 20-80-E (Mass. Pub. Utils. Dep't 2025); Order 01 Authorizing and Requiring Tariff Revisions, No. UG-210729, at 6-7 (Wash. Utils. & Transp. Comm'n 2021). New York's Department of Public Service issued proposed regulatory changes that would reduce support for gas line extensions in 2024, but that change was superseded by legislation that wholly eliminates support for line extensions. *See* Staff Straw Proposal Regarding Modification of 16 NYCRR part 230, No. 20-G-0131 (N.Y. Pub. Serv. Dep't 2024). In all three of these states, the policy change would not prohibit network extensions; it would merely allocate the costs of extending the network to the customers seeking service instead of recovering it from existing customers.

this writing, include actually accelerating depreciation schedules or directing utilities to substitute an NPA project for conventional infrastructure investments – the two categories of action that could strategically reposition gas systems for managed decline.

In a subset of the jurisdictions with legislated emissions limits, utility commissions have gone further, generally pursuant to further legislation. Examples from Colorado, Massachusetts, and Washington are all illustrative, as those states have adopted measures aimed at steering gas utilities to depart from their historic patterns of investment and operation. In Colorado, this takes the form of a Clean Heat Standard,[221] which functions as a sector-specific cap-and-trade scheme.[222] In Massachusetts, the legislature revised the statutory basis for utilities' obligation to serve, updating it to cross-reference the state's emissions sub-limit for the buildings sector.[223] Notably, that legislation was adopted in December 2024, a year after the Massachusetts Department of Public Utilities had issued a historic order in its gas planning proceeding in December 2023,[224] because – notwithstanding the DPU's order – utilities had continued to assert that the obligation to serve imposed a hard limitation on their ability to comply with the DPU's directives to consider NPA projects.[225] As for Washington, the legislature there passed the Large Combination Utilities Decarbonization Act in 2024, directing that state's utility commission to develop regulations to guide the integration of electric and gas network planning by Puget Sound Energy, the state's largest utility, in pursuit of gas system decarbonization goals.[226]

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221. 2021 Colo. Sess. Laws 2039 (S.B. 21-264) (codified at COLO. STAT. REV. § 40-3.2-108 (2022)); *see also What is a Clean Heat Plan?*, COLO. PUB. UTILS. COMM'N: DEP'T OF REGUL. AGENCIES, https://puc.colorado.gov/cleanheatplans (last visited Oct. 10, 2025) (listing implementing proceedings, including utility commission decisions adopting clean heat plans of Public Service Company of Colorado (Xcel Energy), Atmos Energy, and Summit Utilities / Colorado Natural Gas).

222. Although the particulars of each scheme differ, they both specify covered entities, including gas utilities, that must purchase allowances in order to continue emitting above a threshold volume. Payments for those allowances are then used to support customer uptake of clean alternatives, such as air and ground source heat pumps. *See generally* MARION SANTINI ET AL., CLEAN HEAT STANDARDS HANDBOOK (2024).

223. 2024 Mass. Acts 75. The Massachusetts DPU has not yet issued an order or regulation implementing this legislative change, but a recently issued Hearing Officer Memorandum reflecting that it is contemplating such an action. *See* Memorandum from Jennifer Cargile, Stephanie Mealey & Lauren MacArthur, Mass. Dep't of Pub. Utils. Hearing Officers to Berkshire Gas Co. et al., Request for Comments Regarding Legal Issues Associated with Electrification Demonstration Projects by Gas Local Distribution Companies, No. 25-40 – 45 (Aug. 26, 2025), https://fileservice.eea.comacloud.net/V3.1.0/FileService.Api/file//aefciadee?YgWwGTAmq58dUjJIdAUzMsNCatjOk9WV8p1DYzg/yRiPcSxI+blU344Khxm+qpOeg0hKFj9M9l/xQR8+/8GqPvdGgrFe6XR6ngIfa80wd3rxFD8G4j981M2Rna9aVTXA; *see also* Barrett, *supra* note 161, at 2 ("In revising section 92 and making a good number of other changes in state law, the Legislature unambiguously expressed its intention to see the Commonwealth curb certain competitive advantages granted to the gas industry by earlier Legislatures. We chose instead to accelerate the state's transition towards cleaner energy alternatives, and we appreciate the Department's desire to honor these new policy directives.").

224. Order on Regulatory Principles and Framework, No. 20-80-B, at 14 (Mass. Pub. Utils. Dep't 2023).

225. *NPA Working Group Meeting #2*, *supra* note 203 ("The challenges around customer engagement are great – it will be difficult to get 100% of customers on board with an NPA.").

226. 2024 Wash. Sess. Laws 2326 (codified at WASH. REV. CODE § 80.86.020 (2024)) ("Consolidated planning requirements for gas and electric services—Integrated system plan requirements"); Draft Rules RDS-

While these three states have brought utility regulatory practices into greater alignment with decarbonization targets, in jurisdictions that have adopted legislative decarbonization targets but not legislated changes to utility law, efforts to alter the utility regulatory framework have been less durable. For instance, in 2023, Ontario, Canada's legislated emissions limits resembled those of its U.S. neighbor, New York.[227] The Ontario Energy Board (OEB) issued a December 2023 order in "the first OEB proceeding to consider a gas rates application in the context of the energy transition."[228] Citing Ontario law regarding greenhouse gas emissions reduction requirements, the board flatly rejected Enbridge Gas' proposed capital spending plan as "not responsive to the energy transition," likely to "increase[] the risk of stranded or underutilized assets," and therefore not prudent.[229] But this decision was swiftly overturned by legislation adopted just five months later, which shifted the relevant authorities from the OEB to Ontario's energy minister.[230]

In sum, utility commissions have made few and minor changes to the utility regulatory frameworks in their respective states as a result of climate laws that impose economywide emissions limits. Gas planning proceedings have been the main response to statewide decarbonization targets, but such proceedings have served mainly to highlight key issues – not to effectuate changes to the components of the existing utility regulatory framework. Further, where commissions have made such changes in a durable fashion, they have grounded their actions in additional legislation that expressly revised the statutory basis for the utility regulatory framework. Legislators, for their part, often have not reconciled their commitment to long-term decarbonization targets with the shorter-term actions those targets require. When the Ontario Energy Board did so on its own authority, without overstepping a legal boundary but also without express legislative sanction, the legislature promptly reopened that gulf, preventing regulators from aligning gas utility planning with economywide emissions limits.

6464.1, No. U-240281 (Wash. Utils. & Transp. Comm'n 2025); Draft Rules RDS-6471.1, No. U-240281 (Wash. Utils. & Transp. Comm'n 2025), https://www.utc.wa.gov/casedocket/2024/240281/docsets.

227. The New York Climate Leadership and Community Protection Act of 2019 prescribes statewide greenhouse gas emissions reductions from 1990 levels of 40% by 2030 and 85% by 2050. 2019 N.Y. Sess. Laws ch. 106 § 2 (McKinney) (codified at N.Y. ENV'T. CONSERV. LAW § 75-0107(1)(a)-(b)). Ontario adopted a greenhouse gas emissions reduction target of 30% below 2005 levels by 2030. *See* Cap and Trade Cancellation Act, 2018, S.O. 2018, c. 13, § 3 (Can. Ont.); MINISTRY OF THE ENV'T, CONSERVATION & PARKS, PRESERVING AND PROTECTING OUR ENVIRONMENT FOR FUTURE GENERATIONS A MADE-IN-ONTARIO ENVIRONMENT PLAN 21-24 (2018). This was broadly consistent with the federal Canadian nationwide emissions reduction targets for 2030 and 2050. *See* Canadian Net-Zero Emissions Accountability Act, S.C. 2021, c. 22 (Can.). Notably, Canada's government also adopted an escalating carbon price that was scheduled to rise C$10/ton CO2e (carbon dioxide equivalent) annually starting in 2018 until it reached C$170/ton CO2e in 2030. *Update to the Pan-Canadian Approach to Carbon Pollution Pricing 2023-2030*, GOV'T OF CAN. (last updated Aug. 5, 2021), https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information/federal-benchmark-2023-2030.html.

228. Enbridge Gas Inc., Decision and Order, No. EB-2022-0200, at 9 (Ont. Energy Bd. Dec. 21, 2023), https://tinyurl.com/msmjasrd.

229. *Id*. at 19-21.

230. Keeping Energy Costs Down Act, 2024, S.O. 2024, c. 10 (Can. Ont.); Fatima Syed, *Ontario Government Fulfills Promise to Overrule Independent Energy Board — in Favour of Enbridge Gas*, THE NARWAHL (Feb. 22, 2024), https://thenarwhal.ca/ontario-overrules-energy-board-enbridge/.

V. OPTIONS FOR REFORM

The fundamental conflict between the status quo of utility regulation and the likely future of gas systems still demands action – action that legislated decarbonization targets do not appear likely to deliver. As sections II and III detail, the 1907 regulatory model is built not on a coherent foundation of unified principles, but rather on loosely cohered solutions to specific problems. Supposedly inviolable principles actually often conflict – and resolving the looming crisis of wires-vs-pipes competition can best be achieved by resolving one or more of those conflicts. The long-lived utility regulatory framework has actually proven quite malleable in the past,[231] and regulators should not shy away from resolving longstanding tensions to better meet the needs of the moment. Doing so can make both utilities and commissions responsive to competitive pressure, rather than simply susceptible to it.

Each of the three categories of reform presented here would end gas utilities' regulatory treatment as independent, privately owned, natural monopolies, and would create legal and regulatory circumstances that allow for the resizing of the gas distribution system to keep costs in line with revenues and protect ratepayers and shareholders alike from the risk of collapse. But each reform proposal also takes a distinct approach to recognizing the challenge of wires-vs-pipes competition. The first would recognize that gas' status in a particular jurisdiction has become duplicative and address it by ending utility regulation of gas utilities. The second option would encourage integration of co-located electric and gas utilities to regulate them jointly as energy distribution utilities. The third – public ownership – would, like the first, remove gas utilities from their current status under the existing regulatory framework, but by placing them under wholly public, rather than wholly private, auspices. To fully illustrate how these distinct approaches to reform could address the different concerns raised above, we examine each independently, but many different mixed approaches are possible.

A. Unleashing competition would require careful dis-integration

Removing gas companies from the state utility regulatory framework would both recognize the increasingly duplicative status of gas service, and force gas companies to be more responsive to competitive pressure from electrification. Unconstrained by any obligation to serve – fuel-specific or otherwise – or by the prohibition on discriminatory terms of service, a gas utility faced with the situations described in section IV.A.2 would be free to change the shape or size of its network, the range of its service offerings, or the rates charged to its customers. Exposure to competition could prompt gas companies to address the risk of mismatch between their costs and revenues, empowering managers to decide where decommissioning is more appropriate than ongoing operation, and whether new terms of service would better meet the needs and capacities of a declining consumer base. In places where the cost of gas service leads a critical mass of customers to opt for alternatives, deregulation would leave gas companies freer to

231. *See, e.g.*, Gocke, *supra* note 56.

cease operating and exit the energy distribution market well before they encounter acute financial distress.

As described in section III.B.4 above, gas distribution systems provide critical services, but require substantial investments to provide those services in a way that is safe, for both end users who depend on gas heat and the public at large. Deregulation of gas utilities would therefore require sunsetting natural-monopoly treatment and rate regulation, while also providing for the safe unraveling of gas companies' relationships with their customers. In some jurisdictions this may be possible without legislation, but legislation can still give the reform program a clear legal basis, coherence, and momentum. Whatever vehicle launches reform, historical precedents can help in designing the separation it involves. Several industries have previously exited from regulatory regimes that limited entry and set prices through administrative processes. Deregulation came to natural gas extraction and transmission in the 1970s and 80s, to long-haul trucking in the 1980s, to many aspects of telecommunications in the 1990s, and to the generation and transmission segments of many states' electric power sectors in the 1990s and early 2000s.[232] But while these industries contribute to public safety and wellbeing in important ways, none involve operations that are as omnipresent, critical, and potentially dangerous as the distribution of natural gas through the mains and service lines that run under public streets and into millions of residential and commercial buildings.

Experiences with the deregulation of other industries are important and informative but also incomplete for guiding an economic deregulation of gas distribution service. If deregulation proceeds too rapidly and does not pair the right to withdraw from service with robust transition-assistance programs, it could easily deprive vulnerable ratepayers of critical services. While electric appliances appear highly likely to be able to provide all consumer-scale services currently met by gas utilities, constraints at every level of the electric system, and the realities of appliance installation, mean that such replacements cannot be available instantaneously.[233] Likewise, if deregulation extends beyond the natural-monopoly and rate-regulatory aspects of energy utility regulation in a way that erodes existing safety and maintenance obligations, it could enable explosive and potentially deadly neglect. Even in past cases of deregulation where system safety outcomes remained relatively stable, such as in the case of interstate trucking,

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232. *See* CASTAÑEDA, *supra* note 39, at 183-194; Reuel Schiller, *The Curious Origins of Airline Deregulation: Economic Deregulation and the American Left*, 93 BUS. HIST. REV. 729 (2019); MARK H. ROSE, BRUCE E. SEELY & PAUL F. BARRETT, THE BEST TRANSPORTATION SYSTEM IN THE WORLD: RAILROADS, TRUCKS, AIRLINES, AND AMERICAN PUBLIC POLICY IN THE TWENTIETH CENTURY (2006); RICHARD F. HIRSH, POWER LOSS: THE ORIGINS OF DEREGULATION AND RESTRUCTURING IN THE AMERICAN ELECTRIC UTILITY SYSTEM 8 n.12 (1999) (terming deregulation as "restructuring.").

233. In addition to the fundamental reality that installing replacement heating and cooking appliances takes time, constraints on available HVAC technicians, the manufacturing and supply of electric appliances, capacity on local electric distribution circuits, capacity on transmission infrastructure, and electric generation itself could all increase the challenge of providing replacement electric service on an emergency basis. Furthermore, unmanaged shrinkage of a gas distribution network could cause sudden failure of the gas network itself or its managing utility corporation. For further discussion of this risk, see Lappen & Grubert, *supra* note 14.

workers have still documented dangerous degradations in maintenance and operating standards.[234]

Describing the key principles of a successful deregulatory transition for gas helps to highlight the questions of policy and issues of law that would likely crop up as the process unfolds. To begin, to protect the crucial, ongoing priorities of safety and reliability, the decision to deregulate would have to provide for a period of transition including dates or sets of conditions that trigger the end of specific rights and obligations. This transition period would also allow gas companies to assess business conditions and form plans about the future operation of their networks outside of economic regulation. Where managers determine that market conditions do not warrant maintaining certain segments of their distribution network, they could then begin a decommissioning process. To make this process safe and equitable, the program of deregulation would need to include strong outreach and transition-assistance measures to ensure that customers are not left without critical services, and to clarify what responsibilities deregulated gas companies have to their former customers.

To steer the utility, its customers, and other stakeholders through this deregulatory transition, policymakers would need to establish clear, binding timelines in advance, and answer several core questions relating to costs and their recovery. Most fundamentally, policymakers would need to specify when particular regulatory requirements (and rights arising from those requirements) would change or end. For instance, a fuel-specific obligation to serve new customers with gas might end as soon as the deregulatory reform program enters into effect, but a fuel-neutral version of the obligation on gas utilities to ensure service to their existing customers might persist for the duration of the transition period.[235] As noted above, several jurisdictions outside of the United States have adopted partial or full gas network decommissioning plans that are scoped for a decade or longer.[236] Within an overarching deregulatory decommissioning

234. *See* Donald V. Harper & James C. Johnson, *The Potential Consequences of Deregulation of Transportation Revisited*, 63 LAND ECON. 137, 140-41 (1987) (noting significant jump in number of bankruptcies among trucking companies following deregulation); W. Kip Viscusi, *The Effect of Transportation Deregulation on Worker Safety*, *in* TRANSPORTATION SAFETY IN AN AGE OF DEREGULATION 70, 89 (Leon N. Moses & Ian Savage eds. 1989) ("A variety of regression specifications fail to reveal any adverse effects of deregulation . . . [However, o]ne should not dismiss out of hand the claim by pilots and trucking operators that safety conditions are worsening.").

235. For a fuller description of a fuel-neutral obligation to serve, see *infra* Section V.B.3.

236. *E.g.,* JAN ROSENOW, WAS TUN MIT DEN GASNETZEN? EINE ZUSAMMENFASSUNG EUROPÄISCHER LÖSUNGSANSÄTZE [WHAT TO DO WITH GAS NETWORKS? A SUMMARY OF EUROPEAN APPROACHES] 8 (2025) (noting that Winterthur, Switzerland plans to decommission one-third of its gas distribution network by 2033); GHD ADVISORY, GAS CONNECTION DECOMMISSIONING (ABOLISHMENT) TECHNICAL REVIEW 50 (2025) (observing that adherence to statutory decarbonization target "equates to roughly 20 years (at the time of writing) for a phased decommissioning program to be rolled out."); GEMEENTE AMSTERDAM [CITY OF AMSTERDAM], UITGANGSPUNTENNOTITIE WARMTEPROGRAMMA 2026-2031 [BASIC PRINCIPLES NOTE HEAT PROGRAM 2026–2031] 2, https://openresearch.amsterdam/en/media/inline/2025/7/7/uitgangspuntennotitie_warmteprogramma_2026_2031-757324975.pdf?is_http_request=true&auth_replay_token=rrPSmvGLzt6HndybwoTl (last visited Oct. 21, 2025) ("The Heat Program provides direction for the heat transition by identifying which neighborhoods (or parts thereof) we will work with sustainable heating technologies in the coming ten years and in what order that will happen.").

timeline, some termination points might be determined not by dates but rather by triggering conditions such as indications from the co-located electric utility that the capacity of its distribution system can support full electrification of all gas customers, and from a state energy office that all affected gas customers have enrolled in a transition support program that will track enrollees' access to energy services.

Because constitutional protections of process and property prevent policymakers from directing a utility to provide service without also enabling it to recover the costs of doing so, questions of how to value assets, allocate costs, and authorize cost recovery are all bound up with decisions noted above about what duties to assign to gas utilities for the duration of the transition period. Deregulation would almost certainly affect the value assigned to the gas utility's business going forward: a gas company not subject to rate of return regulation would be valued by markets rather than utility commission proceedings and so would be a riskier bet for investors. But what about the assets in the gas utility's rate base that are not depreciated at the time of deregulation – how are they to be valued during the transition period and afterward, and from whom should the gas utility have a right to seek to recover that value? More specifically, what return *on* investments, if any, should utility shareholders receive during the transition, and should they, by the end of that period, receive a full return *of* their investment in assets used to provide service to customers? Further, how do the answers differ for investments made prior to deregulation and during the transition period? And finally, if returns fall below what a gas utility needs to meet its obligations during transition, what other sources can be tapped to ensure that service remains safe and reliable and that rates borne by remaining gas customers do not balloon? All of these questions have valuable historical antecedents in the comparisons listed above.

A deregulatory reform program – even one the implementation of which went to plan – would create significant risks. Jettisoning the economic regulations that have provided an exoskeleton for gas utilities for over a century could destabilize those systems in a myriad of ways. Stripped of their core profit protections, utilities' current owners might seek to exit as quickly as possible, only to face would-be buyers wary of the profitability of economically deregulated gas service. This approach would also deprive regulators of some of their most-used tools for incentivizing compliance with safety requirements and alignment of utility conduct with public-interest goals such as equity.

B. Managing competition through integration could be aided by consolidated ownership

Instead of unleashing competition on gas utilities, policymakers could relieve the competitive pressure those utilities face by coordinating or fully integrating the electric and gas distribution networks that serve a given area.[237] This would mean moving away from treating piped gas as a separate category of natural monopoly but otherwise continuing to apply the components of the utility regulatory framework described in section IV.A.1. As explained in this

237. *See* LAPPEN ET AL., *supra* note 3, at 12-13.

subsection, fuel-specific obligations to serve and parallel, siloed operation and regulation of electric and gas service impede effective management of the risks facing gas utilities and their customers. Breaking down these barriers between gas and electricity could mitigate wires-vs-pipes competition and improve regulators' ability to preserve service while decommissioning gas assets. In addition, greater oversight capacity, updates to service territories, or both, would be needed to steer integrated utilities effectively

1. Integration

Integration of electric and gas utility planning and decision-making could make single-fuel utilities more responsive to competitive pressure by enabling them – with oversight from utility commissions – to reorient their analyses, investment decisions, and rate designs to a de-siloed notion of energy distribution services. Most importantly, integration could allow both the electric and gas networks in a given area to operate as complementary parts of a single energy distribution system, the owners of which, guided by regulation and regulators, aim to deliver safe and reliable *energy* at least cost. This approach draws on the foundational concerns about wasteful duplication, described in section II.A, that helped to prompt the development of state utility regulation. Integrating gas and electric oversight, planning, and management allows regulators and system operators to see where existing service segments are duplicative, and therefore to avoid wasteful preservation of both parallel systems. Importantly, this approach is fuel-neutral, and would neither competitively disadvantage gas service, nor push groups of customers off gas where costs do not warrant doing so. Rather, it would remove regulatory and ownership silos that currently prevent customers and utilities from responding to competitive pressures and opportunities to benefit from fuel-switching. Where the benefits of switching do not outweigh the costs, regulators could allow gas service to continue.

Generally, today, "[g]as and electric utilities plan and operate their networks in parallel to one another even when they are affiliated companies with a common parent company."[238] Long-term utility planning is common in the U.S., especially for electric utilities,[239] but such planning takes place within the silo of a particular fuel's offerings and customers, and generally does not examine costs, benefits, or other effects that accrue beyond that silo. A small handful of jurisdictions have begun pushing their utilities to explore what integrating planning across co-located electric and gas systems would involve: Massachusetts' utility commission directed utilities there to undertake some amount of coordinated planning starting

238. EVERSOURCE, ELECTRIC SECTOR MODERNIZATION PLAN, No. 24-10, at 641 (2024),

239. Integrated resource plans are required in 28 jurisdictions and distribution system planning is required in 22 others. Planning requirements have become ubiquitous since the tumultuous 1970s and 80s, and as the array of resources available – on both the supply and demand sides – has broadened. MARK LEBEL ET AL., OPPORTUNITIES FOR INTEGRATING ELECTRIC AND GAS PLANNING 3-4 (2025); LISA C. SCHWARTZ ET AL., STATE REQUIREMENTS FOR ELECTRIC DISTRIBUTION SYSTEM PLANNING 8 (2024). However, only nine states direct gas utilities to conduct long-term planning. *See* ZITELMAN, *supra* note 208, at 4. Notably, this number has stayed small in spite of integrated resource planning being a known and readily available option for gas utilities for decades. *See generally* CHARLES GOLDMAN ET AL., PRIMER ON GAS INTEGRATED RESOURCE PLANNING (1993).

in 2025;[240] Washington State's commission adopted a regulation in September 2025 to guide integrated planning for both the electric and gas sides of that state's largest utility;[241] and utilities in California, Colorado, and New York have made exploratory forays as well.[242] These efforts, however, are all preliminary.

The January 2025 report *Opportunities for Integrating Electric and Gas Planning*, published by the Regulatory Assistance Project (RAP) and Berkeley Lab, organizes the activities involved in utility operation – information gathering, demand forecasts, systems analysis, and decision making about operations and investments – in a way that makes it easy both to identify potential benefits and also to see the changes – and challenges – that integration would involve.[243] By expanding the scope and improving the quality of information available for analysis, and by standardizing decision making, de-siloing these activities can lower energy system costs, improve reliability and resilience, improve confidence in investment choices, allocate costs across fuels and customers more equitably; and streamline administrative processes.

The major changes required to achieve integration include: expanding access to information that is currently compartmentalized, and homogenizing parameters for collection, collation, storage, and sharing; aligning model inputs and analytical parameters, possibly by outsourcing the task to a disinterested third party; integrating technical analyses of network capacity relative to demand (including power flow analysis for electric grids and hydraulic analysis for gas networks); and integrating financial analyses of different options for meeting identified needs.

Beyond these planning measures, integration would also entail the implementation of decisions about the ownership and maintenance of assets and the allocation of costs among utilities, ratepayers, and others. That is, where the integration of planning can reveal opportunities to reduce aggregate costs to customers by redesigning rates, adjusting system operations, modifying plans for capital investment, or accelerating depreciation of assets slated for disuse, the costs and benefits arising from those decisions would need to be allocated across utilities and their customers. While this type of cost allocation is not entirely unprecedented, neither is it obvious; establishing new principles for assigning responsibility across fuels will require careful policy design.

Attempting to coordinate the efforts of separately owned utilities with an eye to the integration of planning and implementation would create a circumstance in

240. Order on Regulatory Principles and Framework, *supra* note 224, at 131.

241. Order Adopting Rules Permanently, No. U-240281 (Wash. Utils. & Transp. Comm'n 2025), https://tinyurl.com/2879mbrz. The legislature directed the Utilities and Transportation Commission to develop these regulations in 2024 legislation. WASH. REV. CODE § 80.86.020 (2024). The utility commission's final order adopting implementing regulations explains: ". . . this is likely to result in an ISP [integrated service plan] that proposes a different set of specific actions compared to what siloed analyses would recommend separately for the gas system and electric system." Order Adopting Rule Permanently, No. U-240281, at 6 (Wash. Utils. & Transp. Comm'n 2025).

242. Chris DiGiovanni, Gas Strategy Program Manager, Pac. Gas & Elec. Co. & Gerhard Walker, Manager, Eversource Energy, NARUC Task Force on Natural Gas Resource Planning: Expert Learning Series, Coordination Between the Gas and Electric Sectors at the Distribution Level (June 26, 2024), https://tinyurl.com/2m37d8dy.

243. LEBEL ET AL., *supra* note 239, at 10, 12-15.

which the interests of one or both utilities' shareholders are likely to be pitted against the interests of the shareholders or customers of the other utility. Competing, co-located utilities would be unlikely to cooperate on decisions that put them in a worse financial or strategic position than they would occupy if they had made and executed their plans independently. Preventing such conflicts from derailing integration efforts would require regulators to lay out clear decision and cost-allocation metrics in advance and then referee actively as utilities translate plans into investments and actions.

2. Limits of coordination

Regulators' experience with non-pipeline alternative (NPA) projects provides a good illustration of how and why separate utilities with overlapping service territories sometimes resist measures that integrate planning and decision making. If increased coordination between separate electric and gas utilities cannot overcome the hurdles that currently impede identification and development of NPAs, then such coordination will probably not be sufficient to reveal the costs of ignoring wasteful competition between electric and gas utilities, much less mitigate it.

Identifying potential NPA projects and pursuing those that are viable and cost-effective currently requires determining five key factors: (i) the location and operational and economic profile of the gas system segment at issue; (ii) the ability of the NPA project's component parts to meet all safety and reliability requirements of customers served by the project; (iii) the timeframe required for NPA development relative to the timeframe available to address any gas system reliability or safety issues; (iv) the costs of the project relative to a conventional gas system upgrade or replacement; and (v) the willingness of customers served by the segment to participate in the NPA project.[244]

The last three of these factors all interact more or less directly with the obligation to serve. Should a utility commission interpret the obligation in its jurisdiction to be rigidly fuel-specific, then one or more potential customer-participants could slow down design and development, increase costs, or simply

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244. *See generally* DNV, FINAL REPORT: SYSTEM PRUNING JURISDICTIONAL SCAN (2025), https://ehq-production-canada.s3.ca-central-1.amazonaws.com/d7bfc7d6f85955d970397c10a2275a2145bdb509/original/1757083590/7ab5351fadae114ca696d6f478d13dae_Enbridge%20System%20Pruning%20Jurisdictional%20Scan_Final%20Report.pdf?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIA4KKNQAKIII4DU7AG%2F20260425%2Fca-central-1%2Fs3%2Faws4_request&X-Amz-Date=20260425T000152Z&X-Amz-Expires=300&X-Amz-SignedHeaders=host&X-Amz-Signature=5eaa1a39f3bfa17ffda67ddc54b37a3796e6c19a0fe6aed2ae386f1583712949; Kelly Klima et al., *How to Select Strategic Pilot Sites to Decommission Portions of Natural Gas Infrastructure in Southern California* (RAND, Working Paper No. WR-A1717-1, 2025); ABIGAIL LALAKEA ALTER, SHERRI BILLIMORIA & MIKE HENCHEN, RMI, OVEREXTENDED: IT'S TIME TO RETHINK SUBSIDIZED GAS LINE EXTENSIONS (2021); RON NELSON ET AL., STRATEGEN, NON-PIPELINE ALTERNATIVES TO NATURAL GAS UTILITY INFRASTRUCTURE: AN EXAMINATION OF EXISTING REGULATORY APPROACHES (2023); RON NELSON ET AL., STRATEGEN, NON-PIPELINE ALTERNATIVES: A REGULATORY FRAMEWORK AND A CASE STUDY OF COLORADO: LEADING PRACTICES IN THE SCREENING AND EVALUATION OF NPAS (2023).

scuttle the project by refusing to participate.[245] Gas utilities therefore tend to characterize the obligation to serve as a checkmate that requires them to maintain and expand their pipeline networks,[246] thus precluding NPA project proposals that have anything less than unanimous consumer buy-in.[247] This sort of characterization has informed recent legislation in Colorado,[248] California,[249] and Washington[250] that authorizes exemptions from the obligation to serve under narrowly defined circumstances, in order to conduct targeted decommissioning of gas system segments. As of this writing, no segments have been decommissioned in those states pursuant to their respective legislative measures.

More fundamentally, all five factors have two things in common: they can be used to thwart NPA projects, and much of the information necessary to assess each of them is controlled by the gas utility. Thus, alone or in combination, these factors enable gas utilities to wield information, schedules, and other ministerial tools to try to exclude system segments from consideration or to weaken the case for a given segment being replaced by an NPA. Given that NPA projects will seldom yield benefits to a gas utility that can rival the addition, upgrading, or replacement of conventional gas infrastructure, gas utilities will generally have both motive and opportunity to defeat many if not all proposed NPA projects.[251] This has so far been borne out in practice: since the establishment of California's zonal decarbonization pilot program, which was established pursuant to a statute devised expressly for the purpose of fostering NPA pilot projects, not a single project has been established.

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245. *See* DNV, *supra* note 244, at 10 ("The obligation to serve is a major barrier to system pruning that has not yet been solved in any jurisdiction.").

246. *Compare, e.g.*, Post-Hearing Statement of Position of Public Service Company of Colorado, Proceeding No. 24AL-0049G, at 2 (Colo. Pub. Utils. Comm'n 2024) ("While the Company's obligation to serve is not disputed, the nature of that obligation as we move forward will be the subject of future proceedings. In the interim, however, the Company must provide gas service to existing and requesting customers *at the same time* it is actively support[ing] efforts to significantly reduce greenhouse gas emissions."), *with* Commission Decision Permanently Suspending Tarriff Sheets, Proceeding No. 24AL-0049G, at 100 (Colo. Pub. Utils. Comm'n 2024) ("The record in this Proceeding further shows rate projections that anticipate a 40 percent drop in throughput, coupled with a full doubling of base rates for retail customers. . . . Based on these factors, it is reasonable to conclude that natural gas will likely struggle to compete cost-wise with efficient electric options for heating. The dichotomy of [the utility] seeking to profit from the expansion of its system, while also planning to spend $440 million over the next three years to largely reduce load on that same system is striking.") (internal citations omitted).

247. *See, e.g.*, Northwest Natural Gas Company's Opening Brief, No. UG 520, at 4 (Or. Pub. Util. Comm'n Aug. 8, 2025) (urging commission to reject proposal that utility pursue an electrification pilot to enable gas segment decommissioning and arguing that "the Commission lacks legal authority to implement the Coalition's proposals because of its affirmative statutory duty to obtain gas service for customers and its lack of authority to order [the utility] to take actions inconsistent with [it]'s duty to serve.").

248. H.B. 24-1370, § 40.3.3-103(4), 74th Gen. Assemb., 2d Reg. Sess. (Colo. 2024).

249. 2024 Cal. Legis. Serv. ch. 602 (West).

250. H.B. 2131, § 6, 68th Leg., Reg. Sess. (Wash. 2024).

251. This has so far been borne out in practice in the implementation of California's pilot segment-removal law. Over the past year, gas utilities have attempted to keep key data private and have engaged in malicious compliance with mandatory data disclosure. Denise Grab, *Gas Utilities Can Do Better on Neighborhood Electrification*, LEGAL PLANET (Aug. 7, 2025), https://legal-planet.org/2025/08/07/gas-utilities-can-do-better-on-neighborhood-electrification/.

In sum, inter-utility coordination under a fuel-specific obligation to serve and without stringent regulatory intervention will probably fail to achieve widespread development of NPA projects.[252] Achieving coordination's promise will require confronting these conditions.

3. Changes that would enable integration

A fuel-neutral obligation to serve. Utility commissions today generally interpret utilities' implied or explicit obligation to serve existing and new customers as being fuel-specific, meaning that a utility would not comply with its obligation if it supplied a customer seeking gas service with, for instance, upgraded electrical service and a heat pump instead. This interpretation, however, is generally tacit: neither commissions nor courts have had occasion to resolve a dispute about whether a fuel-specific reading is actually grounded in the statutory language that creates an energy utility's obligation to serve its customers.[253] In states where the statutory language underlying that obligation does not present a bar to adoption of a fuel-neutral version, a utility commission might issue an order or adopt a regulation to clarify and update the nature of the obligation on utilities. Where statutory language precludes such an order, this step would require a legislative change directing the utility commission to update the obligation.

Whether the update is a clarification by a utility commission or an order that implements new legislation, a fuel-neutral obligation to serve would need two elements to make it an effective tool for unlocking inter-utility integration. First, it would expressly establish that utilities must provide energy distribution services, and that a customer's preference for a particular fuel need not determine what the utility provides. Second, it would also set forth a performance standard to guide utilities and protect customers by specifying technical parameters for a supply of distributed energy that is adequate given foreseeable conditions.

Consolidation. By "consolidation" we mean the unification of ownership and management of co-located electric and gas distribution networks wherever gas networks exist – a step that would "replac[e] inter-firm competition with intra-firm strategic planning."[254] To quote Alfred Kahn:

> There is one extremely strong case to be made for conglomerately integrated companies in any industry, wherever a service can be provided or performed by a number of alternative media: the company that is in a position to use any or all of the media will find it in its own interest to choose the combination in each case that performs the service at the lowest possible cost.[255]

While about sixty combination utilities operate in the United States, few of those operate their electric and gas units in wholly overlapping service territories.[256]

252. As of this writing, the list of completed NPA pilot projects in California, Connecticut, New York, Washington State, and elsewhere is short and notable for having a low ratio of projects to customers.

253. *See generally* WALLACE ET AL., *supra* note 176 (identify analogous cases from the transportation context but no examples of cases arising out of disputes over the provision of energy distribution services).

254. LAPPEN ET AL., *supra* note 3, at 12.

255. 2 KAHN, *supra* note 1, at 264.

256. *Annual Electric Power Industry Report, Form EIA-861 Detailed Data Files*, U.S. Energy Info. Admin. (Oct. 7, 2025), https://www.eia.gov/electricity/data/eia861/; *Natural Gas Annual Respondent Query System (EIA-176 Data through 2024)*, *supra* note 124 (explaining authors' analysis of data).

Thus, consolidation aimed at integrating the planning and operations of co-located electric and gas networks for the purpose of removing duplicative service segments would require not only a transfer of ownership but, in many instances, a redrawing of service territories.[257]

Achieving these mergers will require navigating both utilities' property rights and their financial interests. Utilities – like all legal persons – have procedural rights with respect to the adoption of regulations and other administrative decisions that affect them.[258] They also have constitutional protections with respect to their property.[259] Constitutional protections do not preclude condemnation of private property for use by a utility,[260] but they do prevent the condemnation of property for acquisition at a price lower than fair market value.[261] As for the right to challenge the reasoning and evidence underlying a utility commission's decision, while it does not guarantee that a utility can prevent the decision from moving ahead, it can subject that decision to delay and scrutiny by a court and the wider public.[262]

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257. *Cf.* LEBEL ET AL., *supra* note 239, at 13 (noting that, even where electric and gas utilities operating in a given area are owned by the same parent, there are likely siloes in place and "[d]eliberate reorganization of personnel may be needed to foster integrated electric and gas planning, and decision makers will need to consider the terms of cooperation between the electric and gas sides of the company. . .").

258. *See, e.g.*, PacifiCorp v. Wash. Utils. & Transp. Comm'n, 376 P.3d 389, 396 (Wash. Ct. App. 2016) ("We review the Commission's Final Order under the Administrative Procedure Act (APA), chapter 34.05 RCW.").

259. Duquesne Light Co. v. Barasch, 488 U.S. 299, 308 (1989); *see also, e.g.*, Nat'l Utils., Inc. v. Pa. Pub. Util. Comm'n, 709 A.2d 972, 976-77 n.10 (Pa. Commw. Ct. 1998) ("Under the due process clause of the 5th and 14th Amendments to the United States Constitution, a utility is 'entitled to rates, not per se excessive and extortionate, sufficient to yield a reasonable rate of return upon the value of property used, at the time it is being used, to render the services.'" (quoting Denver Union Stock Yard Co. v. United States, 304 U.S. 470, 475 (1938))).

260. *See, e.g.*, 53 CAL. JURIS. 3D PUBLIC UTILITIES § 6 (West 2026) ("A public utility has the power to take property by eminent domain whether or not the power is expressly mentioned in its articles of incorporation."); 17 ILL. LAW AND PRAC. EMINENT DOMAIN § 16 (West 2026) ("The right to exercise the power of eminent domain may be conferred on public utility companies, subject to proof of a public purpose by a preponderance of the evidence, and just compensation.") (internal citations omitted); 11A IND. LAW ENCYC. EMINENT DOMAIN § 11 (West 2026) ("The Eminent Domain Act provides eminent domain procedures with regard to utilities and other corporations, who are given the authority to exercise the powers of eminent domain.") (internal citation omitted).

261. *See, e.g.*, Opinion of the Justices, 555 A.2d 1095, 1098-99 (N.H. 1989) ("State law under part I, article 12 of the Constitution of New Hampshire is comparable to its federal counterpart and leads to the same answers in this case. Although article 12 does not in terms guarantee compensation for taking by eminent domain, ever since *Piscataqua Bridge v. N.H. Bridge*, . . . this court has "inferred a right to just compensation,". . . equal to "fair market value, which may properly be defined as 'the price which in all probability would have been arrived at by fair negotiations between an owner willing to sell and a purchaser desiring to buy, taking into account all considerations that fairly might be brought forward and reasonably be given substantial weight in such bargaining.''"") (first quoting State v. Garceau, 387 A.2d 330, 331 (N.H. 1978); then quoting Davis v. State, 52 A.2d 793, 793 (N.H. 1947)); City of Logan v. Utah Power & Light Co., 796 P.2d 697, 700 (Utah 1990) ("UP & L's right to just compensation under article I, section 22 of the Utah Constitution must be fully protected against harms inflicted upon it by Logan in the exercise of the city's power to provide electrical services.").

262. *E.g.*, *In re* Minn. Power for Auth. to Increase Rates for Elec. Serv., 12 N.W. 3d 477, 494 (Minn. Ct. App. 2024) (". . . the decision is arbitrary and capricious because the commission departed from the ALJ's recommendation without adequate explanation. If an agency's findings are insufficient, the case can be either remanded for additional findings *or* reversed for lacking substantial evidence supporting the decision. . . . Because the decisional defect in this case stems from the commission's failure to explain its findings and

Policymakers and regulators can use a variety of tools to encourage utilities to look favorably on a merger that integrates electric and gas network ownership and management.[263] They could do some or all of the following, among other things: establish performance standards that would be extremely difficult for separate utilities to meet; determine that refusal to consider a merger would effectively commit a gas utility to a capital plan that risks stranding assets or underinvesting in network capacity and therefore requires an accelerated depreciation schedule; specify what costs merged entities would be authorized to recover from customers of the consolidated utility; limit unmerged utilities' access to direct or indirect policy supports; make the review and approval process for proposed mergers predictable and a clear regulatory priority; or conduct a thorough assessment of utilities' fair market value, complete with liabilities arising under CERCLA and RCRA as a result of being the successor in interest to manufactured gas companies. These and other tools could all be deployed within the bounds of constitutional policymaking.

4. Managing consolidated utilities

Utilities enjoy what Scott Hempling has called an "unearned advantage" by virtue of holding a monopoly franchise in their service territory.[264] Consolidating ownership of co-located electric and gas networks could create new opportunities to exploit this advantage, for instance by making regulatory oversight even harder for utility commissions by adding to the information asymmetries that existed before consolidation. And so, while consolidation can help make energy distribution utilities more responsive to competitive pressure from electrification in ways that eliminate redundancies and glean efficiencies, it will not inevitably do so, and could also add to the challenge utility commissions face when trying to align utility governance and operation with the public interest.

A reform program that aims for consolidation of gas and electric utilities with overlapping service territories in order to foster responsiveness to competition and reduce duplication must also establish measures to ensure that consolidated entities actually pursue NPA projects, and do not leverage their consolidation to the disadvantage of ratepayers or regulators. Legislatures could, for instance, provide commissions with additional staffing and authority to provide closer oversight of utility decisionmaking, enabling them to check up on how well utilities are at, for instance, avoiding redundant investments. Commissions can also establish performance standards to guide that decisionmaking and better facilitate oversight.

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conclusions, we conclude that remand to the commission for additional findings is appropriate.") (internal citations and quotation marks omitted).

263. LAPPEN ET AL., *supra* note 3, at 12. As the authors lay out, regulators will need to incentivize gas and electric utilities differently to achieve mergers.

264. SCOTT HEMPLING, REGULATING MERGERS AND ACQUISITIONS OF U.S. ELECTRIC UTILITIES: INDUSTRY CONCENTRATION AND CORPORATE COMPLICATION 154 (2020).

C. Public ownership deserves serious consideration, but would require careful design

Even though it has not been adopted in many U.S. jurisdictions over the past fifty years, public ownership deserves policymakers' consideration. Like the deregulatory approach discussed in section V.A, public ownership could put gas utilities outside the utility regulatory framework that, today, makes them susceptible but unresponsive to wires-vs-pipes competition. And like the combinatory approach discussed in section V.B, public ownership could make it easier for gas system managers to make decisions on the basis of system stability and service reliability rather than short-term profits, creating better conditions for responding to competition. Our discussion of it here proceeds in four parts, beginning with a summary description of the legality and current extent of public ownership of utilities (especially gas) in the United States. Next, we highlight key features of the context in which policymakers ought to evaluate the possibility of using public ownership to manage the causes and effects of wires-vs-pipes competition. Against that backdrop, we discuss the prospective costs and benefits of municipalization, the most common form of public ownership, and an alternative category of state, federal, cooperative, or nonprofit ownership.

Background. State and local governments may establish or acquire energy utilities,[265] and today there are about 950 publicly owned gas utilities in the United States, the vast majority of which are municipal.[266] The history of governmental ownership of gas systems in the United States stretches back to the mid-nineteenth century, when communities across the country began to establish municipal gas-light systems – whether by establishing a new gas company or purchasing an

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265. Laws governing the authority of state agencies and local governments to establish enterprises or to purchase them – whether the sale is voluntary or the result a condemnation involving use of eminent domain – vary from state to state. Shelley Ross Saxer, *Government Power Unleashed: Using Eminent Domain to Acquire a Public Utility or Other Ongoing Enterprise*, 38 IND. L. REV. 55, 55 (2005) ("This power to convert public utilities from private to public ownership . . . has historically been available to state and municipal governments to secure lower power rates for local residents."). In some instances, those variations are significant. *See, e.g.*, CLAIRE ARNESON ET AL., ROADMAP TO CLEAN AND EQUITABLE POWER IN MICHIGAN 147-48 (2024) (observing that 1905 Michigan law limits options for public development or acquisition of utilities). For a dated but thorough and relevant overview of legal and other hurdles facing municipalization, see VAN NESS, FELDMAN, SUTCLIFFE, CURTIS & LEVENBERG, P.C., THE UTILITY HANDBOOK: A GUIDE FOR LOCAL GOVERNMENTS IN DEALING WITH ELECTRIC AND GAS UTILITY ISSUES 52-67 (1983), https://www.osti.gov/servlets/purl/5977764.

266. *See Gas Distribution Annual Data - 2024*, U.S. DEP'T OF TRANSP.: PIPELINE & HAZARDOUS MATERIALS SAFETY ADMIN. (last updated Apr. 8, 2026), https://tinyurl.com/53juzshf (listing 949 munis). The largest and oldest gas muni in the U.S. is Philadelphia Gas Works, which serves almost 500,000 customers using about 3,050 miles of gas mains. *Id*. For comparison, the largest privately owned gas utility is Southern California Gas Co., which serves about 5.7 million residential and 178,000 commercial customers using about 101,000 miles of gas mains. *2023 Ranking of Companies By Residential Sales Customers*, AM. GAS ASS'N STAT. DATABASE, https://www.aga.org/wp-content/uploads/2025/01/1002RESCUST_Paul-Pierson-2.pdf (last visited Oct. 28, 2025); *2023 Ranking of Companies By Commercial Sales Customers*, AM. GAS ASS'N STAT. DATABASE, https://www.aga.org/wp-content/uploads/2025/01/1002COMMCUST_Paul-Pierson-2.pdf (last visited Oct. 28, 2025); S. CAL. GAS CO., PIPELINE BASICS (2013), https://tinyurl.com/4mxa92s2. Public ownership of electric utilities is both much more common, and displays a far wider variety of ownership models, including federal agencies and authorities, state agencies, municipalities, and many forms of special district. Large, publicly owned electric utilities include the Tennessee Valley Authority, the Los Angeles Department of Water and Power, the Sacramento Municipal Utility District, and the Nebraska Public Power District.

existing one – either out of dissatisfaction with private service, or because no private service was available.[267] This wave of municipalization continued through the early twentieth century, before declining as emerging state utility regulation mollified some critics and system expansion offered large, privately-held energy utilities advantages that municipal systems struggled to match. A second, larger wave of gas system municipalization occurred between 1947 and 1972, following the development of interstate pipelines that greatly expanded access to natural gas on the East Coast and in the Midwest, offering individual cities the opportunity to secure cheaper, more reliable, and less polluting gas and deflating the economy-of-scale advantages held by manufactured-gas utilities.[268] After 1972 the rate of gas municipalization ebbed to a trickle.[269] This means that, today, the vast majority of state and local governments which might consider acquiring privately-owned gas utilities have little, if any, living institutional knowledge or direct experience to draw upon.[270] This amplifies the risks of opting to address competition through public ownership, in particular by potentially slowing even further what has historically been an extremely time-consuming and politically fraught process of negotiating a purchase or condemnation price.[271]

When contemplating how to handle the likely trajectory of current wires-vs-pipes competition, policymakers should consider that the decline of assets or systems that provide critical services often ends in a form of emergency public management – generally involving direct or indirect subsidy that prolongs dependence on a declining system even as it seeks to stabilize that system for those who still depend on it. Relatively recent experiences with coal mining companies illustrate the pattern.[272] Given this likelihood in the case of unmanaged decline of

267. For more on the causes of municipal gas service, see generally Werner Troeksen, *The Sources of Public Ownership: Historical Evidence from the Gas Industry*, 13 J. L., ECON., & ORG. 1 (1997).

268. E.B. CLARK, B.N. LEIS & ROBERT J. EIBER, INTEGRITY CHARACTERISTICS OF VINTAGE PIPELINES 4-5 (2004) (reporting that 62% of transmission pipeline mileage was constructed between 1940 and 1970).

269. Of the 637 gas munis that have reported their founding date to the APGA, 472 (74% of those reporting) indicate a date between 1948 and 1972. The most active year was 1954-55, when 31 gas munis were founded. Of the 45 founded since 1990, just 13 were founded after 2000. *APGA Members by Year Founded* (spreadsheet) (received from Erin Kurilla, Am. Pub. Gas Ass'n, Nov. 11, 2025) (on file with authors).

270. This lack of institutional knowledge in government is paralleled by a relative lack of late 20th and early 21st century scholarship on the mechanisms of, obstacles to, and advantages and disadvantages of different forms of public ownership. As this section's citations show, we have therefore relied in part on the much larger body of early 20th century scholarship. In many cases, this scholarship's legal arguments are now out of date, but their overarching analyses are still solid, and they offer valuable evidence of previous generations' approaches.

271. Whether public acquisition of private utility systems has proceeded via negotiation or condemnation, timelines have often stretched from years into decades. See, for instance, the case of the Sacramento Municipal Utility District, which took more than two decades to take control of its local private electric utility systems. *See generally* Sacramento Mun. Util. Dist. v. Pac. Gas & Elec. Co., 165 P.2d 741 (Cal. Dist. Ct. App. 1946).

272. The standard story of fossil fuel firm exit or industry decline involves the inadequate provision for externalities and liabilities, even where bonding has been required in anticipation of eventual exit by well-capitalized firms. *See, e.g.*, Joshua Macey & Jackson Salovaara, *Bankruptcy as Bailout: Coal Company Insolvency and the Erosion of Federal Law*, 71 STAN. L. REV. 879, 883 (2019) ("Since 2012, four of the largest American coal producers have used Chapter 11 to discharge or otherwise avoid approximately $5.2 billion in regulatory debts: $3.2 billion in retiree benefits and $1.9 billion in environmental liabilities.") (internal citations omitted). The version of the story we anticipate in relation to gas distribution utilities is sketched in *supra* section III.B.

gas system demand, regulators should consider whether more proactive public intervention could both improve outcomes for ratepayers and reduce the risk that eventually public agencies and public coffers will be called on to subsidize a failing gas system. In this context, public ownership can be understood as a means of securing the management authority and resources needed to accomplish the parallel processes of gas customers' transition to substitutive forms of energy distribution service and a gas utility's consolidation or wind down.

Municipalization. As the muni is a relatively familiar form of public ownership of gas utilities in the United States, municipalization might be proposed as a ready solution to a gas utility's obstructive tactics, declining service quality, or rising prices in the face of intensifying wires-vs-pipes competition. The most common barrier to municipalization – including some recent attempts – is the cost of purchase or condemnation, which often exceeds the financial resources available to local governments.[273] More fundamentally, though, municipalization today raises the same issues of jurisdiction that it raised a century ago. Modern investor-owned gas utilities' distribution networks and the support systems that allow those networks to operate cheaply and reliably almost always extend far beyond the boundaries of any one local government.[274] A century ago, the municipal model of gas utility ownership was in many places outcompeted by investor-owned competitors precisely because multicity systems gained access to economies of scale unavailable to most single-city systems, and the same dynamics continue to hold true today.[275]

Municipalization, therefore, would likely end with control of only a subset of the overall gas utility. This arrangement would likely leave the resultant municipal utility either facing high start-up capital costs, higher operating costs, and lower reliability, or require it to serve as a redistributor of gas provided by the investor-owned utility from which it had separated. Depending on the goals of such a takeover, creating a publicly-owned utility that remains bound to its investor-owned predecessor could still allow the municipality to mitigate the effects of competition and phaseout, but it would not avoid the obstacles inherent in corporate control. Secondly, municipalization risks replicating the inequities of municipal boundaries themselves. In a country where city borders have long mirrored and enforced multiple forms of segregation, municipalization could widen resource and service gaps as wealthier localities pursue local control, skimming off more lucrative gas customers and destabilizing the remaining privately-owned gas utility.

Regional ownership. While municipalization has been by far the most common form of public utility in the United States, the U.S. also possesses several different models of regionwide public ownership of utilities that would likely prove better suited to contending with wires-vs-pipes competition. Public utility

273. TOBY BISHOP, ANN BULKLEY & CHRIS WALL, ELECTRIC UTILITY MUNICIPALIZATION: KEY STATISTICS AND RISK CONSIDERATIONS 2-5 (2025) (identifying that most municipalization attempts since 2000 have ended in failure and identifying key contributing factors).

274. Lois G. Forer, *Divestment of Utility Properties to Public and Nonprofit Bodies*, 42 COLUM. L. REV. 232, 240-44 (1942).

275. CASTAÑEDA, *supra* note 39.

districts, irrigation districts, state agencies, multi-state authorities, federal agencies, and some cooperative structures each offer access to more substantial financial resources and more varied revenue-generation tools. State-level structures of public ownership also further align decisionmaking by bringing control of utilities under the same level of government as most of their current regulators. Structurally, these models would allow for public control of an entire gas service territory, steering clear of the multiple jurisdictional issues created by municipal ownership. This also improves public managers' ability to guide a utility system through shrinkage or decline, ensuring that revenues from still-profitable segments of the system can be used to decommission other segments safely.

Some models of region-scale public ownership are longstanding, while others are more recent or have never yet been put into operation. In many cases, the best examples stem from the electric utility sector, where political battles for public ownership have historically been more common and taken a wider array of forms ranging across all three levels of U.S. government.[276] At the regional level, different forms of special district have been created since at least the 1930s to provide energy utility services. The most common form of these, the Public Utility District, is complemented in many parts of the American West by the electricity-providing Irrigation District. In Nebraska, electric utility service is provided to most of the state by the Nebraska Public Power District.[277] Across much of the American Midwest and West, electricity is provided by federally-financed rural electric cooperatives.[278] These regional agencies are generally governed by boards elected from within their service territories – either by ratepayers specifically or by the resident public at large – distinguishing them from other, coinciding political jurisdictions.[279] This also distinguishes special-district ownership from state ownership, a category in which existing state officeholders and ultimately the

276. For a partial accounting, see Donald J. Pisani, *Wiring the New West: The Strange Career of Public Power*, *in* WATER AND AMERICAN GOVERNMENT: THE RECLAMATION BUREAU, NATIONAL WATER POLICY, AND THE WEST, 1902-1935, at 202 (2002); Abby Spinak, *"Not Quite So Freely as Air": Electrical Statecraft in North America*, 61 TECH. & CULTURE 71 (2020); Brent Cebul, *Creative Competition: Georgia Power, the Tennessee Valley Authority, and the Creation of a Rural Consumer Economy, 1934–1955*, 105 J. AM. HIST. 45 (2018).

277. The Nebraska Public Power District was created in 1970 by the state legislature's combination of three smaller special-district electric utilities, which had themselves been purchased out of investor ownership between 1939 and 1940. Those original public takeovers had been motivated by the politics of agricultural irrigation and intensified by the crisis of the Dust Bowl, and the emergent public power districts were in fact originally forms of irrigation district. *See generally* Ralph O. Canaday, *Laws Affecting Public Power Districts*, 42 NEB. L. REV. 777 (1963); *see also* Pisani, *supra* note 276, at 202. NPPD offers arguably the best U.S. model of public repossession and operation of an entire investor-owned energy utility but has received very little scholarly attention over the past eighty years. *See, e.g.*, William F. Kennedy, *The Nebraska Public Power Districts*, 15 J. LAND & PUB. UTIL. ECON. 29 (1939).

278. *Co-op 101: Electric Co-op Facts and Figures*, NRECA (June 25, 2025), https://www.electric.coop/electric-cooperative-fact-sheet; *see also generally* PHILIP J. FUNIGIELLO, TOWARD A NATIONAL POWER POLICY: THE NEW DEAL AND THE ELECTRIC UTILITY INDUSTRY, 1933-1941 (1973).

279. On these and other forms of "public authority," see generally GAIL RADFORD, THE RISE OF THE PUBLIC AUTHORITY: STATEBUILDING AND ECONOMIC DEVELOPMENT IN TWENTIETH-CENTURY AMERICA (2013).

state electorate would control a publicly-owned utility.[280] Federal ownership, including prominent examples such as the Tennessee Valley Authority and the Bonneville Power Administration, locates governing authority with federal officeholders, despite their regional specificity.[281]

Regional ownership of all forms can create governance challenges, either because a new special district creates an opaque new government entity that ratepayers and voters struggle to comprehend, or because governance by a larger state or federal body introduces sectional or redistributive tensions.[282] As models for understanding these risks and designing well-crafted region-wide public ownership, US policymakers can examine current state and special-district agencies that operate major networked systems including water, electric generation and transmission, and telecommunications, or look to past examples of temporary or partial public ownership.[283]

Publicly-owned utilities of all forms are often subject to political and structural expectations that they self-fund, and sometimes also that they subsidize other government programs or deliver reliable transfer payments equivalent to profits.[284] These expectations create strong incentives for policymakers that mirror investor-owned utility incentives to resist declines in consumption and cut financial corners to preserve financial independence. In many United States jurisdictions, public agencies are also subject to strict financial controls that further reduce their ability raise new revenues or adjust their existing revenue streams, meaning that under certain conditions publicly-owned utilities could prove less

280. The authors are not aware of any current examples of state ownership. New York's Long Island Power Authority, Nebraska's Nebraska Public Power District, and California's proposed Golden State Energy are (or would be) created by state authority, but in each case, governance is (or would be) independent of state officials. The closest extant version of state ownership of an energy utility is the category of state-owned electric generation assets, and especially large hydroelectric dams.

281. The board of the Tennessee Valley Administration is appointed by the president and confirmed by the Senate, and the administrator of the Bonneville Power Administration is appointed by the Secretary of Energy. The Bonneville Power Administration is primarily a power wholesaler but has in the past take on direct industrial customers. For more on these federal power institutions, see PAUL W. HIRT, THE WIRED NORTHWEST: THE HISTORY OF ELECTRIC POWER, 1870S-1970S (2012); ERWIN C. HARGROVE, PRISONERS OF MYTH: THE LEADERSHIP OF THE TENNESSEE VALLEY AUTHORITY, 1933-1990 (2001); SARAH T. PHILLIPS, THIS LAND, THIS NATION: CONSERVATION, RURAL AMERICA, AND THE NEW DEAL (2007).

282. *See generally* RADFORD, *supra* note 279; DONALD AXELROD, SHADOW GOVERNMENT: THE HIDDEN WORLD OF PUBLIC AUTHORITIES – AND HOW THEY CONTROL OVER $1 TRILLION OF YOUR MONEY (1992).

283. Examples of public ownership of significant generation and transmission assets include the Bureau of Reclamation, the Army Corps of Engineers, the Department of Defense, and the California Department of Water Resources. For one example of partial, temporary public ownership, policymakers can examine the U.S. federal government's 2008-2009 bailout of major U.S. automakers. However, policymakers should not expect to earn back their initial investments or restore private ownership when taking a whole or partial ownership stake. Unlike in the preceding example, the goal of a public takeover of a gas utility would be stabilization for safe decline. Given the competitive conditions described above, this would most likely require indefinite and increasing public subsidy.

284. RADFORD, *supra* note 279, at 889; Bryan A. Mantz, *Utility Transfers to the General Fund: What Is Reasonable, Fair, and Legal?*, 104 J. AM. WATER WORKS ASS'N E530 (2012); LINDSEY BUTTEL, AM. PUB. POWER ASS'N, PUBLIC POWER PAYS BACK: PAYMENTS AND CONTRIBUTIONS BY PUBLIC POWER UTILITIES TO STATE AND LOCAL GOVERNMENTS IN 2022 (2024).

stable than the investor-owned incumbents they were designed to stably shrink.[285] Making public ownership viable as a tool for resolving wires-vs-pipes competition, then, would require careful institutional design, robust new state capacity, reliable financial checks and resources, and skilled public communication.

Lastly, policymakers interested in exploring public ownership as a means of managing wires-vs-pipes competition should pay careful attention to the institutional tools and legal rules by which they will value utility property in advance of purchase or condemnation. Public takeovers are often made or broken on the question of valuation, as the purchasing agency and private utility owner tangle over the system price.[286] In particular, any jurisdiction that sees public ownership as even a potentially useful option for addressing wires-vs-pipes competition and managing gas utility shrinkage over the coming decades should first ensure that the valuation process takes into account gas systems' direct and indirect liabilities, closure and decommissioning costs, and prospective changes to depreciation schedules for both existing assets and new investments due to declining gas consumption. As much as possible, policymakers should anticipate key features of a utility's valuation. Traditional approaches to valuation could make overly optimistic assumptions about future profitability and growth prospects that could lead incautious policymakers to overpay for utility properties. Policymakers should therefore be proactive about ensuring that the rules, guidelines, plans, and analyses within their purview support realistic assumptions about future gas demand and revenues, so as to be maximally protective of ratepayers and potential public purchasers. Many private utility owners try to outlast political support for public takeover by dragging out valuation proceedings in court, often for decades.[287] To prevent this, policymakers should also seek to establish clear timelines and rights of action for valuation proceedings to prevent costly delays.

Despite the hurdles examined above, proactive public ownership remains a tool worth careful consideration. Public ownership of gas utilities requires significant upfront public investments that are unlikely to be repaid in financial terms but give policymakers unparalleled means of addressing parallel policy goals, and have the potential to head off far greater future costs and liabilities imposed by the growing threat of system collapse. In many of its current forms, public ownership reproduces rather than avoids the mixed incentives, conflicts of interest, and decisionmaking silos that characterize private utility ownership. Under those conditions, public ownership could potentially still allow policymakers to better manage pipes-vs-wires conditions. Avoiding those pitfalls requires sustained political will and robust institutional design. Regardless of whether policymakers currently foresee attempting to own gas utility assets, they

285. See, for instance, California's Propositions 218 and 26, which have been interpreted to constrain both the uses of publicly-owned utilities' rate revenues, and the structure of those rates. LEAGUE OF CAL. CITIES, PROPOSITIONS 26 AND 218: IMPLEMENTATION GUIDE (2019); LAURA FEINSTEIN, KEEPING THE WATER ON: ADDRESSING RISING WATER-BILL DEBT DURING THE COVID-19 ECONOMIC CRISIS (2021).

286. BISHOP, BULKLEY & WALL, *supra* note 273, at 4-5.

287. *Id*.

should prepare the foundations for successful public ownership and operation, not least because unmanaged wires-vs-pipes competition could create exigent circumstances that make public rescue difficult to avoid. Done right, public ownership can create greater managerial flexibility relative to the status quo, and can mitigate the types of exigent interventions that force ratepayers and even taxpayers to subsidize struggling industries rather than facilitating their transformation.

VI. CONCLUSION

Technological change, aging gas infrastructure, new policy goals, and changing consumer preferences are all driving accelerating competition for gas distribution utilities from electrification. Countervailing policy dampers on that competition will mitigate the effects of these factors in some places, for a time, but several decades of evidence strongly suggests that electrification will eventually erode residential and small commercial ratepayers' demand for gas in every utility territory. Like all network utilities, gas utilities are highly likely to perform poorly in the face of steadily declining demand. Mounting financial stress on a gas distribution system is in turn highly likely to create serious physical danger for customers and the public as a whole. With that risky potential future in view, policymakers and regulators face a stark choice: stay on the present course, leave the regulatory status quo largely undisturbed; or pursue meaningful reform of our long-lived utility regulatory framework to directly address the unrecognized competition that threatens gas utilities.

This article argues for proactive reform. Resolving the blind spot that has characterized the state utility regulatory framework since its establishment more than a century ago can unlock major cost reductions, mitigate serious risks to public safety and system reliability, and yield co-benefits. It would enable energy customers to take advantage of competition rather than leaving them trapped in a regulatory scheme that makes gas utilities both unresponsive and susceptible to competitive pressures.

Proactive reform will not be simple or easy. It will require ambitious, consequential, and sustained action on the part of policymakers, along with skilled public communication about paths not taken and lesser evils. In section V of this article, we have sought to equip policymakers who are ready to face up to the fundamental challenge posed by wires-vs-pipes competition with options as well as analysis. Subsequent work can flesh out these options in jurisdiction-specific ways, noting conditions, constraints, risks, and procedural rules, and settling the order in which policymakers should answer key questions, design policies, and, finally, charge utility commissions, utilities, and other entities with the work of translating words on paper into investment decisions, institutional changes, and new operational practices.

It is increasingly urgent for the policymakers responsible for state-level utility regulation to consider the abstract questions at the core of the utility-regulatory tradition in concrete ways. As they do so, they should understand that the long life of the existing regulatory framework does not imply rigidity or an entirely coherent foundation. That framework has always been a collage rather than a constitution, built upon existing institutions and contemporary ideas and assembled for pragmatic reasons in reaction to shifts in technology and policy. It has always been plastic in the face of new challenges and now must be so again in response to the rising risks posed by wires-vs-pipes competition.