# THE ROLE OF ELECTRIC UTILITY MONOPOLIES IN US RENEWABLE ENERGY TRANSITION

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> > By

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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### **1 INTRODUCTION**

With a quarter of US greenhouse gas (GHG) emissions in 2022 associated with electricity generation, finding routes to decarbonize energy production is a key challenge in addressing anthropogenic climate change (US EPA, 2024). The transition to renewable energy holds immense potential for economic, environmental, and social benefits (Barth et al., 2024). Yet, despite rapid technological advancements and growing public demand, the shift away from fossil fuels remains constrained. One of the major, often overlooked, barriers to this transition is the entrenched power of electric utility monopolies. These entities, which dominate electricity markets in much of the United States, have a vested interest in maintaining the non-renewable status quo. By leveraging regulatory frameworks, political influence, and market control, utility monopolies frequently resist changes that could undermine their short-term profitability, even when such changes align with long-term societal and environmental goals.

The current structure of utility monopolies emerged in the early 20th century, driven by the need for centralized, reliable electricity distribution. Governments granted exclusive rights to single utility providers under the assumption that economies of scale would lead to lower prices and universal service. While this system successfully expanded electricity access, it also concentrated power in a few entities that now dominate the energy sector. Today, these monopolies continue to control a significant share of the grid, influencing policy and infrastructure development in ways that often prioritize their interests over broader societal benefits. (Stokes, 2020)

In parallel, renewable energy technologies have steadily evolved over the past century. Solar and wind power, once considered fringe solutions, have become viable alternatives to fossil fuels due to advances in efficiency and cost reductions (Roser, 2020). Despite this progress, the integration of renewables into the power grid has been met with significant resistance from many incumbent utility monopolies, which view distributed energy generation as a threat to their centralized business model (Farrell, 2024).

This dynamic has created a critical imbalance: monopolistic utilities exert outsized influence over energy policy and infrastructure decisions, often stalling or shaping the renewable energy transition to protect their short-term profits. This situation exemplifies a broader systemic issue—when powerful interest groups dominate regulatory frameworks, they distort feedback loops that should otherwise reflect public interest and technological progress.

This thesis explores the placement and power of electric utility monopolies in the complex network of renewable energy transition. Dissecting this network reveals the capacity for interest groups to deceive public servants and misrepresent technology, and the routes for action that can be taken to promote energy transition and gain back power.

# **2 BACKGROUND & SIGNIFICANCE**

### **2A ACTORS**

The actors involved in executing renewable energy transition are complex and interwoven. This analysis seeks to examine hindrances on renewable energy transition with a special focus on electric utility monopolies; however, an understanding of the other actors involved in this transition provides context and weight to the actions of utility monopolies. These other actors include but are not limited to alternative energy providers, fossil fuel companies, renewable energy technology companies, climate researchers, scholars, interest groups, policy makers, and public interest.

The electric utility landscape is comprised of investor-owned, publicly-owned, and cooperative utilities; however, investor-owned utilities have dominated the utility market for over a century (US EIA, 2019). In fact, electric utility monopolies served 110 million U.S. customers in 2017

compared to only 42 million served by publicly-owned and cooperative utilities combined (US EIA, 2019). Historically granted exclusive rights to supply electricity within specific regions, these monopolies operate as regulated entities, controlling power generation, transmission, and distribution. As their granted monopoly status removes natural market competition, these utilities' profits are set through Cost of Service Regulation created by state Public Utility Commissions (PUCs) (McDermott, 2012). While utilities' operating expenses are covered by billing electricity customers, PUCs set a fixed rate of return funded by the state on utilities' capital expenses (Kibbey, 2021). This guaranteed rate of return is necessary for utilities to prove their fitness for borrowing money from banks or investors to build new infrastructure; however, this system also incentivizes utilities to invest in costly projects in order to make more profits off the set rate of return (Kibbey, 2021). Although renewable energy sources incur very little operating expenses, these costs do not affect electric utilities as they are only neutralized by customer bills (Cleary & Palmer, 2022). Instead, pursuing costly infrastructure expansionregardless of whether or not it is renewable or non-renewable—serves as a more profitable endeavor for the utility (Cleary & Palmer, 2022). As this regulatory system places much weight on PUCs' approval of utility capital investment projects to result in utility profits, investor-owned utilities work tirelessly to influence PUCs and resist against decentralized energy models, such as rooftop solar (Stokes, 2020). Their role in shaping energy markets and regulatory environments makes them a crucial force in either advancing or obstructing the clean energy transition.

Electric utility monopolies act as and fund some of the most prolific interest groups influencing energy policy through direct lobbying as well as influencing public opinion (Stokes, 2020). In addition to prioritizing costly infrastructure investments and, thus, profits, utilities avoid retiring non-renewable energy infrastructure prior to it reaching its intended lifespan as that would result in investments that are no longer profitable (Stokes, 2020). In response to emerging evidence in the 1970s pointing to the burning of fossil fuels as drivers of global warming, Edison Electric Institute (EEI), the association that represents all U.S. investor-owned electric companies, started a public campaign to "'reposition global warming as theory' and not fact" fueling decades of discourse (Stokes, 2020). From 2017 to 2018, Arizona Public Service funneled \$11 million into defeating a renewable energy ballot measure by promoting misleading claims about rising electricity rates (Bade, 2018). In 2018, Entergy staged fake grassroots support by hiring actors to testify in favor of a natural gas plant in New Orleans, effectively silencing community opposition (Stokes, 2020). Meanwhile, Southern Company and Duke Energy have worked closely with groups like the American Legislative Exchange Council (ALEC) to push antirenewable model legislation across multiple states, while simultaneously funding think tanks and public campaigns that cast doubt on the reliability and affordability of clean energy (Stokes, 2020). In 2024 alone, electric utilities spent over \$130 million on lobbying, placing them amongst the top ten lobbying sectors based on dollar contributions (*Electric Utilities Lobbying Profile*, 2025). These coordinated strategies have allowed utilities to shape public narratives and maintain regulatory environments that favor fossil fuel infrastructure, even in the face of mounting climate and economic evidence supporting renewable alternatives.

Fossil fuel companies, including coal, oil, and natural gas corporations, also act as opponents to renewable energy transition due to its direct threat to their business model (Anderson, 2024). These companies generate revenue from extracting, refining, and selling fossil fuels to many other industries including electric utilities. Many have actively worked in conjunction with electric utilities to lobby against renewable energy policies, fund misinformation campaigns, and support regulatory structures that favor continued fossil fuel reliance. Notably, in the late 1990s, ExxonMobil helped create the Global Climate Science Team to invest millions of dollars to manufacture uncertainty on the issue of global warming (Union of Concerned Scientists, 2007).

In contrast, environmental and public interest groups push for stronger climate policies and challenge fossil fuel expansion. Their motivations range from improving air quality and lowing energy costs to fully dismantling the private energy market (Farrell, 2024; Stokes, 2020). While there is strong public support for renewable energy, public influence is often diluted by the lobbying power of large corporations (Stokes, 2020). However, when grassroots movements, consumer advocacy, and community-led renewable energy projects gain momentum, public engagement can be a powerful driver of change (Stokes, 2020). The Union of Concerned Scientists (UCS), Environmental Defense Fund (EFD), National Resource Defense Council (NRDC), Public Citizen, Sierra Club, and Utility Reform Network (TURN) are some of the many organizations that have played key roles in promoting energy transition through public education, legal action, and campaigning (Stokes, 2020).

Renewable energy technology companies are also at the forefront of the transition, developing and deploying solar panels, wind turbines, battery storage, and other clean energy solutions. These companies benefit directly from policies that promote renewable energy adoption, such as tax incentives and net metering laws. However, they often face resistance from utility monopolies, which may impose restrictive grid access rules or advocate for policies that disadvantage distributed energy generation. A national survey found that interconnection challenges—largely driven by utility noncompliance—are a leading cause of renewable energy project cancellations and delays, with one-third of wind and solar projects canceled and 85% of solar developers citing utility issues as a major barrier. A Despite these challenges, the rapid cost decline of renewable technologies has strengthened their competitiveness. (Lusiani, 2024)

Policymakers at local, state, and federal levels create the regulatory frameworks and appoint members of Public Utility Commissions that either accelerate or hinder renewable energy adoption. They respond to competing pressures from industry, lobbyists, and public opinion when crafting legislation related to energy markets, subsidies, and emissions reductions. While

some policymakers champion renewable energy initiatives, others, influenced by fossil fuel and utility interests, introduce policies that slow the transition. (Stokes, 2020)

Lastly, scholars, including climate scientists, economists, lawyers, engineers, amongst others, weigh in on the viability, pace, and scale of renewable energy transition. These professionals analyze the process by which transition must be carried out through various lenses. While some grid operators pose concerns about grid stability in a fully renewable network, these stability issues can be solved through a variety of energy storage and smart grid technology solutions (*Grid Stability Issues With Renewable Energy Sources*, 2021). Others voice concerns over finite access to mined minerals necessary to build solar panels and wind turbines; however, current reserves of these minerals are nearly enough to achieve net-zero by 2050 not including potential other sources for these minerals (Big Think, 2025). The bottom line is that there is dire need, interest, and capability to build renewable energy infrastructure at a faster pace than what is currently underway (Rand et al., 2024).

### 2B BRIEF HISTORY OF THE US ENERGY LANDSCAPE

The history of electric utility monopolies in the U.S. is rooted in early decisions in the late 1800s to grant private utilities exclusive regional franchises, rather than allowing competition or municipal ownership. This model was justified by the belief that electricity distribution was a natural monopoly, where a single provider could deliver power more efficiently than competing firms with redundant infrastructure (Cleary & Palmer, 2022).

Throughout the 20th century, utilities adopted growth-oriented pricing, prioritizing expansion over efficiency. Their profits were tied to infrastructure investments, incentivizing continuous grid expansion rather than energy conservation (Kibbey, 2021). To maintain control, utilities pushed for regulatory oversight to shift from municipal governments to state-level Public Utility

Commissions (PUCs), which were often more insulated from local political pressures and more aligned with industry interests (Stokes, 2020).

Centralization further strengthened utility monopolies, allowing them to control power generation and transmission while limiting market entry. Figure 1 (below) depicts the process by which generated electricity flows for residential use. This strive for vertical integration led many utilities to complete ownership of the infrastructure used in every step of the depicted process. However, this dominance was first seriously challenged with the Public Utility Regulatory Policies Act (PURPA) of 1978. Enacted in response to the petroleum shortages known as the energy crisis of the 1970s, PURPA introduced Qualifying Facilities (QFs), non-utility power producers that often use renewable energy or cogeneration. This law marked the first disruption of the monopoly system by requiring utilities to purchase power from QFs if it was costcompetitive (US FERC, 2021).



Figure 1 Transporting Electricity – How It Flows (Solar School, n.d.)

Further deregulation came with the Energy Policy Act of 1992, which aimed to increase competition by opening wholesale electricity markets. This led to restructuring in some states, enabling competitive power generation while utilities retained control over transmission and distribution (Stokes, 2020). However, many monopolistic practices persist, and utilities found

new ways to maintain dominance, including regulatory capture and resistance to decentralized renewable energy (Stokes, 2020). Although they comprised only 6% of utility companies in 2017, 72% of US electricity customers received their power from an investor-owned utility (US EIA, 2019).

In parallel to the emergence of present-day electric utilities is the emergence of renewable energy. Beginning in the late 1800s to the 1990s, the US's energy needs were almost exclusively met by non-renewable fossil fuels with limited hydropower and wood fueling as the only renewable source (US EIA, 2024). In the early 1980s in response to the energy crisis of the 1970s that resulted in PURPA, the U.S. became a global leader in renewable energy, driven by tax incentives aimed at reducing pollution and decentralizing electricity production. However, after these incentives expired in 1986, renewable adoption stalled as federal policy failed to sustain support. Despite this setback, research and development in renewable technology continued due to its potential to address pollution and decentralization concerns. By 1989, recognizing the threat that renewables posed to their dominance, private utilities actively promoted climate denial to undermine public and regulatory support (Stokes, 2020).

In the 1990s, policies such as Renewable Portfolio Standards (RPS) and Net Energy Metering (NEM) emerged to encourage renewable adoption. RPS mandated that utilities generate a portion of electricity from renewables, while NEM allowed distributed solar users to sell excess power back to the grid. Investor-owned utilities, fearing profit losses, pushed Public Utility Commissions (PUCs) to raise fixed charges on customer bills, successfully securing increases two-thirds of the time to limit the financial benefits of distributed renewables (Stokes, 2020).



Figure 2 The price of electricity from new power plants (Roser, 2020)

Further regulatory support for renewables came through the Energy Policy Act of 2005; however, the greatest shift in promoting the adoption of renewables has been the drastic drop in energy production cost since 2009, making renewable energy the most cost-effective option for new energy infrastructure (see Figure 2, above). This price drop is attributed to the technological learning curve that wind and solar photovoltaic technologies followed as well as lowered manufacturing costs (Roser, 2020).

Together, these historical developments of electric utilities and renewable energy provide context for the many motivations and entry points for renewable energy transition, while also carving out how electric utilities amassed vast control over the electricity landscape.

### **3 METHODOLOGY**

#### **3A ANALYTICAL FRAMEWORK**

To better understand the role of regulated electric utility monopolies in the U.S. renewable energy transition, this study employs actor-network theory (ANT) as its primary analytical framework. ANT conceptualizes the world as a network of interconnected actors, which include not only individuals and organizations but also technologies, policies, and infrastructure (Law, 1992). This approach is particularly useful for examining how power and influence are distributed across a sociotechnical system and for revealing how different entities—both human and non-human—shape and are shaped by one another.

Applying ANT to the issue of electric utility monopolies highlights the complex relationships between regulatory bodies, private utilities, emerging renewable technologies, and consumers. By mapping these interactions, this framework helps analyze how monopolistic structures influence the pace and direction of renewable energy adoption, the ways in which regulatory decisions shape market dynamics, and the role of policy in either reinforcing or challenging the status quo.

### **3B MIXED-METHODS APPROACH**

To conduct this analysis, a mixed-methods approach will be employed, drawing from both historical and contemporary sources to construct a sociotechnical map of how electric utility monopolies are positioned within the renewable energy transition.

This approach will provide a layered understanding of the regulatory, political, and cultural forces that have enabled monopolies to maintain power, even in an era of technological innovation and public support for clean energy. This will involve a legal and academic literature review, which will establish the historical and theoretical foundations of electricity generation

regulation in the United States. Academic analyses of energy policy and economic theory will help contextualize the motivations behind this regulatory framework, including the justification for treating electricity as a natural monopoly.

Furthermore, a review of contemporary critiques of the utility monopoly model will be conducted. This portion of the study will analyze present-day challenges to the current system by exploring policy debates, the advocacy work of nonprofit organizations, and activist movements pushing for decentralized, renewable energy solutions.

By synthesizing these methodological approaches, this study aims to provide a nuanced understanding of the electric utility monopoly's enduring power and its complex role in shaping the contours of the renewable energy transition.

## **4 LITERATURE REVIEW**

Using the methods outlined above, legal scholarship, reports, and op-eds were reviewed to inspect the state of discussion surrounding electric utility monopolies. Special focus was placed on the relationships electric utility monopolies have with other actors involved in renewable energy transition. Regulations regarding electric utilities vary greatly across the country as they are primarily written at the state-level. While traditional, vertically integrated utility monopolies still exist in most of the US, since the 1990s over a third of US states have opted to "deregulate" or "restructure" their electric utilities in part or in full (Customer First Renewables, 2016). This variation in energy market types and regulation means that commentary from specific case studies must not be overly abstracted into generalized statements. This nuance was considered when examining literature.

Legal and academic literature review was conducted over key articles and books to garner an understanding of the lenses and analyses key scholars from these disciplines apply to status of electric utilities in energy transition. Subjects spanning energy sources, energy markets, and specifically the role of oil extraction in world economics and geopolitics are well covered. Notably, Daniel Yergin's 1991 book *The Prize: The Epic Quest for Oil, Money, and Power* and Vaclav Smil's 2017 book *Energy and Civilization: A History* both provide high-level overviews of the socio-technical networks within which energy systems operate. Yergin focuses on the economic rise and political dominance of the oil industry, detailing how fossil fuel interests have shaped global markets and geopolitical conflicts (Yergin, 1991). In contrast, Smil traces the history of humanity alongside innovations in energy sourcing and production, offering a broad yet nuanced perspective that notably avoids a strictly technologically deterministic view (Smil, 2017). While both works provide valuable insights into the broader contexts of energy industries and scientific advancements, their scope extends beyond the specific focus of this research and connects energy development to other actors.

In the landscape of academic books, Leah Stokes's 2020 book *Short circuiting policy: interest groups and the battle over clean energy and climate policy in the American states* provides paramount context and information on the role of electric utilities in the renewable energy transition. Stokes approaches the subject through the lens of U.S. policy, with a particular focus on policy feedback. Through detailed chronological case studies, she connects Public Utility Commissions, policymakers, utility companies, and lobbying groups, illustrating how their interactions have shaped the trajectory of state-level energy markets. (Stokes, 2020)

Rather than prescribing an idealized vision of what electric utility markets should look like, Stokes traces how existing markets across U.S. states have developed, emphasizing the realworld forces that drive or hinder clean energy adoption. A critical aspect of her analysis is the role of interest groups in shaping policy outcomes. Unlike many discussions that treat policy as the primary catalyst for change, Stokes highlights how actors—including utility monopolies and renewable energy advocates—actively push policy in directions that serve their interests. (Stokes, 2020)

A key contribution of Stokes's work is her application of policy feedback theory, the idea that "policies do remake politics" (Stokes, 2020). In the case of renewable energy, well-executed policies should ideally create self-reinforcing feedback that drive continued clean energy adoption. As the public experiences the benefits of renewable energy, such as cleaner air and cheaper power, there will be a greater push for more renewable energy policy. However, Stokes demonstrates how utility monopolies, which often stand to lose from such policies, engage in regulatory capture, a process in which they co-opt regulatory institutions to serve their own interests, disrupting positive policy feedback loops. As she explains, this occurs when regulators depend on utilities for expertise, career advancement, and most notably campaign contributions, leading to a system where monopolies exert outsized influence over the rules meant to govern them. By exposing these dynamics, Stokes places interest groups funded by electric utilities at the center of the energy transition lag and provides a crucial framework for understanding why the renewable energy transition faces persistent resistance despite public support and technological feasibility.

Pivoting to legal scholarship, discussions are much more varied across domains of policy that influence energy transition. Most directly in line with this paper's research, Alison Gocke's 2024 writing overtly states: "State public utility commissions are at the forefront of the clean-energy transition" (Gocke, 2024). Gocke argues that it is PUCs that are overlooked in their potential to carry out clean-energy transition, and that at the state-level most PUCs already hold the legal authority to lead this transition. The reason Gocke points to for why the transition is not more aggressively pursued ties back to the regulatory capture Stokes wrote of: "[PUC] reluctance to engage in the clean-energy transition lies in other factors, such as deeper structural and political dynamics - not doctrinal limitations" (Gocke, 2024).

The sentiments of William Boyd largely concur with Gocke's. In Boyd's 2014 writing, he argues that a shift back to the legal mindsets of the early twentieth century toward public utility as vertically integrated utility monopolies is a powerful instrument in guiding renewable energy transition. In other words, the same historic policies and frameworks that Gocke references regarding regulatory bodies substantiate that PUCs can promote change. Boyd speaks to the praises of the US's unique utility structure, saying "a broad concept of public utility provides important organizing principles and tools for managing the transition to a low carbon future." He cites that while the founding principles of the US's public utility organization can empower energy transition, it was external ideological shifts that stemmed from free-market fundamentalist economists in the 1960s and concerns raised during the energy crisis of the 1970s that gave rise to the more narrow and critical view of public utility that is held today. (Boyd, 2014)

Apart from academia, critiques of the traditional, vertically integrated public electric utility monopoly are present from many angles. The most prominent critiques are that this system results in higher electricity bills for consumers that have no choice in electricity provider and that this system does not promote innovation and adoption of renewable energy. The regulatory restructuring stemming from the energy crisis led to many forms of electricity distribution apart from traditional markets that range from competitive retail markets to publicly owned utilities (Cleary & Palmer, 2022). Contemporary critics of traditional markets typically promote distributed energy models that include local ownership and decentralized renewable energy production, falling in line with concepts under "energy democracy."

John Farrell, the co-director of the Institute for Local Self Reliance, is amongst the loudest of these critics. In his 2024 report entitled "Upcharge: Hidden Costs of Electric Utility Monopoly Power," he argues that electric utility monopolies have perpetuated reliance on fossil fuels, contributing to environmental degradation and public health issues. Like Stokes, Farrel points to

many specific instances where utility monopolies have used their guaranteed profits on a state and federal level to influence regulators, promote policies that deepen their pockets, and block policies that interfere with their control. Farrell demonstrates the degree to which utilities seek regulatory capture, listing over 30 recent cases of regulatory capture and citing that, in Arizona, the three largest utilities have 107 registered lobbyists in Pheonix compared to only 90 total legislators in the state (Farrell, 2024).

Unlike Boyd, though, Farrell does not see any sustained value in the traditional public utility model. He claims that throughout the twentieth century, the emergence of small-scale wind and solar and the success of retail markets in certain states ended the rationale for monopoly ownership of power generation. He proposes transitioning to a system where electricity distribution is managed independently and publicly, fostering competition and prioritizing public interest. Such a shift, he argues, would enable communities to develop energy systems that are affordable, innovative, and environmentally sustainable. (Farrell, 2024)

# **5 DISCUSSION & RESULTS**

This paper explores the placement and power of electric utility monopolies within the complex network of renewable energy transition. Through an analysis of legal, academic, and advocacy perspectives, it is evident that in regions following a traditional utility model, utility monopolies emerge as an oversized actor in shaping the energy transition. Their influence extends beyond infrastructure development to policy formation and regulatory control, reinforcing a system in which guaranteed profits sustain further entrenchment through regulatory capture.

A central consensus among scholars and advocates in environmental politics and law is that the existing utility monopoly structure perpetuates a cycle where profits are redirected toward securing more regulatory influence, thereby stalling or shaping the trajectory of renewable

energy adoption. However, a critical point of divergence arises in determining whether the utility monopoly model must change—or even can change—in order for energy transition to succeed.

From the perspectives of Gocke and Boyd, a return to the early legal foundations of the public utility model presents a viable pathway to enforce energy transition (Boyd, 2014; Gocke, 2024). They argue that a well-functioning public utility commission can recalibrate the balance between private and public interests, ensuring that renewable energy policies are implemented effectively despite the inherent complexities of modern energy production. A properly regulated public utility model, in their view, has the potential to mitigate the monopolistic tendencies that currently stifle energy transition.

In contrast, Farrell strongly critiques this perspective, contending that any return to a broader public utility framework would fail to disrupt the power of existing monopolies (Farrell, 2024). He asserts that the current system has funneled excessive financial and political capital into the hands of investor-owned utilities, whose profit-driven motives inevitably lead to regulatory capture. In Farrell's view, as long as large, centralized generators dominate the energy landscape, renewable energy policies will continue to face structural opposition. He instead advocates for a fundamental restructuring of the electricity sector, moving toward decentralized and locally owned power generation as the only means to break the cycle of monopoly control and accelerate the renewable energy transition.

These findings help map the network in which electric utility monopolies occupy a central and powerful position. Despite debate over how the electricity distribution system should be reformed, there is broad consensus that electric utility monopolies wield disproportionate influence over the adoption of renewable energy technologies. Even when other actors, such as policymakers, regulators, or voters, are identified as contributing to delays in the energy transition, these delays often trace back to the influence of electric utilities. Within the actor-

network, utility monopolies shape the behavior, perceptions, and constraints of nearly every other node in the system.

As cited by Stokes and Gocke, policy frameworks and state PUCs frequently hinder the rate of renewable energy transition. However, Actor-Network Theory compels the question of not just who is acting, but through what relationships and networks those actions are shaped. In this context, both policy and regulatory slowdowns can be directly linked to the calculated influence of utility monopolies (Farrell, 2024; Stokes, 2020). These utilities exert substantial control over the regulatory process—particularly through political contributions, lobbying, and the strategic placement of allies within PUCs—ensuring that policy decisions often serve their financial interests rather than the public good or even their customers financial interests.

As Stokes and Farrell chronicle, electric utility monopolies actively distort public interest by funding misinformation campaigns and supporting think tanks that promote misleading narratives about climate change and the reliability of renewable energy. These campaigns shape public discourse, contributing to voter skepticism and resistance to renewable energy policies, especially at the state level. At the same time, utilities pour substantial financial resources into political campaigns, shaping not only electoral outcomes but also determining who is appointed to regulatory bodies like PUCs. This grants them significant leverage in shaping the very rules that govern their operations.

This influence forms a powerful reinforcing loop: utility monopolies secure guaranteed profits through regulated monopolistic structures, and those profits are then reinvested in the political and media tactics that protect and perpetuate their dominance. In doing so, they misrepresent renewable energy technologies to other actors in the network—voters, legislators, electricity consumers—leading to widespread underutilization of technologies that are economically viable and environmentally necessary. The utilities' influence stretches across technical, political, and

cultural domains, ensuring their continued centrality within the actor-network despite growing pressure for systemic change.

At the same time, renewable energy technologies themselves are not passive. These technologies emerge as active agents within the network. They are disruptive forces that challenge the utility monopolies' centralized model of control. As decentralized generation options like rooftop solar and community wind become more accessible and cost-effective, they alter consumer expectations and shift power dynamics. Importantly, renewable technologies have access to their own feedback loop: as adoption increases, consumers experience tangible benefits such as lower energy bills and reduced air pollution, which in turn encourages broader public support and further adoption.

This tension between reinforcing feedback loops—the utilities' loop of influence and protectionism, and the renewables' loop of affordability and public benefit—defines a central conflict in the U.S. energy transition. ANT reveals that these loops do not merely coexist but are in direct competition, with each actor enrolling others into its network to either reinforce the status quo or push for systemic change. At the center of this struggle, electric utility monopolies maintain an outsized sphere of influence, shaping political, regulatory, and public perceptions to preserve their dominance. Their ability to co-opt other actors and institutions has created a tightly bound, self-sustaining system that resists reform. When abstracted, this dynamic reflects a broader political pattern, one in which concentrated wealth enables powerful actors to entrench their position, using their resources to preserve systems that benefit them while resisting reforms that threaten their dominance. Therefore, meaningful progress toward a renewable energy future requires deliberate disruption of the utility monopolies' network—identifying and activating leverage points that can unravel their influence and reorient the system toward a more decentralized, equitable, and sustainable energy model.

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### 6 CONCLUSION

This paper has examined the central role electric utility monopolies play in shaping the renewable energy transition in the United States, using an actor-network theory (ANT) framework to trace how their influence permeates legal, political, and technological domains. The findings reveal that utility monopolies operate as dominant actors within a self-reinforcing network, strategically shaping policy, public perception, and regulatory decisions to preserve their market control. Through lobbying, misinformation campaigns, and political contributions, these entities construct and maintain a powerful loop of influence and protectionism.

Actor-Network Theory helps illuminate not only who holds power but how that power is distributed and reinforced across relationships and institutions. Electric utility monopolies are not just isolated actors, they are central in a network that includes regulatory bodies, electricity consumers, energy production technologies, amongst other actors. The persistent underutilization of renewable energy technologies, despite their economic and environmental advantages, is a direct result of this entangled system of control. The transition to a clean energy future is not hindered by technological limitations, but by asymmetrical power networks.

At the same time, renewable energy technologies act as insurgent forces in this network, introducing new patterns of decentralization and public benefit. Their own feedback loop—lower costs, increased adoption, and enhanced public support—offers a compelling counterweight to the utilities' power; however, for this loop to gain momentum, intentional disruption of the monopoly-dominated system is essential.

Ultimately, this case reflects a broader political sentiment: when powerful actors control the levers of regulation and information, systemic change demands more than one disruptive actor—it requires dismantling and reconfiguring the networks that sustain power. To accelerate the energy transition, dismantling the barriers imposed by utility monopolies is essential but not

singularly sufficient for achieving a rapid transition to renewable energy. A combination of regulatory restructuring, policy enforcement, and grassroots advocacy will be necessary to realign energy governance with environmental and social imperatives.

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