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END-USE EFFICIENCY (Y WANG, SECTION EDITOR)

From Regulation to Governance in the Electric Sector

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Abstract

Purpose of Review The purpose of this article is to review and synthesize recent scholarship on stakeholder engagement in electric sector governance, placing research within a framework for understanding the role that stakeholders play in regulation and governance.

Recent Findings Collaborative, multi-actor forums have developed to assist in the governance of electricity transmission and state-level clean energy activities, allowing stakeholders with divergent interests to help resolve political and technical challenges related to increased use of renewable and distributed electricity.

Summary The traditional approaches to electric sector regulation are ill-suited to address the opportunities and challenges facing the sector today. In response to changing conditions in the electric sector, many jurisdictions and regions have developed more flexible, cooperative, deliberative, and inclusive approaches to governance that encourage diverse stakeholders to work together to resolve emerging issues and coordinate between policy venues.

Keywords Electricity governance · Stakeholder engagement · Public participation · Renewable energy · Energy efficiency · Energy transitions

Introduction

The US electric sector is in a state of transition. For much of the twentieth century, monopoly electricity companies provided electricity services, and regulators' primary task was to ensure that these monopolies charged fair rates to consumers. Today, however, both electric service provision and regulation are more complex. One important—but understudied—aspect of this complexity is the emergence of new forums and opportunities for stakeholders and the public to participate in electric sector decision-making.

While interest in stakeholder engagement in electric sector governance is on the rise, scholarship on these emergent opportunities and challenges has been limited to date. In a recent commentary in Nature Energy, Bidwell notes that despite substantial research on stakeholder participation in environmental decision-making, little research has focused on stakeholders in electric sector governance [1]. Moreover, renewable energy policy makers and practitioners often emphasize the need for public participation and stakeholder engagement, but few participation initiatives are informed by rigorous social science research scholarship [2]. While there is an extensive literature on public participation in environmental governance [3–5], little of this research has focused on the electric sector [2]. Moreover, many of the existing studies on participation in energy governance cluster in two areas—case studies of participatory forums [2, 6, 7•, 8–10] or studies of public attitudes toward and acceptance of renewable energy [1, 11–13]. In practice, however, stakeholders take on a set of diverse and important roles in electric sector governance that have only begun to be explored by scholars.

The purpose of this article is to review and synthesize recent scholarship on stakeholder engagement in electric sector governance, placing research within a framework for understanding the role that stakeholders play in regulation and governance. In doing so, this article highlights that the traditional approaches to electric sector regulation are ill-suited to address the opportunities and challenges facing the sector today. In response to changing conditions in the electric sector, many jurisdictions and regions have developed more flexible,

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cooperative, deliberative, and inclusive approaches to governance that encourage diverse stakeholders to work together to resolve emerging issues and coordinate between policy venues.

A Framework for Understanding Stakeholder Engagement in Electric Sector Decision-Making

The Traditional Approach to Electric Sector Regulation

Many of the regulatory institutions that govern the US electric sector were developed in an era when electricity services were dominated by vertically integrated electricity monopolies who were responsible for three distinct aspects of electric service provision: generating electricity, transmitting it from the point of generation to a given service territory, and distributing it to customers.

Initially, regulators' primary concern was that monopoly electricity companies would overcharge or provide poor service to consumers. State public utility commissions (PUCs) were established and authorized to oversee service provision, and their main function was to regulate utility rates [14, 15]. Traditionally, PUCs use a quasi-judicial approach to decision making, where utilities initiate a "rate case" when they seek to raise customers' rates [14]. During a typical rate case proceeding, a utility provides evidence to justify its rate request, and state consumer advocates and other stakeholders contest the request with counterevidence [16•]. A panel of Commissioners acts as fact finder and judge and makes the final decision on the utility's request. Under this model, utilities have substantial authority over their own activities, subject to regulatory approval, and play a dominant role in shaping regulatory proceedings [17]. While this approach remains largely intact today, the structure of the electric sector has changed substantially, and PUC rate regulation is now only one aspect of a much more complex governance system.

Emerging Complexity in Governance Arrangements

The vertically integrated monopoly no longer dominates the sector, and today generation, transmission, and distribution of electricity are governed by different institutional arrangements that vary by state and region across the USA. In addition, new small-scale electricity generation technologies and growing concern over the sector's environmental impacts have re-shaped the range of actors and objectives for regulation.

Generation

To encourage greater competition in electricity generation, nearly half of US states embarked on restructuring that would require utilities to divest their generation holdings, in theory becoming "wires only" companies who would distribute electricity from generators to customers, allowing merchant generators to compete for customers. The stated goal of electric sector restructuring was to induce efficiency and reduce costs by allowing market forces, rather than regulatory forces, to govern electricity prices and investment decisions [14].

Other states, however, have adopted policies that exert countervailing pressures in the sector. Twenty-eight states have embraced a practice known as integrated resource planning, which requires utilities to engage in long-range planning and gives regulators approval authority over utilities' generation investment decisions and procurement practices [18]. Integrated resource planning also allows policy makers to emphasize conservation over supply side resources, or to prioritize renewable energy. While a scholarly literature has emerged on best analytical practices in utilities' resource planning processes [19], the effect of regulatory proceedings and the potential role for stakeholders in these proceedings remains under-studied.

Transmission

Traditionally, monopoly utilities controlled their own transmission lines, acting as gatekeepers with authority to determine whether merchant generators had access to the electricity grid. Today, federal regulations require utilities to provide merchant generators access to the electricity grid at nondiscriminatory rates, thus enabling robust wholesale electricity markets [15]. To prevent utilities from managing the grid in ways that discriminate against merchant generators, cooperative regional transmission organizations (RTOs) have emerged as a new approach to governance of transmission [20•].

RTOs are membership organizations charged with managing dispatch, grid maintenance, and other aspects of a region's transmission lines. Utilities retain ownership of their transmission lines, but RTOs act as independent managers with authority over utilities' shared—and interconnected—grid of transmission infrastructure. Today, there are seven RTOs managing the grid in different regions of the USA [20•]. RTOs are cooperatively governed by their members, which include utilities, regulators, and other market actors and stakeholders [21••].

Two recent studies provide in-depth case analysis of two of the country's RTOs, finding that these organizations play a crucial role in integrating intermittent renewable energy resources into the grid. In a qualitative case analysis of the

Midwestern Independent System Operator (MISO), Stafford and Wilson [21••] find that the RTO plays a crucial role in determining whether wind electricity will be integrated into the grid, and that collaborative stakeholder processes help members to solve emergent problems with wind integration and ensure coordination between RTOs and state policy officials. In a qualitative case study of the California Independent System Operator (CAISO), Lenhart et al. [22] find that the RTO helps to bring multiple organizations together to resolve problems. RTOs thus provide crucial links that ensure reliability and assist states in meeting environmental policy goals.

Distribution

The regulation of electricity distribution and of utilities specializing in electricity distribution has largely retained the original, formal, quasi-legal approach to decision-making that was developed to regulate utilities' rates. However, the scope of regulators' oversight over distribution utilities has increased over time in many states, expanding to include not only rate and reliability of service regulation but also to include oversight of other aspects of utility service provision, such as utilities' resource planning practices or delivery of conservation and energy efficiency programs to consumers [20••]. As the scope of regulation has increased, many states have developed collaborative and deliberative approaches to decision-making that supplement or even supplant traditional regulatory oversight and provide stakeholders and the public with new opportunities to engage in electric sector governance [23••, 24].

In traditional rate cases, decision-making is quasi-judicial and adversarial. Utilities initiate proceedings with a request to increase rates, and other stakeholders—such as consumer advocates—have an opportunity to submit evidence and legal arguments in opposition to utility requests. In many states, this sort of engagement is highly formalized and requires stakeholders to request formal intervenor status or engage legal representation. Rate cases also typically include public forums, hearings, and comment periods in which members of the public can submit comments [23••].

These quasi-judicial proceedings provide the basic approach to governance that is used for most policy matters that come before PUCs. In many states, the 2000s ushered in revived concerns about environmental and climate change impacts of electricity generation, prompting policy makers to mandate utility integrated resource planning, impose renewable energy mandates on distribution utilities, or require utilities to develop energy efficiency programs to help consumers save electricity [25, 26]. As PUCs began to initiate proceedings to determine how these new policies should be implemented, a growing number of environmental and consumer advocates began to regularly intervene in utility proceedings, building networks of expert stakeholders with interest and capability in participating in rate cases and other proceedings before PUCs [23••, 27].

The 2000s also witnessed the emergence of new forums for stakeholder engagement in state renewable energy and energy efficiency policy. A recent case study of renewable energy policy in Western states finds that stakeholders are engaged in a wide range of formal and informal forums that aid utility and PUC decision-making on renewable energy outside the formal, quasi-judicial setting, including informal discussions, working groups, and public meetings [27]. These forums provide both public and expert stakeholders with an opportunity to communicate with and attempt to influence utilities and policy makers. In a nationwide study, Baldwin et al. [23••] find that over half of US states have developed collaborative approaches to energy efficiency policy. Similarly, Shih et al. [24] find that 12 US states have established formal administrative bodies for energy efficiency and renewable energy governance that bring together actors from the public, private, and civil society sectors. In a comparative case study of energy efficiency collaboratives in two states—Connecticut and Maryland—Baldwin et al. [23••] theorize that states may use collaborative approaches to decision-making to increase decision makers' access to information, to enhance actors' ability to solve emerging problems, and to improve democratic accountability.

The Rise of Distributed Generation

The above discussion largely presumes a large-scale, centralized model of electricity provision. In recent years, however, there has been a rise in small-scale, customer-located "distributed generation," (DG), fueled by technological improvements, rapid price reductions in solar PV technology, and attractive financial incentives that have put small-scale renewable energy generation within reach of residential and small business consumers [28]. Similarly, community organizations—such as schools or community centers—can self-generate renewable energy [29]. Along with technological innovation, business and social entrepreneurial models for distributed generation have burgeoned [29, 30].

Despite the potential for DG to empower consumers and promote clean energy, it poses challenges to the regulatory system. DG systems are intermittent and must be integrated carefully into the grid. From a policy perspective, it can be challenging to determine electricity rates for DG consumers that fairly reflect the benefits of DG to the system—including reduced GHG emissions and reduced line losses—as well as the costs of DG users, including the possibility of eroding utility revenues and the need for utilities to take on new "standby" roles [31, 32]. Not

surprisingly, questions about whether and how policy makers and regulators should encourage DG are politically contested, often pitting utilities against DG advocates in legislative and regulatory policy arenas [17].

Environmental Considerations

Electricity poses a number of potential environmental threats, including siting of electric sector infrastructure and air and water pollution from power plants. Traditionally, these concerns have been managed separately from other aspects of utility regulation. Local and regional officials deal with siting issues, and the U.S. Environmental Protection Agency requires regulate pollution from power plants [20••].

Starting around the 2000s, concern about the electric sector's contributions to climate change has prompted policy makers and stakeholders alike to start considering policy options to reduce greenhouse gas emissions from the sector, or to consider a transition over time to cleaner sources of electricity [25]. Well over half of US states have adopted Renewable Portfolio Standards, which require distribution utilities to ramp up the percentage of renewable energy that they deliver to consumers over time, or Energy Efficiency Resource Standards, which mandate similar goals for utilities to save electricity [25]. Other states have directly adopted statewide greenhouse gas emission reduction goals, and see use of renewables, energy efficiency, and fuel switching to lower-carbon fuels as integral to these goals [33]. PUCs are responsible for implementing many of these policies, often in conjunction with utilities, environmental agencies, and other actors.

Emergent approaches to and venues for electricity governance are at least partially a response to the challenges of implementing climate change policy in a complex and dynamic electric sector. New renewable energy technologies emerge over time, and often have characteristics—such as intermittency, or location on the customer's side of the meter—that differ substantially from more traditional sources of electricity and often present technical and political challenges that must be resolved.

New Roles for Stakeholders

The above-described changes to the electricity sector—electric sector restructuring and the development of new institutional governance arrangements, the emergence of distributed generation, and the growing concern over the sector's greenhouse gas emissions—have been accompanied by new opportunities for stakeholders to engage in sector decision-making.

Different Roles for Different Stakeholders

As a starting place, the scholarship has begun to recognize that there are different roles for different stakeholders in the policy process. Rountree and Baldwin [27], for example, recognize that certain "special stakeholders" have access to different decision-making forums due to their capability and ability to devote time and resources relative to members of the public. Synthesizing across the literature, there are different types of stakeholders that take on different, sometimes overlapping, roles in electricity governance. Members of the public provide policy-makers with public opinion and advocate for preferred policies [10]. Communities can provide policy-relevant information about community energy needs and preferences, and are often in a position to facilitate or oppose renewable energy installations [11]. Interest group stakeholders often form around specific interests—such as environmental or consumer concerns—and ensure that these interests are represented in policy venues. Another category of stakeholders includes direct participants: utilities, merchant generators, government agencies, and other actors whose participation is crucial to energy markets or regulatory settings [27].

Political Roles

All of these actors play political roles that can include advocacy for preferred policy options. Depending on the jurisdiction, the public can take on different political roles—providing political legitimacy for clean energy policy, pushing policy makers to be more ambitious in renewable energy policy, or advocating for broad policy transitions that give citizens more direct control over energy production [34, 35]. At other times, the public is seen as reluctant to support renewable energy. NIMBY-ism is as a potential threat to renewable energy and related infrastructure, and scholars have identified public participation as a key strategy to increase local acceptance of renewable energy and related infrastructure [6, 7•, 11].

The public and other stakeholders play political roles well beyond renewable energy siting, however. As the previous discussion has shown, the electric sector has experienced dramatic changes in recent years, and choices about the sector's future are heavily contested, with some stakeholders and members of the public advocating for a cleaner, more distributed energy future—with the potential to upset traditional utility business models and regulatory practices—while utilities and other stakeholders often resist and contest this vision [27, 34, 35]. And as the set of potential players becomes more diverse over time—going from utilities and consumers to utilities, merchant generators, renewable energy industry, environmental interests, and prosumers—it is difficult for policy makers to accurately assess the political landscape or the policy choices that advance the public interest unless there are meaningful ways to gauge these diverse groups' interests.

These issues by necessity must be contested in both legislative and regulatory forums. Utilities have traditionally played a dominant role in politics, but often have incentives to avoid promoting distributed sources of energy that could erode utility revenues [23••]. Stakeholders from the public to the experts can act as a counterweight and represent non-utility interests as policy makers consider whether and how to transition away from large-scale sources of electricity. [27]

In practice, however, there are multiple challenges with meaningful public engagement, including difficulties in educating and communicating with the public [2,10], ensuring adequate transparency and inclusion [7•], and consulting with the public early in the policy process when public opinion may still shape policy decisions. Moreover, the public's influence on renewable energy deployment may be insignificant compared with more expert stakeholders [27]. More research is needed to identify effective practices for including public opinion in renewable energy policy decisions in an effective and meaningful way.

Instrumental Roles

In addition to stakeholders' role as policy advocates, there are instrumental reasons that stakeholder engagement has become more common, although these instrumental reasons tend to focus on the participation of experts and participants rather than members of the public. Market participants and expert stakeholders have the expertise to anticipate and resolve challenges that emerge when major policy changes are implemented in the sector. For example, stakeholder groups can help to overcome challenges with ramping up energy efficiency programs or bring together diverse stakeholders to help coordinate between different venues [15, 21••, 23••].

One of the characteristics of today's electricity sector is that a wide range of actors hold policy-relevant information, including utilities, merchant generators, renewable energy trade associations, energy efficiency vendors, grid operators, energy analysts, and consumer advocates [21••, 23••]. Regulators are tasked with making well-informed policy decisions, but information asymmetries require them to coordinate with and rely on this diverse set of actors. Moreover, many of these actors have individual interests that may not be fully aligned with the public interest, presenting a classic collective action problem. Several studies highlight the potential for collaborative and deliberative decision making forums to remedy these information asymmetries [22, 23••]. When actors with diverse interests come to agreement on an acceptable solution to a problem or approach to a new policy, it is likely that the agreement represents the public's interest, or at least represents a mutually acceptable solution.

While stakeholder engagement has significant instrumental potential, more research is needed on these emergent stakeholder decision forums. The existing studies of collaborative electric sector governance have largely focused on well-documented successes [21••, 22, 23••, 24]. More research is needed to know how these venues affect electric sector decision making and whether the collaborative approach is equally effective across all political contexts.

Conclusion

This review and synthesis of an emergent literature shows that the electric sector has experienced and continues to experience changes that present new challenges and opportunities. The traditional approach to electric sector governance—quasi-judicial rate cases—is insufficient to manage these changes, and we are witnessing the emergence of new governance approaches designed to solicit relevant information and increase stakeholder participation in electric sector decision making. To date, most studies have focused on the role of the public and public opinion, with particular focus on the implications of public opinion for renewable energy. An emerging literature, however, examines the role of stakeholder engagement in electric sector governance, from clean energy governance at the state level to transmission governance among RTOs. Additional social science research is needed to better understand why these new arrangements emerge, how they affect electric sector decisions and outcomes, whether they are effective at communicating public interest concerns to policy makers, and how policy makers can design more effective approaches to participation and stakeholder engagement.

Compliance with Ethical Standards

Conflict of Interest The author declares that she has no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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