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RESEARCH ARTICLE

A review of stakeholder participation studies in renewable electricity and water: does the resource context matter?

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Abstract

The growing scholarship explaining stakeholder engagement in natural resources policy and decision-making has produced theories about how participation does and should occur. Along with yielding more informed decisions that better meet stakeholder needs, numerous other benefits have been attributed to effective engagement practices. Some natural resource contexts, water governance for example, are very well researched, while other emerging decision settings, such as renewable electricity generation, are just gaining attention. Can lessons about stakeholder engagement in one context generalize to another? Understanding whether and how context affects stakeholder engagement could lead to more informed and equitable practices. In this pilot study, we show how the grounded theory literature review method can be used to systematically explore differences in the literatures on stakeholder participation in water governance and renewable energy governance. We find that researchers focus on different phenomena within these two contexts, specifically the kinds of decisions made and who makes them; the type, length, and intensity of stakeholder participation; and the extent to which non-expert stakeholders influence decisions. We suggest two possible reasons for these differences: first, researchers in these two natural resource domains may conceive of and examine stakeholder participation in different ways, asking different kinds of questions; and second, there are real-world differences between these two resource contexts, including different types of stakeholder and institutional capacity, physical differences in the resources and their technical complexity, and scale of the problem. Our research suggests that scholars of stakeholder engagement should pay greater attention to these contextual factors. Given these findings but also the small number of papers analyzed, examination of a larger sample using this method is warranted to generate grounded hypotheses.

Keywords Stakeholder participation · Water governance · Renewable electricity governance

Introduction

Interest in multi-actor policymaking and stakeholder engagement has burgeoned. Scholars and practitioners alike have long argued that stakeholder engagement improves democratic accountability, legitimizes decisions, and allows citizens to voice policy preferences (Nabatchi 2012; Fung 2006; Arnstein 1969). These potential benefits of stakeholder engagement have become particularly relevant to natural resource governance, which has become more participatory in recent years. And, there are a wide range of possible approaches to "stakeholder participation." Public administration and policy scholars have begun to identify distinguishing features of engagement, including the means of recruiting citizens, processes for exchanging and deliberating over information, and the ability of stakeholders to

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influence final decisions (Nabatchi 2012; Fung 2006; Rountree and Baldwin 2018).

Prior research also tells us that the broader institutional context—cultural, political, historical, and economic—influences management strategies and decision-making processes (Stenseke 2009; Abelson et al. 2007; Irvin and Stansbury 2004); but, little is known about how the nature of the underlying collective action problem and the characteristics of the resource itself might affect the approach to and outcomes of stakeholder engagement in decision-making. For example, how the resource is produced and provided, whether it is commonly owned or managed, whether it is fully or minimally regulated, and its ease or difficulty of capture and delivery may all have important implications for whether and how stakeholders engage in decision-making processes. Scholars have, however, pointed out that, even if best practices in stakeholder engagement are applied, there is no guarantee that objectives of the participatory process will be achieved in future cases (e.g., Luyet et al. 2012); this suggests that there are many variables as yet unexplored and calls into question the generalizability of such best practices across drastically different settings.

Our observation of discordance between, on the one hand, acknowledgement among scholars that stakeholder participation is situationally dependent and, on the other hand, theoretical suggestion that effective engagement processes should look the same regardless of context has led us to ask, are theories about stakeholder participation developed in one resource context applicable in another? We explore this question using a grounded theory approach. Specifically, we analyze a small set of influential research studies, which we define as those most frequently cited per year since publication, to see whether stakeholder participation looks the same in two resource contexts: water and renewable energy. Our aims with this approach are to (1) see whether the empirical findings about stakeholder participation are the same in water and RE contexts, (2) identify which aspects of participation and broader context are discussed by scholars, and (3) pilot a method that could be used in a more exhaustive review to develop hypotheses grounded in the literature.

This approach is not meant to reveal all possible processes and outcomes for engaging stakeholders in natural resource decision-making, nor is it aimed at uncovering the mechanisms behind any source of variation between the two resource contexts. Rather, it is meant as a first step toward understanding the complex relationship between engagement process, broader resource and problem context, and outcome. And, it is meant to indicate whether this question warrants further attention. If we find that stakeholder participation looks different in water and RE samples, the question then becomes, why? Is it due to institutional differences as a product of history, use, and how the resource is captured or produced? Is it the way stakeholder participation has been studied, for example the cases scholars choose to examine? Understanding the generalizability of theories about stakeholder participation in decision-making is critical not only to theory and scholarly advancement, but also to developing more effective and equitable practices.

Literature review

Rationales for and characteristics of stakeholder participation

The term "stakeholder" refers to any group of people sharing a common interest—or having a stake—in a particular issue or problem (Reed 2008). Stakeholders are a subgroup within the public, which refers to a "collection of individuals generally unstructured and unorganized" (Luyet et al. 2012, pp. 2013). Stakeholders as individuals and groups vary widely in terms of the interests they represent, the extent and nature of their expertise, and their ability to influence decisions, which may change over time and depend on the specific decision context (Freeman 2010). Though it has been defined in many ways, we follow Reed's (2008) definition of participation as "a process where individuals, groups and organizations choose to take an active role in making decisions that affect them" (pp. 2417).

Early scholars tended to conceive of participation as occurring along a continuum (Arnstein 1969) or at distinct levels of participation during which stakeholders may be informed, consulted, or empowered (Luyet et al. 2012; Rowe and Frewer 2000; Kessler 2004; Tippett et al. 2007). At the extreme end of "informing," stakeholders are not involved at all in decision-making; at the other end of "empowering," stakeholders have decision-making authority and full control over their participation (Kessler 2004). More recently, scholars have recognized participation as a multi-dimensional construct with variation in terms of the inclusivity of participation; the methods of information sharing and communication; the degree to which stakeholders influence final policy decisions (Nabatchi 2012; Fung 2006); the means of engagement (for example, face-to-face or virtual); and when in the decision-making process participation occurs (Rountree and Baldwin 2018).

Stakeholder participation is considered a foundation to democracy (Fung 2006), allowing constituents to hold officials accountable (Baldwin et al. 2018; West 2004) and to influence the decisions that affect them (Cogan and Sharpe 1986). Participation can increase public awareness of important issues (Bryson et al. 2013), enhance trust, social capital, and shared knowledge among participants (Dyer et al. 2014; Teitelbaum 2014; Feldman and Quick 2009), and improve legitimacy of decisions by boosting stakeholder support or buy-in (Chess and Purcell 1999; Beierle and Konisky 2000; Cotton and Devine-Wright 2012). Participation may

also improve resource management outcomes (Adams et al. 2011) and decrease decision-related costs and delays (Cotton and Devine-Wright 2012).

Although the characteristics of engagement processes tend to range from less engagement to greater engagement, the fact that they can vary independently suggests there may not be a *single* continuum but rather many possible configurations each with unique implications for the degree to which the participatory process achieves goals and objectives. There is general agreement among scholars that no single type or intensity of participation is best suited to all decision contexts (e.g., Kessler, 2004). However, there are implied judgments tied to lower-intensity participatory processes, as these are often associated with late involvement of stakeholders in decision-making and perceived as stakeholder placation rather than meaningful engagement (e.g., Arnstein 1969). More intensive and particularly deliberative processes (Emerson et al. 2012), on the other hand, are theorized to maximize beneficial outcomes by allowing for dialogue and information exchange, which may lead to the building of shared knowledge, mutual understanding, trust, and social capital (Quck and Feldman 2011; Quick and Bryson 2016).

These theorized benefits of participation are not always realized in practice (Reed 2008), however, and the drawbacks to highly participatory processes may help to explain why certain processes are chosen over others. Effective participation often requires a highly skilled facilitator (Chess and Purcell 1999), and decision makers may see engagement as a simple box-checking exercise rather than an attempt to understand and address stakeholder concerns (Endres 2009; Layzer 2002). If stakeholder engagement is implemented poorly, it may actually *reduce* the actual or perceived quality and legitimacy of the decision (Irvin and Stansbury 2004; Pearce and Pearce 2010), damage stakeholder relationships, increase conflict among actors, and reduce agency incentives to involve stakeholders in future decision-making (Lukensmeyer et al. 2011; Nabatichi and Leighninger 2015). The process chosen and the way it is conducted often indicate whether authorities aim to implement stakeholder recommendations or merely placate participants (Rowe and Frewer 2000). Even when decision makers are committed to the process, participation can be time- and resource-intensive, a lack of technical knowledge may limit participation by some stakeholders in certain situations (e.g., Fischer and Young 2007), and building consensus can be challenging if not impossible when stakeholders hold conflicting and deeply entrenched values (Vogel et al. 2012).

Thus, existing literature provides support for two divergent and conflicting views about stakeholder engagement: on the one hand, engagement can improve accountability and legitimacy and have a positive and instrumental effect on policy decisions and outcomes; on the other hand, it can consume resources and produce no meaningful effect, or may even undermine decision-making. Although these divergent findings may be attributable to the ways that stakeholder engagement is designed, they might also reflect differences in the underlying context—the characteristics of the resource itself, the diversity and characteristics of stakeholders involved, or the underlying politics and power relationships among actors.

Finding participation processes that fit the "problem context"

Recent scholarship has found that "well-designed" stakeholder participation may look quite different depending on the broader context (Bryson et al. 2013)—what we term the "problem context," for example historical, political, and cultural circumstances (Stenseke 2009; Abelson et al. 2007; Irvin and Stansbury 2004). Abelson et al. (2007) find that political context, community and population characteristics, decision-maker relationships with other stakeholders, organizational context and constraints, and decision-making context—broadly defined as the type of issue, stage, and overall time frame of the decision-making process—all affect public participation. Dolsak and Ostrom (2003) (2003 suggest that the broader economic context can affect the pre-conditions for cooperation. Studies of participation in landscape management have identified geographic scale and physical landscape features as important considerations in landscape management strategies (e.g., Stenseke 2009).

Where issues are highly technical, it may be necessary to involve expert stakeholders who can inform decision makers. But, in instances where local communities have important knowledge that decision makers lack, more inclusive processes may be warranted (Baldwin et al. 2018; Newig et al. 2018). When the socio-political environment is turbulent, decision makers may also need processes that allow them to consult with a wider range of actors (Scott and Thomas 2017). The legal history and traditions around decision-making may also matter: in some contexts, decision making has always been the purview of regulators, while in emergent or cross-boundary policy areas, collaborative approaches may be more likely to develop out of necessity.

Thus, prior studies have categorized participatory processes, created typologies to aid in the design of these processes (Nabatchi 2012; Fung 2006; Reed 2008), and demonstrated the important role of "context"—socioeconomic, cultural, and institutional in particular—in determining the outcomes of participatory processes (Stringer et al. 2014; Ingram 2013; Reed et al., 2017). However, other aspects of the decision context related to the resource have not been explored in any detail as they relate to stakeholder participation, nor, to our knowledge, has participation in two different resource contexts been directly compared.

Research in fields beyond "stakeholder engagement" suggests significant differences between water and RE decision-making contexts. These unique problem contexts, we argue, are the products of complex, dynamic, and interacting social, historical, economic, political, and physical settings. A number of schemes have been used to categorize resources (or "goods") as a means of identifying commonalities in governance challenges and strategies for effective management. Arguably the most influential scheme is the "typology of goods," (Ostrom 1990) which categorizes goods according to the extent to which potential users can be excluded and the degree of subtractability. Other characteristics, such as storage potential, resource predictability (Schlager et al. 1994), exhaustibility, and ubiquity (Ostrom 2003), have also been used to characterize natural resources. In the following section, we compare the problem contexts for water and RE and discuss how characteristics of each resource might affect stakeholder participation in water and RE decision-making.

Comparing contexts: water and RE

Considering the broader problem contexts, it is clear that water and RE are quite different. Water is a classic common-pool resource: its quality and quantity are affected by use and thus it is subtractable, and it often exists and moves at the landscape scale and is therefore difficult to exclude users from accessing it at many points (Ostrom et al. 1994). RE resources themselves vary in their subtractability and excludability—for example, sunlight itself is neither excludable nor subtractable; however, entrance into the electricity market may be considered excludable and any given space can support only one set of solar energy infrastructure (Brownson 2013). And, whereas water is storable, predictable in the short-term, exhaustible, and highly geographically variable and often scarce, RE is not storable (at least not with current technologies) and is inexhaustible in that more generation capacity can be installed to meet electricity demands. The predictability of RE resources varies by resource type and may change over time, and ubiquity varies by geography, though, unlike water, some amount of solar and wind are available everywhere.

It is worth noting though that water and RE resources and infrastructure are also not mutually exclusive. A dam may be used to generate electricity, store water for irrigation or other uses, or both. Depending on the location and use, access to the water itself might be "open," but access to the electricity market via hydropower is highly restricted. In short, the relationship between a resource's physical characteristics, uses and applications, and economic and policy management regimes is complex and heavily intertwined. Moreover, each has a unique history of governance that also plays into each of these factors.

Historically, water in the USA was managed primarily to generate power, transport material (mainly in the east), irrigate crops, and grow cities; thus, the expert-driven model of governance dominated water management. As water management expanded beyond technical considerations to include social and ecological needs, more stakeholders were included in decision-making, and collaborative water governance gained legitimacy. This is true in the east and west, even though different legal doctrines govern the regions.[1] Whether governed by riparian rights or prior appropriation doctrine, using water for the above functions causes social and ecological externalities. As Emerson et al. (2012) contend, water governance has become less about finding the best solution to a technical question and more about making water allocations acceptable to a broader group of stakeholders. This shift from technical problem to governance problem has produced its own momentum: as water management moved into the governance domain, the number and influence of government agencies and civil society groups with an interest has exploded—and so has their expertise. For example, as of 2013, water governance in the San Francisco Bay Delta (where the State of California diverts agricultural and municipal water from the wet north to the dry south) involved over 100 policy institutions and collaborative processes (Lubell 2013).

Water governance often involves multiple issues—such as water quality, quantity, allocation, and access—that span jurisdictions and cannot be well-managed by a single agency. This is a relatively modern approach in places with robust water infrastructure. Dam siting and canal building was traditionally a government agency-driven activity, and not a collaborative or stakeholder-driven process (Lowry 2003). Despite recent retirements of some hydropower facilities, hydropower capacity in the USA has consistently increased over the past two decades. The overwhelming majority of new hydropower projects have been added to existing water infrastructure at non-powered dams and conduits, and large-scale pumped storage hydropower (PSH) now contributes 93% of grid storage in the USA (Uria-Martinez et al. 2021). The landscape for hydropower decision-making has thus changed substantially over time; for example, new permitting processes to decrease time and costs associated with

[1] Riparian rights doctrine, the legal doctrine of eastern US states, gives property owners with land adjacent to water bodies the right to use water so long as it doesn't harm downstream or other users or divert the water out of the watercourse. Prior appropriation doctrine, which dominates western states, allows water to be diverted far from its source, and separates water rights from land ownership. One may, for example, own land but not the right to access water that runs adjacent to it, or conversely, one may own the right to divert water from a distant source to a property that does not abut the watercourse. This doctrine developed because of the need to divert water far from its source in order to irrigate land and hydraulically mine ore.

new hydropower development may be countered by changes in the source and availability of funding for new projects and revenue generated (Uria-Martinez et al. 2021). And, as viable sites with existing water infrastructure become increasingly scarce, siting of new facilities may again dominate, potentially creating new conflicts among competing users.

Today, water resource governance incorporates the fields of ecology, wildlife biology, ecosystem services, social justice and resource equity—which had not yet been "invented" or "discovered" as fields when water infrastructure was constructed en masse (Lowry 2003). Likewise, as infrastructure begot development, major water pollutants were discovered and regulated. All of the above created a "nexus" of policy problems which became less manageable via simple regulation, and more amenable to participatory, collaborative approaches (WEF 2011).

Many different types of stakeholders (municipal, agricultural, industrial, ecosystem/recreational) use water in the same basins, suggesting deliberative approaches to planning may be warranted (Leach and Sabatier 2005). Consequently, a wide range of social scientists have explored how stakeholders participate in water governance (e.g., Gerlak and Heikkila 2011; Wehn et al. 2018; Mancilla García and Bodin 2019; Mewhirter et al. 2018). These studies tend to highlight the benefits of one particular form of stakeholder participation in one particular context: deliberative and collaborative governance that brings together diverse actors with a shared interest in managing water use and quality within a given watershed. Collaborative governance of water resources is not an inevitable outcome, but it is one that has evolved in many places. In much of the highly developed world, policy makers and communities created new institutional arrangements to manage the many issues that emerged and were discovered over time following the period of water infrastructure development (Newig et al. 2018; Sabatier et al. 2005). But water infrastructure and development continues around the world, and the realization that such development is part of a much larger nexus of interests means that it has become a more participatory policy arena (e.g., Dinar et al. 2007).

Evaluative studies suggest that this increased participation has been largely successful. For example, in a study of over 300 watersheds, Scott (2015) finds that collaborative watershed management has a significant and positive impact on water quality outcomes. These results echo findings from Newig et al. (2018) and Sabatier et al. (2005), which describe a broad shift from top-down to collaborative watershed governance approaches and find that these approaches are broadly effective in improving water quality and stakeholder satisfaction.

In contrast, the large-scale development of RE technology, particularly for electricity generation, is a much newer decision-making setting than watershed governance. When water infrastructure was built, the major problems to solve were technical, such as water intermittency and connection from source to use. It took time for regulators, investors, and donors to recognize the range of social and ecological values that are also at stake and to devise governance approaches to address those issues. Today, RE seems to be at that very point—the barriers to making RE work at scale require technical solutions to connect RE, make it transmissible, and address intermittency. Regulatory decisions about RE are often focused on these technical issues, as well as similarly complex issues about RE funding and finance. Like water, RE also has implications for a complex set of environmental and social values, but regulatory processes generally remain oriented around inclusion of technical experts rather than those who represent communities and environmental interests. And as previously noted, whether or not the resource being managed is considered a "technical" issue or not in general discourse may matter in terms of who gains entrée into policymaking.

Despite its generally technical frame, the move from expert-driven governance to cooperative stakeholder-driven governance might turn out to be relatively rapid for the RE sector for several reasons: the institutional rules and incentives for collaboration (broadly) now exist, there is a belief heterogeneity among citizens that they ought to be meaningfully involved at the policy level (see Sabatier et al. 2005), and the politics around climate change and therefore energy policy are turbulent and urgent. Turbulent politics, in which there is disunity in defining the problem (i.e., climate change) and powerful interests compete economically and politically in the policy domain may incentivize policymakers to seek stakeholder engagement as a means for legitimizing a policy preference (Emerson and Nabatchi 2015). Expanding RE generation may create winners and losers regarding a range of benefits and externalities, so including a broad set of stakeholders could be politically expeditious, as the decision outcome would seem multilateral and thus legitimate.

Empirical studies have shown that stakeholders increasingly participate in RE decisions that were once the purview of a few elite policymakers and utilities in renewable electricity generation. While many political actors have called for a transition from fossil fuel-generated electricity to RE, such a transition poses significant governance challenges, including the entrance of new actors into renewable energy markets (Davies and Carley 2017), siting new generation facilities (Walker et al. 2017), social and political conflict over state policy implementation (Rountree and Baldwin 2018), equitable access by electricity users (Sovacool and Drupady 2016), and the need to manage long-term impacts of facilities on communities and ecosystems (Thomas et al. 2018).

As with water, stakeholder participation in RE decision-making occurs in a variety of ways. Where deliberative

processes that resemble those used in collaborative watershed management exist, diverse stakeholders may be actively involved; but their involvement can be cursory at best (Layzer 2002). Actors may also develop context-specific processes for stakeholder engagement (Rountree and Baldwin 2018; Endres 2009; Baldwin et al. 2018). Stakeholder engagement is seen as one way to facilitate the technical challenges of the transition to clean energy, while managing political conflict and minimizing negative consequences. Many of these concerns mirror those that drive stakeholder engagement in water resource governance, including the nexus of concerns that cross boundaries and sectors to impact stakeholders in diverse ways. However, in renewable energy, stakeholder participation in many settings is still largely restricted to consultation with technical experts or informing regulators about public opinion.

Whereas in watershed governance studies participation has been shown to influence decisions and improve outcomes, we have limited knowledge about how participation affect RE decisions and outcomes (Rountree and Baldwin 2018). A handful of studies suggest that collaboration and deliberation affects regulatory decisions about electricity (Ulibarri 2015) and can improve environmental outcomes (Baldwin 2019). But collaborative and deliberative approaches are not (yet) the norm in RE governance, where participation is often limited to public hearings on new RE developments. Here, many scholars document continuing public resistance to new RE projects (Devine-Wright 2007; Upreti and van der Horst 2004; Painuly 2001) and delays in renewable energy policy implementation (Pellizzone et al. 2015).

In theory, water and RE are entirely different decision-making settings; and yet stakeholder engagement is often treated in scholarship as a one size fits all approach where best practice includes intensive, ongoing engagement processes where stakeholders influence the decision outcome. But is this empirically—or necessarily—so? Is it feasible and practical given the technical, policy, and historical constraints of different problem contexts? Following, we discuss our approach to examining a subset of influential studies by identifying differences in *how* researchers have studied and come to understand stakeholder engagement. We then consider *whether* that is due to inherent attributes of the resource and its governance context or if the conclusions that researchers draw in terms of the benefits, costs, and outcomes of participation is, in some ways, a product of the cases they explore and how they explore them to suggest new lines of inquiry.

Methods and data

The grounded theory literature review (GTLR) method (Wolfswinkel et al. 2013), which draws from the broader principles of Grounded Theory (Strauss and Corbin 1990, 1998; Glaser and Strauss 1967), was used to identify and analyze a sample of empirical research papers that address the details of stakeholder participation in decision-making processes related to water and RE governance. In grounded theory research, hypotheses are not formulated prior to data collection but rather emerge from the data (Glaser and Strauss 1967; Glaser 1998). The GTLR method thus provides a systematic and repeatable means of analyzing a selected set of studies, allowing the researcher to inductively identify "the emergence of new themes, issues and opportunities; interrelationships and dependencies in or beyond a particular area; as well as inconsistencies" (Wolfswinkel et al. 2013).

This study follows the five iterative steps of GTLR: define, search, select, analyze, and present (Appendix A). In GTLR, researchers will purposively collect, code, and analyze initial data before collecting additional data (Chun Tie et al. 2019); thus, this study sample includes a *subset* of peer-reviewed, empirical research journal articles published between 2008 and 2017 that describe stakeholder participation in either water or RE governance. Boolean searches in Google Scholar and Web of Science were conducted using combinations of key words, including water, governance, management, participation, engagement, and renewable energy, electricity, governance, management, participation, engagement.[2]

Insights derived from the GTLR method inherently reflect how phenomena are being studied (Wolfswinkel et al. 2013) and not necessarily what occurs in the real world. Results are interpretive in nature and thus vulnerable to research bias and, because of small sample sizes, findings may not be generalizable beyond the context of the study (Randall and Mello 2012). Thus, it is ideal for answering questions related to theory building rather than to theory testing (Randall and Mello 2012) and in this case, for exploring the specific *contexts* in which stakeholder participation have been recently studied.

The small and non-random sample used in this study is not intended as a comprehensive look at the scholarship of stakeholder participation in water and RE management and governance. However, as a first-cut at understanding how scholars are conceiving of stakeholder participation in these two resource contexts, the small-sample is appropriate for use with the GTLR method as it allows for a systematic,

[2] Some relevant studies may have been excluded from the sample due to the use of the search terms "governance" and "management" and not "regulation." However, although governance involves regulatory processes, the aim was to select for participatory processes specifically, which would likely fall under the "governance" term, whereas processes occurring within a regulatory framework are less likely to be included.

repeatable, in-depth review of the literature to generate insights that might guide future, larger-scale studies.

The search produced 207 water-related and 48 RE-related studies from which a subset of 16 studies (8 from each water and RE) was selected for inclusion in the sample (Appendix B). The small sample size allowed for in-depth analysis of each study and detailed comparison across the sample. Because a key aim of this study is to explore how participation is theorized and studied in the two resource problem contexts, the most influential papers were selected—those most frequently cited in Web of Science *per year*[3] since publication—since these studies reflect issues most salient to researchers.

A two-stage, "circular" analysis process was used to analyze the sample. First, open coding (Charmaz 2006) was employed to inductively identify common categories of information contained in the sample. Second, each publication in the sample was carefully read to extract detailed information pertaining to each category or "theme." Unlike in content or quantitative text analysis where codes are assigned to pieces of text, in GTLR coding also involves iteration and idea generation.[4]

Results

The information categories identified through open coding (Charmaz 2006) were analyzed and grouped into the following themes: resource information; socio-political context; goals of participation; characteristics of the process; outcomes of participation (Appendix C).

Resource characteristics and underlying policy problem

To start, papers in neither sample discussed the underlying characteristics of the resources themselves; thus, the theme "resources information" was included based on the observation that examination of the resource context was lacking. It is unclear why this area of study remains under-explored, though perhaps researchers tend to view characteristics of the resource as sufficiently represented by other contextual factors, such as economic and political contexts.

Water governance and renewable energy papers did, however, explicitly discuss the underlying problem context, although they tended to conceive of the underlying social dilemma in different ways. In the water governance sample, watershed governance is seen as a complex collective action dilemma, in which many heterogenous stakeholders have diverse and interdependent interests in a watershed, and meeting these individual stakeholders' needs is likely to improve watershed functioning for the entire community. Following years of top-down governance that largely failed to address connections between social, ecological, and economic aspects of watershed management, watershed governance has become much more place-based and participatory, using governance strategies that allow diverse stakeholders to collectively address the full range of stakeholders' concerns over water quality, resource use, ecological functions, economic uses, and equitable access. Papers in this sample generally assessed participation as it functions within specific geographical boundaries, assessing the shift from top-down to broadly participatory governance, and understanding how participation integrates diverse stakeholder interests. Papers tended to focus on resource planning and management (Salgado et al. 2009; Brown 2011; Lennox et al. 2011; Muro and Jeffrey 2012; Sultana 2009), river basin management (Franzén et al. 2015; Jager et al. 2016), and watershed management (Larson and Lach 2008).

In contrast, the RE studies were less likely to conceive of the underlying problem as a collective action dilemma—with potential gains from cooperation—and more likely to characterize the RE context as a politically contentious one, in which stakeholders with competing interests vie for political influence within hierarchical regulatory settings. Like the watershed governance context, the RE sector is in a state of transition, with many jurisdictions recognizing that increased reliance on RE is necessary in a carbon-constrained future. But unlike the watershed context, there has been no concerted effort by policy makers to shift from top-down to local-level governance; and large utilities and power companies often use their considerable influence to either resist the transition to renewables outright, or to push for a transition that will preserve their power and profitability. Whereas water governance studies usually had an explicit geographical focus, RE studies rarely made explicit reference to geographical boundaries, reflecting the fact that the producers and users of RE can be geographically dispersed. RE studies tended to cluster around collaborative management and had diverse foci that included policy development (Adams et al. 2011), energy transition planning (Kowalski et al. 2009; Chilvers and Longhurst 2016), investments, financing (Yildiz 2014; Fraune 2015), siting, and development (Hindmarsh and Matthews 2008; Evans et al. 2011; Pellizzone et al. 2015).

These differences in the underlying problem context are striking. Partly, these differences may reflect that there is a smaller body of work studying participation in the RE context, and scholars may still be in the early stages

[3] The number of citations was divided by the number of years since publication to create a normalized metric and avoid biasing our sample in favor of older research publications.

[4] One author conducted the data analysis, and all authors discussed and collectively determined the "categories" for coding, emergent themes and trends across each sample.

of understanding the basic venues in which participation occurs. They may also reflect differences in the way these two sectors are regulated, where policy makers in the watershed context responded to ineffective policy making with deliberately collaborative approaches to decision making, while RE remains dominated by a largely hierarchical approach to regulation, with fundamentally different opportunities for end-user participation. But they also suggest fundamental differences in the way that scholars conceive of the problem context between the two resources, where water governance is seen—and studied—as a context with considerable gains to cooperation, while RE regulations is more often studied as a zero-sum game where stakeholders seek to influence political and regulatory decisions that create winners and losers.

Goals of stakeholder engagement

Not all studies directly discussed the decision makers' motivations or goals for engaging stakeholders in decision-making processes; however, those that did—for both water and energy—tended to focus on goals related to improving legitimacy of the decision process and improving decisions by incorporating stakeholder interests, values, and concerns. A number of the RE studies goals related to improving the legitimacy of decisions, including restoring trust between decision makers and stakeholders (Pellizzone et al. 2015), creating more legitimate and robust decisions (Kowalski et al. 2009), and gaining community support for city projects (Adams et al. 2011). This confirms prior findings in renewable energy research that people tend to support renewable energy in general while often opposing specific projects, particularly projects in close proximity to their homes, as in NIMBYism (Wolsink 2000).

Goals related to improving decisions by incorporating stakeholder interests, values, and concerns were more often noted as a primary goal in the water governance studies; for example, goals included developing decisions that create more equitable distribution of resources (Brown 2011), that get feedback to align plans with community values (Lennox et al. 2011), and that improve the outcomes of planning (Jager et al. 2016). In energy studies, improving planning outcomes was listed as a goal in just one study (Kowalski et al. 2009).

These differences reflect several contextual differences between water and RE noted in the literature review: water governance is being used as policy tool for instrumental reasons (equitable distribution), while stakeholder engagement for RE is being used to legitimize policy.

Characteristics of the process

Participatory processes described in the water and RE studies differed in terms of who participated; when stakeholders were engaged; who had decision-making power; and the type, length, and intensity of participation.

Who participates?

In both water and RE governance samples, a wide variety of actors were engaged in participatory processes. Mentioned in both problem contexts were resource users and the general public (in RE studies often referred to as "ratepayers"); community associations; local experts, business owners; industry groups; community groups; social and environmental advocacy groups; local, state, and national government agencies; politicians; governing boards; and councils. However, only "developers" and "investors" were discussed as participants in the RE studies.

In listing the stakeholders involved, some authors were somewhat vague—e.g., "land owners" (Lennox et al. 2011); "local authorities" (Muro and Jeffrey 2012) "local business forum representatives" (Chilvers and Longhurst 2016)—suggesting non-exhaustive lists of participants. Moreover, most papers contained very little description of participants beyond a general stakeholder category. Although further investigation with a larger sample of papers may yield additional insight, our findings suggest greater attention is given to characteristics of the participatory process than to the participants themselves. And yet, power dynamics among stakeholder participants, for example, can influence the decision-making process and affect outcomes (Purdy 2012; Ulibarri, 2015).

When do stakeholders participate?

The water governance sample included examples of stakeholder involvement at a variety of decision-making stages from early and late-stage planning (Lennox et al. 2011) all the way to implementation (Muro and Jeffrey 2012) and the allocation and reallocation of resources (Brown 2011). In the RE studies reviewed, stakeholders were involved in early planning, such as when stakeholders were asked to rank various project scenarios (Kowalski et al. 2009) or to share opinions of potential future projects (Pellizzone et al. 2015) and in mid-stage planning after projects were proposed (Hindmarsh and Matthews 2008); stakeholders were only involved in project implementation when they were financial investors in the project (Yildiz 2014). For the water governance papers, this finding aligns with the well-documented broader trend toward participatory

governance of water resources. For the RE papers, it is less clear whether this result reflects more cursory forms of participation in RE decisions, limited scholarly interest in the details of policy implementation, or some combination of the two.

Who makes decisions?

In both samples, high-level government agencies retained final decision-making authority; however, in water contexts these agencies were more likely to delegate power to local government entities, such as regional and local water authorities (e.g., Franzén et al. 2015) and advisory councils (e.g., Muro and Jeffrey 2012), to develop and sometimes implement management strategies, and make policy recommendations. On the other hand, in RE contexts, there was very little devolution of power. An exception cited by Evans et al. (2011) was a local government planning committee with final say regarding the potential development of wind turbines in the community (Evans et al. 2011). RE development plans were often created by electric utilities or private developers who informed the public about their proposed plans (e.g., Evans et al. 2011), but often the higher-level regulating agencies made decisions irrespective of public and other stakeholder input (e.g., Hindmarsh and Matthews 2008).

Type, length, and intensity of participation

Although a variety of processes were described, water contexts more often involved ongoing participation in formal groups, such as advisory councils, committees, and collaboratives, and were highly deliberative (e.g., Brown 2011; Muro and Jeffrey 2012). Stakeholders were also able to participate directly in the implementation of management plans, for example by constructing wetlands and monitoring pollution (Franzén et al. 2015).

Participation in RE decisions occurred through short-term events and ongoing processes. Short-term events included single incidents involving little to no deliberation (focus groups and surveys) (e.g., Pellizzone et al. 2015; Evans et al. 2011) and multi-session processes involving intense deliberation (e.g., workshops) (e.g., Kowalski et al. 2009; Chilvers and Longhurst 2016). Ongoing events centered on financial investments and were restricted to stakeholders directly involved in RE development by investing in new projects (Yildiz 2014; Fraune 2015). Unlike water contexts, stakeholders did not participate in the physical implementation of decisions, as these required skilled technicians.

Socio-political context

The "problems" at hand in both samples of water and energy studies were largely framed to meet human rather than biological needs. However, the water governance studies focused on the scarcity of the resource and equity issues surrounding allocation, whereas the RE studies centered on the need to address climate change and the energy security and economic benefits of renewables over fossil fuels. For example, Brown (2011), Franzén et al. (2015), and Lennox et al. (2011) all justify the need for improved water governance because adequate and clean water is increasingly scarce; equity issues associated with race, gender, and/or class are discussed in Brown (2011), Larson and Lach (2008), Lennox et al. (2011), and Sultana (2009). On the other hand, nearly all of the RE studies refer in one way or another to a "trilemma" of challenges associated with current energy resource use: impacts to climate, threats to energy security, and socio-economic impacts (Adams et al. 2011; Kowalski et al. 2009; Hindmarsh and Matthews 2008; Yildiz 2014; Evans et al. 2011; Chilvers and Longhurst 2016; Fraune 2015).

Particular governance challenges noted in the water studies is that water resources often span political boundaries (Jager et al. 2016; Franzén et al. 2015) and there are an increasing number of resource users putting ever-growing pressure on the diminishing resource (Franzén et al. 2015; Salgado et al. 2009). A notable challenge to governing RE was the issue of project siting (Hindmarsh and Matthews 2008) and significant stakeholder conflict related to NIMBYism (Pellizzone et al. 2015). This may be due to the nascency of this policy domain: RE policy is at the siting stage in which much infrastructure becomes "locked in." Much water infrastructure is well past that stage and therefore distribution is the major conflict, rather than production.

In both samples, there was often a legacy of mistrust and disempowerment that discouraged stakeholder involvement. Stakeholders were often polarized on issues (energy: Hindmarsh and Matthews 2008; Lennox et al. 2011); and, complex or technical aspects of the decision-making process limited the ability of some stakeholders to participate (water: Brown 2011; Jager et al. 2016; Muro and Jeffrey 2012; energy: Adams et al. 2011; Kowalski et al. 2009; Evans et al. 2011).

Outcomes of the process

There was a notable difference between stakeholders' ability to influence decisions in water versus RE contexts. In the sample of water governance papers, in six out of eight cases, stakeholders had actual or perceived influence over management decisions. In one study, participation was perceived as exclusive or ineffective (Sultana 2009), and in another the process was not intended to directly influence decisions but to inform participants (Salgado et al. 2009).

In RE, possible influence over decision-making occurred in four out of eight cases: two in which policy and development recommendations were given, though it is unclear whether these were adopted or implemented (Adams et al. 2011; Kowalski et al. 2009), and two in which stakeholders influenced decisions by investing in RE projects (Yildiz 2014; Fraune 2015). In two cases, stakeholders did not appear to influence regulatory or development decisions, and in two the participatory processes were not intended to influence immediate decisions (Pellizzone et al. 2015; Chilvers and Longhurst 2016). Trends observed within each of these themes according to resource type are summarized in Table 1.

Discussion

We start by examining key differences between these study samples. The results presented in Table 1 display a key difference: in water governance, stakeholders were involved in deciding *how* to implement decisions, while in RE studies, stakeholders were involved in deciding *whether and where* to site infrastructure. In this way, the "stakes" were different in the sample of water versus energy studies. Regarding water governance cases, elite policy actors may be more amenable to devolution of decision-making to resource users because decisions about who is a user and what infrastructure is needed have already been made. Decisions about siting RE generation facilities, by contrast, require input into a discrete policy decision, and the stakes for elite policymakers are higher. The questions are less about equity in access to the resource and more about deciding where to construct and how to finance large infrastructural components, which require technical expertise, political coalition-building, and the need for decision legitimacy that appeals to a larger audience.

Because participants were involved in different decision types (*how* versus *whether and where to participate*), so too were the extent and nature of their participation. In particular, the ongoing nature of stakeholder participation in water governance studies versus the discrete participation in most of the RE governance studies reflect their respective decision timelines. Because freshwater

Table 1 Observed differences in the sample of water and renewable electricity studies

	Water	Renewable electricity
Underlying policy problem	Collective action dilemma among diverse stakeholders	Political contestation between diverse stakeholders
Goals of participation	Improving decision outcomes	Improving decision outcomes; improving legitimacy of decisions
Decisions being made	How to meet diverse user needs	Whether and where to construct new renewable energy generation facilities
Decision makers	Regional and local water authorities comprised of stakeholders from many interest groups develop management strategies; higher-level government agencies oversee	Power producing companies develop plans for new generation facilities; electricity regulators oversee plan implementation
Participatory process(es)	Collaborative groups, such as advisory councils and committees, to design and sometimes implement management strategies	Scenario-planning workshops for development planning; focus groups, surveys, public meetings to provide opinions to decision makers
Length of participation	Ongoing	Short-term (one or a few sessions, until a decision is reached)
Type of communication	Deliberative, collaborative	One-way, consultative, or deliberative
Socio-political context	Resource scarcity; equity of allocation	Climate change, energy security, and economic benefits of renewables
Challenges to participation	Legacy of mistrust/conflict; technical/knowledge barriers; time commitment	Legacy of mistrust/conflict; technical/knowledge barriers
Outcomes	Yes: six out of eight studies find actual or perceived impact on governance and management decisions	Sometimes: four out of eight studies find actual (through investment schemes) or potential (through policy/development recommendations) influence on decisions

resources and user needs are interlinked and continuously changing, management of water resources is ongoing and requires adaptive decisions informed by the successes and failures of past management efforts. Decision timelines in RE siting, however, may be long-term but they are not necessarily ongoing. For example, a new generation facility may take years to decades to site, design, and construct; NIMBYism plays a significant role in the conflict over RE siting and likely will for the foreseeable future, particularly as less contentious locations get used up, and as new technologies like wave and tidal power make RE generation technically feasible in new locations. But, once in place there is little opportunity for revision or iteration. These findings echo recent work on community engagement in "new energy landscapes," which highlights that renewable energy developers often solicit community input during the initial planning or environmental impact assessment stages of decision-making, but give communities limited opportunity for input once initial siting decisions have been made (Smeardon and Palmer 2016). Truncating community engagement in this way may do little to increase public acceptance and reduce the tendency toward NIMBYism.

Whereas stakeholders in water governance participated at all decision-making stages, in the RE studies stakeholders were primarily involved in very early decision-making—often via workshops designed to yield policy or planning suggestions, with little further involvement in the decision-making. The fact that this sample does not include examples of ongoing or iterative stakeholder participation in RE governance does not necessarily mean it does not occur, but it could also be indicative of how scholars are studying participation in RE decision-making.

We now turn to possible explanations for these differences. First, stakeholders in water governance may have *greater knowledge and capacity*, a relic of the devolutionary trend in water governance in the USA and elsewhere that has given diverse stakeholders greater opportunities to engage in decision making. Stakeholder engagement in RE governance, in contrast, is a relatively recent phenomena and few stakeholders have developed the capacity to participate.

Capacity to engage stakeholders, of course, is encouraged by *participatory institutions*. Water governance, as a policy domain, has developed stakeholder-inclusive institutions for governance as it developed over time. The discovery and care for ecosystem services, the inclusion of previously ignored stakeholders, and the discovery of new pollutants to regulate has spurred policy innovation. This institutional capacity, and the hard-fought creation of it, makes deep stakeholder engagement possible. Though RE may touch upon many of these same core problems (ecosystemic benefits, justice, pollution reduction), perhaps because it is a newer field, scholars (and policymakers) have tended to focus on its initial phase: siting and construction. There are few institutions to foster stakeholder engagement or even governance, and so its "technical" nature and high degrees of formal regulation are leaned on as explanations for why it isn't (or even cannot be) amenable to governance as water is. And when they do engage stakeholders, regulators may be primarily focused on gauging the public's response to important siting or planning decisions that affect local communities, rather than seeing stakeholders' participation as a fundamental part of the governance process. Perhaps in several decades, governance institutions regarding the flow and consumption of RE will develop.

A third explanation is *physical differences* between water and RE. Resources vary on dimensions including predictability (Schlager et al. 1994), exhaustibility, and ubiquity (Ostrom 2003), and these differences affect how they ought to be governed (e.g., Ostrom et al. 1994). The deliberation common to water governance—crucial to maximize beneficial uses of a scarce resource—may be less necessary for more ubiquitous resources like RE. Although both water and renewable energy may be extracted in one location—generating both local economic and environmental benefits and costs—and used far away generating non-local benefits, the scarcity and exhaustibility of water create competition among local and non-local resource users thereby incentivizing participation in decision-making.

A fourth possibility is that stakeholders' salience is a function of *scale of the problem*. At the global, national, or subnational level, stakeholders have a stake in political decisions about whether and how to move toward a clean energy future, as well as how the costs are distributed across society. At the local level, stakeholders often have a much more practical stake in siting decisions about where RE facilities will be located, how they will connect to the grid, and who will benefit economically. Technical and financial decisions made by regulators may also have implications for stakeholders, but these implications are often less visible or acute to non-expert stakeholders.

A fifth possibility is that *technical complexity* affects the decision-making context. In the RE sector, where regulators, utilities, and energy generators have superior technical knowledge, regulators may limit stakeholder engagement to issues like siting decisions, where the public is most likely to have relevant input. Other barriers to stakeholder engagement in RE governance may include regulators' *perceptions* of citizen capacity or of the likelihood that groups

with deeply entrenched and opposing positions can actually realize gains from deliberation.

Finally, our results may indicate differences in the *cases selected* and *questions asked* by scholars. Water governance is widely studied and theorized (e.g., Ostrom 1990), and scholars may choose cases that provide evidence for or against theories about whether decentralized water governance is effective. Participation in RE governance is not as clearly theorized; electricity is a *good*, rather than a resource, creating a murky theoretical space where research questions about how to best govern a transition to clean energy are still in development. Given this, scholars may choose highly visible, early-stage aspects of RE governance that are salient to citizens and useful for theorizing about the process of policy legitimation by policy elites or the process by which interest groups crack into elite-driven policy subsystems.

The observation of notable differences between these two small samples warrants a follow-up with a much larger sample, which would allow development of hypothesized explanations that are more concretely grounded in the literature. Additionally, there is room for additional work using purposive sampling to isolate variables. For example, study samples including papers that explore stakeholder participation in decisions about water and RE infrastructure or the provision of water and renewable electricity via utilities may yield insights about the role of markets in influencing participatory decision-making processes in each sector. Finally, because water and RE are not mutually exclusive, follow-up studies could examine how stakeholder participation is approached in watershed and RE governance and an additional context: that of new hydropower projects, the majority of which have been added to existing water infrastructure at non-powered dams and conduits (Uria-Martinez et al. 2021), which may illuminate the ways in which competing stakeholder needs for water and electricity may be entangled.

Conclusions

Although scholars acknowledge that participatory governance varies across policy sectors (e.g., Ansell and Gash 2008), specific cross-sectoral variation in governance processes have not been systematically compared, even as scholars and practitioners sometimes attempt to apply lessons in one context to governance design in another. Understanding whether and how the broader resource context might affect the types of stakeholder engagement that occur, how they play out, and how scholars go about assessing their effects is a vast undertaking; this paper provides a modest first step toward this endeavor by examining and reflecting on how scholars have approached empirical research in these areas. Our findings based on a small number of papers suggest that results from participation research in one context do not necessarily generalize to other contexts. First, we disaggregate the concept of public engagement into key dimensions, including the kinds of decisions made and who makes them; the type, length, and intensity of stakeholder participation; and the extent to which non-expert stakeholders influence decisions. We find significant differences between water and RE governance processes on these dimensions.

We suggest possible explanations for the observed differences: stakeholder knowledge and capacity to participate, institutional capacity for participation, physical differences in the resources, scale of the problem, technical complexity, and research case selection. Water governance institutions may have had more time to mature and devolve, water resources by their "publicness" are more amenable to certain types of iterative participations, and scholars studying water governance are selecting cases of devolved and participative governance for theoretical reasons. By contrast, RE studies, tend to explain a relatively nascent policy arena still dominated by elites, the resource governed is itself amenable to privatization, and scholars are studying it with an eye on different theories than those examining water governance.

Although there are lessons on stakeholder engagement that span a broad swath of policy arenas, this pilot study indicates resource context should not be ignored in the quest for seeking broader theoretical clarity. However, given the intentionally small sample size of the present study, it is worth noting that a larger sample could lead to different conclusions about stakeholder participation in one or both contexts. Here, evidence is presented that justifies examination of a larger sample to generate grounded hypotheses. Scholarship on stakeholder participation is also in need of deeper reflection on the epistemological roots of how have come to understand stakeholder participation in decision-making. There are significant physical differences between types of natural resources, and institutional and historical use differences. Coupled with the variety of theoretical lenses of those studying stakeholder participation, importing lessons from one resource context to another should be done with great care.

Appendix A

Table 2 Grounded theory literature review steps 1–4

GTLR step		Data selection
Define	Criteria for inclusion	• Peer-reviewed journal publication • Presents empirical research • Published between 2008–2017 • Describes one or more of the following: who participates; how stakeholders participate; why stakeholders participate; when stakeholders participate
	Fields of research	Stakeholder participation in water and renewable electricity governance
	Sources	Web of Science; Google Scholar
	Specific search terms	Boolean search including all combinations of the following (in title): • Water govern* AND/OR Water manage*; AND Participat* AND/OR Engage* Boolean search including all combinations of the following (in title or topic): • Renewable energy govern* AND/OR Renewable energy manage*; AND Participat* AND/OR Engage*; AND electricity
Search	Search	Boolean search performed: January 7, 2018
Select	Refine sample	Eight papers with the most citations per year in each water and renewable electricity
	Date articles selected	January 7, 2018
Analyze	Open coding	Resource type • Characterization of resource Participation • Research methods • Who participates (actors involved)? • Why they participate (goals/motivations) • How they participate ▪ Who initiates/facilitates? ▪ Direction of information flow ▪ Length/intensity of participation • Challenges associated with participation • Who has decision-making power? • Outcomes of participation Findings/results • Study findings

Appendix B

Table 3 Research studies included in the analysis and number of times cited per year

Resource Type	In-text citation	Citations/year
Water	Brown 2011	4.43
	Franzén et al. 2015	5.33
	Jager et al. 2016	5
	Larson and Lach 2008	4.8
	Lennox et al. 2011	4.43
	Muro and Jeffrey 2012	5.83
	Salgado et al. 2009	4.89
	Sultana 2009	5.67
Renewable Electricity	Adams et al. 2011	2.43
	Chilvers and Longhurst 2016	4.50
	Evans et al. 2011	2.29
	Fraune 2015	2.33
	Hindmarsh and Matthews 2008	4.50
	Kowalski et al. 2009	13
	Pellizzone et al. 2015	2.33
	Yildiz 2014	10.25

Appendix C

Table 4 Themes emerging from open-coding of sample papers

Emergent themes	Open-coding categories
Resource information	• Characteristics of the resource, scale • Type of resource management decision
Goals of participation	• Goals of participation • Decision context -decision being made, timeline for decision
Characteristics of the process	• Actors involved • Who participates • How they participate • When they participate • Who initiates and facilitates the process • Who has decision-making power • Direction of information flow • Length/intensity of participation
Socio-political context	• Context/framing of the issue • Focus of the literature review • Challenges to the process??
Outcomes of Participation	• Outcomes and effectiveness of the process

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