



Original research article

When beyond compliance is the expectation: the realities of environmental planning and permitting for renewable energy projects in the great plains of the United States

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ABSTRACT

Utility-scale wind and solar development have higher land use requirements than fossil fuel energy, and therefore bring with them more complex environmental planning challenges. The formal mechanisms which may require a renewable energy developer to consult with wildlife agencies regarding environmental impacts, however, are limited, especially on private lands. Renewable energy represents a unique governance context, where there are limited formal regulations or regulative pressure and an increased reliance on normative pressure and beyond compliance behavior. This research looks to understand how different renewable energy firms behave in the current regulatory environment in the region given a limited number of regulatory constraints. We conducted 19 one-hour interviews with individuals representing 15 development firms which had operational projects or were working on developing projects in North Dakota, South Dakota, Nebraska, Kansas, Iowa, Oklahoma, and Texas. We found that motivations for environmental behavior were driven by economic, social, or normative norms, with quick development timelines and low risk being a key consideration. Participants identified the changing regulatory requirements, content, or timelines as well as variations in how regulatory frameworks were enacted to be challenging to navigate. Relationships between renewable energy developers and state and federal wildlife agencies are complex, but participants shared an overall positive view of these interactions. Overall, this research provides insight into how renewable energy developers operate within the current regulatory environment and emphasizes the beyond compliance expectations that currently exist for developers.

1. Introduction

Renewable energy requires space to be built; its infrastructure is much more dispersed than fossil fuel energy sources, in the case of wind, or requires a larger volume of land than fossil fuel energy sources, in the case of solar [1]. The immense land use requirements, and geographic nature of development make renewable energy more difficult to site and lead to an uneven distribution of the costs and benefits of development [2]. As Gross states [1], “For renewable electricity, the site ‘chooses’ the project, rather than the other way around” (p. 8). The potential environmental impacts of these large infrastructure projects can hinder development and lead to delay or even cancellation [3]. The environmental considerations and potential impacts of a project, therefore, are an important piece of the development puzzle.

This research specifically focuses on environmental impacts such as

impacts to wildlife and habitat, which are highlighted by Susskind et al. [3] in their case study examples as the main environmental concerns presented, along with impacts to wetlands and waterbodies, which are not included in this research. The formal mechanisms which may require a renewable energy developer to consult with federal and state wildlife agencies related to potential environmental impacts, such as those to habitats or species, are often limited, especially on private land, and vary greatly between states in the U.S. [4]. While federal wildlife agencies have authority under federal policies such as the Endangered Species Act (ESA), Bald and Golden Eagle Protection Act (BGEPA), and the National Environmental Policy Act (NEPA; in limited cases where project funding or location trigger it), mechanisms which create requirements for consultation are sparse [5,6]. In the states of interest for this research – North Dakota, South Dakota, Nebraska, Kansas, Iowa, Oklahoma, and Texas -, the lack of concrete authority to require

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consultation creates what we argue is a unique governance context (as further described in Section 3). In the absence of formal regulations or regulative pressure which require consultation and particular compliance actions, the renewable energy sector and governance has shifted to reliance on normative pressures, becoming subject to the expectations of communities and broader societies as to what their impact on the environment will be [7]. This normative pressure has created a unique environment of beyond compliance behavior as the expectation for renewable energy developers, where beyond compliance can be broadly thought of as business practices that include engaging in environmental programs or pursuing environmental protections that go beyond what the regulatory framework requires [8]. While many states have more robust regulations which guide development of renewable energy project, as shown in a recent inventory of state- and local-level policies by Enterline et al. [9], this research seeks to understand how renewable energy developers navigate planning a project with limited formal regulatory requirements.

Much of the existing literature on renewable energy development and environmental impacts which is not based in understanding the specific impacts to species or habitats is focused on the public perception and response to environmental impacts [10–12]. In current literature, renewable energy developers are grouped into a singular category which does not acknowledge the wide variation in how individual companies or even staff members within a company approach the environmental planning and permitting of their projects [13]. Within any regulatory environment, the individuals being regulated are heterogenous and each firm behaves differently based on multiple different internal and external factors [14]. The purpose of this research is to provide a perspective on how different renewable energy firms behave in the current regulatory environment given a limited number of regulatory constraints.

Drawing on interviews with individuals who work within renewable energy projects and navigate environmental concerns, we examine the variation in how renewable energy developers approach environmental permitting and planning of projects, what may influence their approach, and what their relationship looks like with wildlife agencies. This research uses institutions and the idea of institutional work to understand what rules guide developer behavior, both regulations as well as more informal institutions like social norms or pressure, and how they navigate varying expectations depending on the state or even the local community they are attempting to develop in. In a vacuum of regulatory requirements, the compliance behavior of renewable energy developers represents a unique case study for understanding what other factors may influence compliance beyond regulatory frameworks.

2. Literature review

2.1. Institutions

This paper's approach to the regulatory environment and the policies and guidelines for renewable energy development orients around the idea of institutions. Institutions are defined as rules that guide and constrain actor behavior; these rules include not only actual laws but also organizational policies and social norms [15]. In the context of renewable energy development, these institutions include: formal environmental policies such as the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), Clean Water Act (CWA), informal guidelines like the U.S. Fish and Wildlife *Land-Based Wind Energy Guidelines* (WEGs) published in 2012, societal expectations about how these companies proceed with development (i.e. social norms), and internal compliance policies and strategies [16]. Of note, this research focuses on the environmental permitting of renewable energy projects; there are numerous other policies which apply to other considerations for development of renewable energy projects which are not in the purview of this research.

There are three pillars typically identified within institutional

theory: regulative, normative, and cultural-cognitive [15]. This research is focused on the regulative and normative pillars. The regulative pillar focuses on the explicit regulatory processes that exist, such as the laws that govern environmental impacts: ESA, MBTA, BGEPA, and CWA for example. Laws can often be ambiguous in terms of how they are interpreted and implemented [15]. The normative pillar includes both values and norms. Values and norms can assist in defining the goals and objectives an individual or organization pursues and how those goals and objectives are pursued [15]. Within the normative pillar, developers often determine within the organization what compliance with environmental regulations means and how to achieve this compliance. The third pillar, cultural-cognitive, emphasizes the “shared conceptions that constitute the nature of reality and create frames through which meaning is made” [15]. This pillar is intimately related to the normative pillar in terms of the shared frames of reference through which meaning is determined. Cultural-cognitive considerations were not included in this research as they often exist in the form of more tangible symbols, writing, or interactions which are best observed in person using more ethnographic approaches. This is not to say that this pillar is not equally important, and the shared meanings and symbols that create culture in the renewable energy sector likely also influence how developers behave; this represents an avenue for future research.

2.1.1. Institutional work

Institutions can be conceptualized as constantly being “maintained, altered, contested, or even fundamentally rejected and replaced” through the process of institutional work [17,18]. Institutional work shifts the focus away from how institutions guide and govern actors and on to how actors and their actions may impact institutions [19]. Creation as a form of institutional work is the most extensively represented examination of institutional work in the literature, pairing well with exploration of concepts such as institutional entrepreneurship, who is creating new institutions, and under what conditions are they doing so [18]. Similarly, the disruption of institutions has been well-examined, although the exact practices through which actors disrupt or destroy institutions are not as adequately studied [18]. The least examined of the three forms of institutional work is the maintenance of institutions; this could be attributed to the fact that institutions are often taken for granted in current existence, although it may take significant work to maintain an institution in its current state [15,18].

Particularly when thinking about the maintenance of institutions, institutional work can bring attention to how actors navigate both flexible and rigid institutional structures, maintaining or changing them along the way [19]. As an extension of the institutional work definition outlined by Lawrence et al. [20], Beunen and Patterson [19] proposed extending institutional work, specifically in the context of environmental governance, to include both purposive and non-purposive actions which may impact institutions. This revised conceptualization of institutional work allows for a deeper understanding of how actors influence institutions, whether their action or intentional or passive occurrences of everyday operation within these frameworks.

2.1.2. Organizations and institutions

We can conceptualize the relationship between organizations and institutions as a game, where institutions are the game's rules and organizations are the players. An organization represents a team in this analogy, which shares a common goal or purpose that drives their overall actions and performance [21]. Organizations abide by existing formal and informal institutions in the pursuit of legitimacy: “the generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” [22]. In the realm of renewable energy development, institutions that contribute to legitimacy are both the formal policies in place as well as the expectations set by guidelines like the WEGs.

In addition, important for the basis of this research is the idea of an

organizational field, which Scott [15] defines as “a collection of diverse, interdependent organizations that participate in a common meaning system.” This common meaning system can be conceptualized as a set of institutional logics, or shared institutional frameworks that guide the behavior of organizations within a particular field [15]. Focusing on the renewable energy sector as its own organizational field with a unique set of institutional logics is a key component for the framing of this research.

2.2. Environmental regulations and compliance

Institutional and organizational theory provide a broad framework through which to understand how formal and informal structures impact and are impacted by developer behavior, and we narrow this focus to environmental regulations and guidelines for renewable energy development. The analysis presented is rooted in understanding the compliance behavior of developers in an underrepresented facet of environmental compliance. Much of the existing literature focuses on measurable environmental impacts (pollution, water quality, etc.) but there is very little attention paid to environmental regulations that may be more difficult to enforce, such as monitoring impacts to endangered species in compliance with the ESA [23]. The literature on compliance and permitting in the context of renewable energy is also limited, with examples including: Barr et al.'s [24] review of the permitting process for marine renewable energy, a law review which discusses the call for more federal control over permitting of wind energy in the early 2000s [25], a review of potential state regulation of wind energy in Texas [26], and a chapter in a book on renewable energy and wildlife conservation which explores the current and potential policy directions to balance deployment of renewable energy with potential wildlife impacts [16].

This research relies on two key concepts within compliance literature: beyond compliance and the social license to operate. Beyond compliance can be conceptualized as business practices that include engaging in environmental programs or pursuing environmental protections that go beyond what the regulatory framework requires [8]. Literature has proposed three main motives for beyond compliance behavior: fear of legal repercussions, reputation, and moral obligation [27]. This behavior, however, is largely explored in the context of pollution or water/air quality, which also have more tangible regulatory frameworks or measurable benchmarks companies must meet [23]. Renewable energy development, comparably, can be argued to rely more on beyond compliance behavior to ensure environmental protections given the limited environmental framework to regulate firm behavior [5].

Closely related to the idea of beyond compliance, arguably a driver of beyond compliance behavior, is the concept of a social license to operate. This social license to operate can be defined as “the demands on and expectations for a business enterprise that emerge from neighborhoods, environmental groups, community members, and other elements of the surrounding civil society” which may often lead to “environmental measures even in circumstances where these are unlikely to be profitable” [8]. Beyond compliance and the pursuit of a social license to operate allow for an exploration of compliance behaviors outside of the existing regulatory framework. It is important to acknowledge, however, that both of these terms may be used as a way to limit discussion on social acceptance of development; in the mining industry, for example, it has been acknowledged that the history of this term centered around being able to reconcile community concerns with protecting business [28]. There is value, however, in using a social license to operate framing, which can help emphasize the project-specific approach which accompanies social license efforts versus broader social acceptance of renewable energy development [29].

This research will also explore the more traditionally identified motives for compliance – economic, normative, and social – and how they are presented in a compliance environment with much more ambiguous regulatory benchmarks [30]. The compliance literature, as previously mentioned, has not evaluated the relationship of the

regulated with regulators in more ambiguous policy contexts, or in contexts where beyond compliance behaviors are more common [23]. This research also seeks to fill this gap by providing insight into how developers view their relationship with regulators. This connects back to the concept of institutional work presented earlier in this section, as we seek to explore how institutions are maintained or challenged within the interactions between the regulated and the regulator. Consultation between the regulated and regulator are shaped by these formal and informal institutions, and the perception of developers as to what this relationship looks like provides insight into how they currently operate within or attempt to change these institutions.

2.3. Social acceptance in renewable energy development

While this research focuses on the approach that renewable energy developers take towards compliance with environmental regulations, it is important to acknowledge and discuss the role of public engagement and social acceptance in renewable energy development. Concerns related to impacts to wildlife are ones shared by communities in local meetings or in other public forums, often in opposition to a project [3,31]. In addition, in some cases, public engagement, feedback, and involvement are a required part of the development approval process, often through the local permitting submittal process in the region of interest for this research. While spatial planning of renewable energy development is in part a technical exercise done internally by a developer, it is also political, and previous research has found that those planning processes which provide an avenue for a participatory process can reduce local conflict and lead to more positive project outcomes [32–34]. The requirements for what this participatory process should look like (if it is required at all) also vary immensely depending on whether there are state-led regulations for renewable energy development, if it is left to the county to decide, or if there is split authority between the two [9].

Ultimately, in some contexts, the public perception and feedback on environmental practices of development may become an integral piece of the permitting and approval process. The academic literature surrounding public perception, acceptance, and engagement in renewable energy development is robust, and a recent in-depth study by Elmallah and Rand [35] highlights many of the challenges that come with variations in regulatory regimes and requirements for public participation by tracing the wind planning process from beginning to end. While this research does not explicitly explore the relationship of developers with the public in the environmental planning of their projects, it is important to acknowledge that the public participation facet of development should be conceptualized as a key component of the regulatory process.

2.4. This research

The literature as described in the sections above provides a basis for understanding how regulated actors behave in a multitude of regulatory environments. Institutional theory is used in partnership with literature on the regulatory environment to examine how renewable energy developers behave within the formal and informal institutions which provide a pathway for the environmental permitting and planning of projects and how they interact with other actors in the regulatory environment.

Given the largely voluntary nature of current environmental planning of renewable energy projects and the ambiguous nature of enforcement of existing formal policies, we argue that developers are constantly performing institutional work as they pursue project development. At an individual policy level, developers are both trying to maintain certain policies as well as alter existing frameworks to fit their approach to siting and development. Looking at the broader spatial context of development, developers are in a constant state of institutional work in adapting broad formal and informal institutions to fit the specific ecological context within which they are operating. Institutional

work offers a valuable framework through which to explore the relationship of developers with environmental governance because it encourages an understanding of developer activities that impact and are impacted by institutions, contributing to a bigger-picture understanding of patterns of compliance behavior amongst developers. The renewable energy sector is also driven by a unique set of institutions that set their compliance behavior apart from other energy generation sectors. The informal nature of many of the institutions governing the behavior of developers allows for an exploration of how organizations within a field can vary in how they respond to various institutions. This research will explore how the internal values, norms, and policies of different organizations drive their approach, through individual employees, to environmental compliance.

In the context of the regulatory environment and compliance, we believe that the renewable energy industry provides a unique perspective on the idea of beyond compliance and the pursuit of a social license, where beyond compliance behavior has become a normative institution for the industry. We argue that much of the environmental practices implemented by renewable energy developers can be conceptualized as beyond compliance behavior in pursuit of a social license to operate and that this is the norm (if not an expectation) within the industry.

3. Methods

For this research, we focused on utility-scale solar and wind energy as our renewable energy technologies of interest. They are currently governed under many of the same policies, with solar development often being guided by current wind energy regulations given the infancy of utility-scale solar compared to wind. We interviewed renewable energy development firms who have built projects or are currently developing projects in the Great Plains region, and we sought out professionals who had experience with the environmental considerations of project development. We purposefully selected seven states as our area of focus: North Dakota, South Dakota, Nebraska, Iowa, Kansas, Oklahoma, and Texas. These seven states are predicted to see a large contingency of future development of both wind and solar, and have similar ecosystems and environmental concerns [36]. These states also have a similar level of state regulatory power [5]. North Dakota and Kansas both have mechanisms which indirectly create a requirement to consult with the state agencies (particular project funding mechanisms or required permits include consultation with wildlife agencies as a requirement), and Iowa and South Dakota both have mechanisms that indirectly create authority (have permit review processes which may include referring to state wildlife agency opinion on particular projects). Overall, in these seven states, while there may be instances where agency consultation is required in coordination with another permit, agency consultation is not required across the board [5,9].

This research specifically focuses on those regulations and guidelines that relate to impacts on wildlife species and habitats; while we recognize the importance of regulations such as the Clean Water Act for protecting wetlands and waterbodies, the permitting regime associated with that law and associated regional implementation is complex and would benefit from separate attention versus being included here. We also recognize that local permitting requirements are becoming increasingly important for the success of renewable energy projects, as recent literature has shown, such as Lopez et al.'s [37] analysis of the potential impacts of local siting restriction and Nilson et al.'s [38] research on developer approaches to community engagement. Local permitting, however, represents a different level of complexity and often different staff members within renewable energy firms than those who were interviewed for this research.

To explore the compliance behaviors of renewable energy development firms, we conducted confidential, semi-structured interviews with staff members from development firms. This research and the associated interview material were approved under the University of Oklahoma's Institutional Review Board (#14823). We requested to speak not only to

environmental staff but also to developers, project managers, or any other staff in these firms who felt that they could speak to the environmental piece of developing a renewable energy project. We did not specify what specific environmental planning experience staff needed to have and interviewed any staff member willing to discuss their experience with us. All interviews were conducted via Zoom to increase our geographic reach, and interviews were recorded with the consent of participants. If a participant did not consent to recording, detailed notes were taken and analyzed along with the interview transcripts. The interview guide used for the semi-structured interview is included as an appendix to this manuscript.

These interviews were conducted in March through October of 2023, and the average length of an interview was one hour. We used a snowball sampling approach to recruit participants, reaching out to contacts in development firms and then asking them to refer others upon completion of the interview [39]. We then expanded our reach by: posting on LinkedIn requesting participants, asking renewable energy trade associations to distribute our call for participation, and submitting contact form inquiries or sending e-mails to firms which we did not have contacts for. In total, we contacted 37 development firms identified as having wind or solar energy projects in our region of interest to ask if they would be willing to participate; for some firms, we contacted multiple individuals. Our final participant group consisted of 19 staff members representing 15 development firms (see Table 1 for more specific firm characteristics). We talked to staff members in a multitude of different roles, from environmental managers working on specific projects to senior staff members, vice presidents, and executive staff members. See Table 2 for the demographic profile of our participants.

To analyze the interview data, we coded our transcripts using NVivo™ using an inductive coding approach, where we began with a few coding themes identified from the literature on institutions, organizations, and compliance but added to the codebook as additional themes emerged from the data [39]. One member of the research team was the primary coder, but the codes and associated themes were reviewed by all members of the research team. All quotations have been anonymized to protect participants; identifying information has been removed and quotes are attributed using a number system, where any individual with the number format #.# was one of multiple individuals interviewed from a single firm.

Due to the sensitive nature of the questions asked during the interviews, participants were assured raw data would remain anonymous and confidential and would not be shared.

4. Findings and analysis

We break our findings into six main sets of ideas. First, we identify more generally what values and norms contributed to how different firms approached compliance and the consultation process. Second, we explore how the idea of beyond compliance shows up in firms' approaches to consultation and their reflections on the voluntary nature of

Table 1
Firm characteristics ($n = 15$).

	Number of firms
Technology Developed	
Wind only	1
Solar only	2
Solar and battery storage	1
Wind, solar, battery storage	9
Renewable and non-renewable energy development	2
Development Model	
Owner/Operator ¹	12
Developer Only ²	3

¹ The firm oversees the construction of the project and then continue to own and operate it.

² They oversee the planning and construction of the project and then sell it.

Table 2
Participant demographics (n = 19).

	Number of participants
Gender	
Male	10
Female	9
Race	
White	18
Non-white	1
Average Age	42 years
Education level	
Undergraduate degree	7
Graduate degree ¹	12
Time with current company	
Less than 5 years	9
More than 5 years	10
Worked in renewable energy sector prior to current role	
Yes	16
No	3

¹ This included Master of Science, Master in Business Administration, professional Masters programs, and Juris Doctorates.

much of their environmental due diligence. Third, we look at the overall perspective of participants towards environmental considerations of development. Fourth, we examined how environmental considerations and community engagement intersect. Fifth, we dig into common themes amongst firms as they relate to the relationship with state and federal regulators and the consultation process. Last, we outline some of the key opportunities and challenges for the industry moving forward, as identified by participants. These themes and key findings are summarized in Table 3.

4.1. Organizational values and institutional structures

We first asked participants to discuss their general approach and experience with the environmental permitting and planning of projects they work on as well as how their firm prioritizes environmental considerations in project development. Approximately half of the participants identified specific biodiversity or environmental policies or goals that drove their company's commitment to environmental considerations during development. These specific policies or goals ranged from specific biodiversity impact goals (such as a net positive impact on biodiversity through conservation practices) to internal compliance standards related to how each environmental staff member approaches the permitting process. The remaining participants did not identify any specific goals or policies but indicated that their company valued the environment and recognized it as a key consideration during the development process. For example, one participant indicated that the environmental piece is a priority: "The environmental piece is a strong priority. It's something we discuss, you know, early on in the projects... We're coordinating with the environmental agencies very early in development and then throughout" (Developer 10). In place of citing specific species policies or goals, many participants mirrored this participant in highlighting the environment as a general priority.

When looking at themes in the motivations identified by firms for environmental compliance, they tended to match the general economic, social, and normative motives identified in the compliance literature. Economic motives were mentioned most frequently and included things like: environmental considerations influenced the decisions of firms buying projects or power from developers, or investors wanting to see the environmental risk, and overall risk adversity for projects. Based on the responses of participants, it's clear that remaining environmentally compliant is important for the financial success of development firms. For example, one participant said, "even if you didn't look at it from an environmental perspective but you looked at it from a transactional due diligence de-risking perspective, it's of utmost importance that the

Table 3
Summary of key findings.

Key idea	Main themes
Organizational values and institutional structures	<ul style="list-style-type: none"> • There is variation in whether or not development firms have explicit environmental goals or policies. • Economic motivation and potential project risk are main contributing factors to environmental decisions. • Firms are also concerned about their social reputation.
Beyond compliance	<ul style="list-style-type: none"> • Participants perceive some of what they do in environmental permitting and planning as voluntary. • They are going "above and beyond" current regulations. • Renewable energy is held to higher standard than other energy sectors.
Environmental considerations in development	<ul style="list-style-type: none"> • Regulatory timelines, changes in regulatory content requirements, and variability of guidelines and regulations between regions are difficult to account for. • Uncertainty is a big concern. • Federal regulations are more so top of mind in this region compared to state regulations. • Local permitting considerations are becoming an increasing concern.
Community engagement	<ul style="list-style-type: none"> • The community engagement approach and timeline varied between firms. • The main environmental concerns communities share are impacts to species, impacts on groundwater, and stormwater run-off. • There is a concern that some community concerns are not genuine but instead an effort to hinder development. • There is recognition that some community members have connections to their environment and their concerns about project impacts are genuine.
Consultation with regulators	<ul style="list-style-type: none"> • The timeline for consultation with state and federal wildlife agencies varied amongst firms as well as the amount of information they are willing to share. • Staffing turnover represents a big challenge for consultation currently. • The way guidelines are implemented may vary from state to state. • Individual personalities and biases represent a challenge but emphasize the importance of relationship building and communication. • Consultation needs to be an ongoing process.
Challenges and opportunities	<ul style="list-style-type: none"> • Challenges for renewable energy development centered around availability of space and transmission. • There are concerns about the impact an increase in species listings will have on development. • There is an interest in building more responsible siting practices and collaborating with other stakeholder groups.

environmental considerations are taken into account" (Developer 15).

Social motives for environmental compliance were also mentioned frequently. The most common connection was to the reputation of the firm; environmental due diligence and performance resulted in protecting the reputation of the developer, contributing to their legitimacy. As some of the firms were international firms with a United States portfolio, this reputation facet extended to protecting the overall firm reputation as they developed in countries other than the U.S. as well. Developers also recognized the importance of social acceptance for overall project success – "...I think my company... took the approach that being a good actor is imperative for being a successful developer" (Developer 13). Pursuit of legitimacy and a social license to operate were clear social drivers. Compared to social motivation for compliance, normative motivations (those internal to the firm) were mentioned far

less often. Participants were asked to discuss if they feel their company prioritizes environmental considerations for projects and discuss whether or not it was a company policy or goal, and it seems that participants were far more focused on external approval from stakeholders versus internal values and norms, again emphasizing the pursuit of legitimacy and a social license to operate as key factors in environmental due diligence.

Overall, it was fairly mixed within this participant group whether they had formal policies related to environmental considerations of projects or if it was more so an implied value of operations. Most participants cited economic considerations as a key driver for environmental due diligence, although external social acceptance of individual projects or overall company operations was also mentioned frequently. This external social acceptance and pursuit of legitimacy connects well to the next theme of this research: beyond compliance approaches and voluntary environmental due diligence activities.

4.2. Beyond compliance and voluntary due diligence

Seven participants at some point during the interview referenced the voluntary nature of much of the environmental due diligence process for renewable energy development. Five participants either explicitly mentioned the idea of a feeling of going above and beyond the current regulations or alluded to it by discussing how voluntary measures are expected of developers. For example, one participant said about the lack of formal policies, “We don’t have a blank check. There is still, I think, almost required best practices and lots of expectations on developers of how to put together a renewable energy project that is respectful of the environment” (Developer 14). This theme of beyond compliance as an expectation or a risk mitigation approach came up often in interviews. For the renewable energy industry, for the purpose of development, voluntary guidelines like WEGs are thought of as implicitly required. Developers are not seeking approval from any state or federal agencies, but participants consistently framed consultation as a voluntary activity they choose to pursue. For one developer, they highlighted that no one is requiring them to pursue activities like ecosystem restoration. They pursue these activities because it is “a reflection of my company’s value and our goal to be a good neighbor for communities” (Developer 3.2). Many developers equated this beyond compliance approach and the use of the WEGs as doing development the “right way.”

One point brought up within this idea of beyond compliance, which was not mentioned by many participants during interviews but is certainly part of the dialogue surrounding renewable energy, is the idea that this expectation of beyond compliance is unique to renewable energy developers and the renewable energy sector, compared to other types of energy production. One developer said “But from a cynical perspective, the reality is that renewable energy is always held to a higher standard than other types of industry in infrastructure development. And so if you want to have a social license to operate, you need to take it a step higher than anyone else ever would” (Developer 7). Another developer noted “I think most of us are doing [extensive environmental due diligence]. So, we’re one of the only utilities. Oil and gas doesn’t do this. You know, nuclear doesn’t do this” (Developer 2.1). This represents an important perspective as conversations around the permitting of renewable energy projects continue. This perspective emphasizes that renewable energy is a unique organizational field driven by unique institutional logics compared to other energy production sectors.

4.3. Perceptions of the environmental considerations for renewable energy

When asked about the overall challenges in navigating environmental considerations for projects, sixteen participants identified the changes in regulatory timelines, changes in regulatory content and requirements, and the variability of guidelines and requirements between regions. Five participants specifically brought up the challenge of

“uncertainty.” Developer #1.2 discussed the lengthy planning timeline for projects and the challenges of incorporating an environmental budget and considerations for species like the lesser prairie chicken or tricolored bat, for example:

“Some of our projects are in our development pipeline for 5, 6, 7 years... At that time, we’re setting budgets, we’re constantly refining budgets... I was putting environmental budgets in there, but what they may be now is completely different because of the changing regulatory landscape.”. The challenge of the potential uplisting of multiple bat species came up frequently as a pinch point for development. Firms are waiting for guidance to come out as to what is expected in terms of impact mitigation or how to approach field surveys for presence/absence counts. Beyond the focus of this research, the Waters of the United States designation and overall fluctuations within the CWA also often came up as an example of uncertainty for developers. The institutional context (both formal regulations as well as informal guidelines) is at the forefront of developers’ minds as they plan projects. The ambiguous nature of these formal and informal institutions was made clear in these conversations.

When asked which policies participants were most concerned with when developing projects, federal-level policies like ESA (12 participants), BGEPA (6 participants), and the CWA (12 participants) were mentioned the most. State-level policies were mentioned less (8 participants), which makes sense given the lack of formal institutions guiding development at the state level in this region [5]. Local-level policies were also not mentioned as often (7 participants), but those who did mention them emphasized how important they are becoming for project success. The rise in the requirement of conditional use permits or special use permits in this region (and throughout the U-S) means that local-level considerations are becoming much more important [37,42]. While many of the local-level permitting requirements do not include explicit environmental reporting or assessments, some participants noted that local officials may reach out to other regulatory bodies to confirm their perspective on a particular project. This comes back to the importance of beyond compliance measures. As one developer put it, “So you know, I think it’s really important to understand what the local politics are and what the permitting regime is at these county levels. That may be the most important thing to successful permitting of a project right now” (Developer 4). Local-level institutions are becoming increasingly important, even for development staff who may focus more so on environmental planning of projects, and firms are finding themselves engaged more often with local leaders.

4.4. Community engagement and the environment

Participants were asked to discuss how they currently participate in community engagement and outreach efforts their firm may pursue and how that intersects with the environmental planning of the projects they are managing. In general, most participants have been involved in community engagement at some level; for some participants, they were only brought in as a subject matter expert but for others, the local permitting component was also something that they were responsible for. The approach to community engagement and the priorities for who to engage first varied across the firms, as some focused specifically on county officials (county commissioners and planning department for example) while other firms focus on a wider net of stakeholders including project neighbors and environmental groups.

Common concerns that participants heard from communities included impacts on human health, farmland or livestock, property values, viewshed, pollution or contamination, as well as impacts to species. Impacts to bird and bat species as well as groundwater contamination from heavy metals leaching from solar panels and stormwater runoff were the main environmental-related concerns that communities discussed. Six participants shared skepticism about the validity of some of the concerns they hear from communities. As Developer #13 put it:

“Where [community opposition] can come into play with the environmental folks is if you’ve got opposition to that project, whether it’s individuals who just don’t like wind or wind or transmission and want to find reasons to kill your project. They’ll throw everything at you.”

Developer #13 went on to share an example of legislation which was proposed in 2023 in Texas which would have implemented “very restrictive” permitting-based requirements, and they felt that the effort was less about protecting species and more about hampering renewable energy development. This participant did, however, acknowledge that there were likely individuals in some groups involved that did have the “best intentions of protecting the environment” but the environmental component is often a tool for opposition as well. Other participants echoed this recognition of some genuine environmental concerns in communities; Developer #3.3 said, “You might have a landowner who brings up concerns about bats, for example, and you can see they like to be out in nature and live in nature.” Overall, participants had varying levels of engagement with the community and shared challenges related to parsing out what concerns were genuine versus being used as a tool to oppose a specific project.

4.5. Regulator relationships

All participants identified that they typically pursue consultation with state and federal wildlife agencies for almost all their projects. Eleven participants said that they typically complete consultation before completing any significant fieldwork efforts, but five participants stated that at least in some instances, they will go and collect what they perceive as all of the necessary data before beginning the consultation process. Reasons for collecting survey data first included a concern about “once you engage with regulators, a lot of that information goes on the record” (Developer #3.3) and feeling that they have a “good understanding of what the potential impacts are and [their] consultants have a lot of experience doing these types of surveys” (Developer #1.2). Overall, it appears that at least within this sample of development firms, consultation with agencies represents a key part of the environmental due diligence process; the timing and depth of information provided depends on the firm.

Challenges identified within the consultation process largely revolved around staff turnover within agencies (6 participants), the way various guidelines are applied in different regions (7 participants), and individual staff member personalities and biases (7 participants). When discussing staff turnover, most developers who identified this as a challenge focused on the fact that the projects they are working on take years to develop, and as Developer #14 noted, when individuals leave or get reassigned, “it feels like you start over on some of the big picture issues with whoever is brought in and that is frustrating to say the least.” Ten developers also noted that their perception of regulatory agencies as understaffed and overwhelmed impacted how often they communicated with agencies. For example, one developer said, “We wouldn’t do an introductory meeting with the agencies because agencies are really, really busy and they’re meeting lots of developers and I know they’re already short-staffed” (Developer 1.2). It’s important to note that developers who identified this as a challenge recognized the staffing and financial constraints that result in staff leaving; developers were not blaming agencies or individuals when discussing staff turnover. Staffing levels and turnover represented a key point of discussion when talking about the consultation process.

Participants also identified how regulations and guidelines are enforced or applied varies depending on the location and that this can be a challenge when developing in multiple states. This is a clear example of institutional work in practice. Developer #10 noted that sometimes it felt like “whoever is reviewing the project [referring to agency staff members] may interpret things a bit differently... You may receive different recommendations from one project to the next and they could

be in the same state, relatively same region, but if they have separate reviewers, you may receive very different feedback.” They are frequently operating in different institutional contexts, given the flexibility of existing regulations and the discretion given to both those implementing institutions and those operating within institutions. Permitting related to eagle take permits was an item mentioned by four participants, which provides a clear example of the variation in interpretation and implementation. The entire process is intended to be applicant-driven, but participants who discussed this permit mentioned the challenges in negotiations and overall implementation, which make it feel as if they have limited control. Six participants also discussed the WEGs; given that they are guidelines versus formal rules, the expectations tied to completion of the tiers and the associated consultation may also vary depending on the state or region. Developer 1.1 shared that they appreciated the WEGs and the guidance they offer but “the way that they are applied from region to region isn’t always consistent and that makes things difficult.” The ambiguity of many of the institutions guiding development led to uneven implementation and firms are constantly adjusting their approach to meet different expectations and appeared to contribute to frustration with the consultation process in some instances.

Throughout the discussions of the consultation process, this application of ambiguous guidelines and lack of clear regulatory structures is one spot where many participants identified that regulators held the power in the relationship. This point is interesting given the lack of general power given to regulators by existing regulation, but their ability to provide best management practices and project design suggestions was perceived by some participants as “the discretionary power of field offices” (Developer 11). Participants discussed challenges in the differences in opinion between state and federal regulators when participating in joint consultation, and ultimately, many participants noted that a good consultation came down to just having good individuals on both sides of the table. When asked about ways to improve the consultation process, eight participants discussed creating improved templates or guidelines for the consultation and permitting process. One participant (#8) discussed the idea of specific permits related to infrastructure, comparable to action permits that states like Oklahoma have for oil and gas development.

Despite some of these challenges highlighted above, many participants explicitly expressed overall positive perceptions of the consultation process (7 participants), found regulators to be reasonable individuals to work with (9 participants), or were able to discuss examples of positive consultations they’ve been through (15 participants). This is important to note; while there were definitely challenges identified, they were clearly never unsurmountable challenges in the realm of development. For example, one developer said about the consultation process: “[Regulators] are experts in their field, and they know what potential issues there may be in an area... The resource agencies know what the issues are, and they can tell us right up front” (Developer 4). Another developer noted “I think the industry would be much better off if we all kind of approached regulators a lot earlier in the process and treated them more as stakeholders” (Developer 7).

A common theme amongst participants when discussing positive consultation experiences was an emphasis on collaboration, engagement, and feeling like everyone was on the same page. Participants emphasized the importance of building and maintaining relationships when it came to success in the consultation process. Participants discussed things like formulating field survey plans together and discussing results, hosting site visits to talk through particular issues, and talking through project design to reduce impacts and expedite construction timelines. Participants recognized that these types of collaborative consultations helped to keep their projects on track and schedule; good relationships for many equated bringing a project to construction and then operation with limited delays. One developer said “...Early coordination with the state helped us design the project in a way that, you know, helped achieve really aggressive construction schedules and

really aggressive commercialization schedules” (Developer 5). Institutional work is being performed collaboratively here, where regulations and guidelines are being adjusted in a manner that meets the expectations of all stakeholders involved.

The phrase “early and often” has become a common for the industry in recent years to describe engagement with a number of different stakeholders [40,41]. Many participants took this one step further in emphasizing the idea that these consultations need to be an ongoing conversation. Participants gave the idea of early and often context by discussing the need to be communicating with agencies at all stages. As one developer put it, “I like the question [referring to being asked about an example of a positive consultation] because it assumes that we’re done with consultation, and I say it that way because it does feel like consultation goes on forever” (Developer 14). This participant goes on to emphasize that this consultation needs to be long-term coordination and that regulators, as previously mentioned, need to be considered stakeholders of the project.

Overall, many of the challenges developers face in the consultation process are contingent on the individuals implementing regulations and guidelines. Because of this, many participants emphasized how important relationship-building and collaboration are for successful consultation and implementation of regulations and guidelines.

4.6. Challenges and opportunities for the industry

Participants were also asked what they saw as some of the challenges and opportunities for the industry, both within and beyond the environmental spectrum. Most participants did highlight challenges and opportunities that are deeply engrained in the environmental considerations of renewable energy development.

The three most commonly mentioned challenges amongst this group were: space for development (7 participants), challenges with transmission (9 participants), and impacts to wildlife as well as listing of more species (8 participants). Conversations around space for development typically came back to the idea that “all easy spaces for development are gone,” meaning development is beginning to occur in what is perceived as more ecologically diverse and complex areas as well as closer to higher population areas, which may result in more local opposition. The second most mentioned challenge was transmission, which connected back to locations for development – transmission needs to be built before development can continue in some spaces. Lastly, many participants discussed the challenges they will face in developing wind and solar as more species are listed under the ESA, such as a number of bat species as well as the monarch butterfly. One developer said, “It’s like the earthquake has happened and the wave is coming... [Species listings are] going to change the nature of how the build-out occurs, how quickly it can happen, and how smoothly it can happen” (Developer 5). Many participants also pointed out the challenges these listings will pose in terms of existing regulatory capacity, coming back to many of the other themes already discussed.

Participants also identified potential opportunities which could help to overcome some of these prominent challenges. Of relevance to this exploration of environmental considerations for projects, some participants saw real opportunities in building more responsible siting practices (4 participants) as well as avenues for collaboration and coordination in research and regulation (3 participants). For example, one developer identified the benefits of collaborative guideline development in the face of species listings as an opportunity for the industry: “[Collaboration between regulators and industry] is a huge opportunity for an important part of the country to conserve some keystone species while still meeting our renewable energy targets as a country” (Developer 5). Another developer confronted the idea of greenwashing in renewable energy development, talking about the opportunities for building projects with diverse habitats: “[Big renewable energy companies] are disproving that greenwashing is happening. They’re actually putting some usable, high-quality habitat [for example, planting native

wildlife for pollinators] into their facilities. I think, in the renewable market, that is the way that we distinguish ourselves as more than just another energy generation industry. By putting out valuable habitat and proving that we’ve lived up to our commitments” (Developer 9). Overall, many participants appeared optimistic that there’s space for innovation in conservation practices, to both move renewable energy forward and integrate smart siting decisions.

5. Conclusions

Our research sought to examine the experience of renewable energy developers in the environmental permitting and planning of projects in the Great Plains region, where there are limited regulatory frameworks in place to guide their behavior. Our research emphasized that renewable energy developers are a diverse set of actors, with varying approaches to how they develop projects, how they conceptualize community engagement, their process of environmental planning for a project, and their overall perspective of the process. Developers also engaged in the process of institutional work in almost every project they pursue. For some, that process is collaborative, where they work in concert with the agencies to apply guidelines to their projects in a way that helps to move the project forward in a timely fashion. Table 3 summarizes the key ideas and main themes presented in this research.

5.1. Limitations

It is important to recognize the limitations of this research. Our sample of developers represents a diverse range of firm development goals, current firm portfolio size, and experience of staff members, and overall can reflect some of the general trends and sentiments for development specifically within the Great Plains region. Given the diverse regulatory environments of other regions within the United States and abroad, lessons learned for this region may not always be directly applicable to other regions, although we feel there were useful conversations which could apply more broadly to how we think about developer engagement in environmental planning. In addition, we acknowledge that our sample of developers potentially represents the perspectives of those firms which at least perceive themselves as being more environmentally responsible and conscious when developing projects. Firms which have an internal process which does not prioritize environmental considerations of a project may be less willing to participate in this area of research. Not only may our sample be limited in terms of development firms, we also want to acknowledge the role social desirability bias can play in any interview being conducted; our participants may have shared information that portrayed them and their organization in a more positive light. Despite these limitations, we argue that this research contributes a series of valuable takeaways about how environmental planning and permitting is currently perceived and pursued by renewable energy developers.

5.2. Key takeaways

First, motivations for environmental behavior vary but fit the standard economic, social, or normative motives identified in the literature, with risk aversion, investor expectations, and firm reputation tending to be the most predominant motivations for environmental behavior [30]. Within the organizational field, building environmentally responsible projects is a common thread which underlies the operations of many renewable energy developers, driven by economic-related concerns. While developing the “right way” may become more prominent as development continues and societal expectations increase, the economic incentive of being able to sell a project quickly and with little risk was a big driver for the environmental due diligence many firms complete. This aligns with the idea of energy capital, which emphasizes the pursuit of fast energy development and deployment in the pursuit of profits [43]. Economics ultimately drive development of renewable energy

projects, and much of the motivation to avoid environmental permitting or requirements may be derived from meeting timelines and budgets. If a project doesn't have the correct level of environmental due diligence completed, it risks not being constructed or sold.

Second, the biggest hurdle for renewable energy developers in the environmental due diligence space currently is the changing regulatory requirements, content, or timelines as well as the variation of regulations between regions, states, and even counties. Given the long timeline for project planning, ten or more years in some cases from project conceptualization to when a project becomes operational, the fluctuations in regulatory requirements makes long-term planning challenging. Developers are working within a constantly changing institutional environment and attempting to adapt their approach to fit the individual context of each project. They are sometimes in a constant state of institutional work. Consistency between federal and state agencies as well as between state agencies, at least in terms of the guidance or best management practices, could help with reducing some of the uncertainty in developing projects. Conversely, the current state of regulations does not guarantee that all significant environmental impacts of a project will be identified and considered in all project planning [4]. It also does not ensure that all developers are considering the same environmental impacts or performing the same level of due diligence or implementing the same mitigation practices, which was seen in the differing approaches developers shared.

Third, this research began to explore the intersection between environmental planning and permitting of projects and community engagement. Participants varied in their level of experience and involvement in community engagement in a project, with some serving only as subject matter experts and others being more responsible for the local permitting that may be required. One thing some participants shared was a sense of skepticism at the genuine nature of the environmental concerns communities were sharing; it was sometimes difficult to parse out what they would consider a genuine concern versus a tool to oppose a project. Nilson et al. [38] found a similar theme in their survey of developers, framed moreso in the context of misinformation and "a loud minority." Nilson et al. [38] highlight the growing frustration with not being able to respond to misinformation because of the perceived lack of credibility in communities and the fact that this may limit efforts and investment to engage in communities. Our conversations confirm this challenge and emphasize that this may not only impact effort and investment but may also bias how particular staff members receive community concerns in the first place.

Fourth, this research examined the relationship between renewable energy developers and regulators, in an effort to begin to understand the relationship that developers have with regulators in a context with limited environmental compliance behavior. Overall, the relationship is often a positive one built on collaboration and communication but there are clear moments where tension may arise in the consultation process due to differing priorities and understandings of the development process. Staff turnover also represents a significant challenge, both in being able to build relationships and positive communication as well as being able to engage in consultation in the first place. Staff capacity was identified as a reason as to why some developers waited until they were further along in a project before reaching out. One participant (#7) noted the idea of a fund that renewable energy developers could contribute to support hiring more agency staff members, which could help reduce turnover and increase capacity to build long-term relationships. Interpretation and implementation of regulations and guidance also varied, both within and between agencies and regions. Firms may find themselves having to constantly adjust their approach to meet different expectations, which can contribute to how willing they are to meet regulator expectations in some contexts if it is not a regulatory requirement.

Lastly, reflecting on the challenges and opportunities for the industry moving forward, space for development, transmission and impacts to wildlife were the most prominent. These three challenges are all

intimately connected to the environmental planning of a project, and as renewable energy moves into more complex environments and more species are listed with regulatory protections, the environmental permitting will only become more challenging for the industry. As mentioned in the introduction, location will continue to choose the project [1]. In conjunction with this, as recognized by a few participants, local permitting and engagement will become increasingly more challenging. Despite a recognition Conversely, there are opportunities for collaboration in research as well as building responsible siting practices which could help to alleviate the challenges around environmental planning of future projects. Overall, the challenges and opportunities as seen by renewable energy developers include issues which will have an impact or be impacted by the environmental planning of projects.

Future research could extend this line of questioning to the environmental planning experience in other regions of the United States; while participants in this project touched on a comparison between their experience in different regions, they were often not the ones responsible for states outside of the Great Plains. This research has also begun to explore how ideas like beyond compliance and social license to operate traditionally used in the mineral extraction industry can apply to the approach of renewable energy developers to constructing projects as well; this is a recent call that others like Minadakis and Vega-Araújo [29] have made as well. Lastly, this research serves as an introduction to the complexity of environmental regulations for development and future research could use other methodologies such as policy analysis or large sample surveys to further understand the challenges that can arise in planning for environmental concerns of a project.

Overall, the results of this research contribute to the conversation currently happening regarding the environmental regulatory environment for renewable energy development. When discussing permitting reform or additional regulations, it is important to understand what mechanisms are currently working, what firms are currently doing under existing regulations, and what contributes to firm behavior. This research provides insight into how development firms currently view their consultation and compliance behavior, how they feel they approach consultation, and what they see as roadblocks moving forward. In the eyes of developers, it feels as if the beyond compliance approach is an expectation in the industry, and this will impact how they respond to a changing regulatory environment moving forward.

CRedit authorship contribution statement

Claire Burch: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Rebecca Loraamm:** Writing – review & editing, Supervision. **Chinedu Nsude:** Writing – review & editing.

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Data availability

The data that has been used is confidential.

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