'Doomscrolling' in my backyard: Corrosive online communities and contested wind development in rural Ohio

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ABSTRACT

Wind energy development in the rural U.S. remains locally contentious across geographies and social groups. These development decisions are often debated on social media sites, where individuals seek out information and share ideas related to risks and benefits of development. This research examines content from two anti-wind Facebook Community Pages (FCPs) focused on northwestern Ohio. We apply the corrosive community framework to categorize discourse around the framework's three major themes of health risk, recreancy, and litigation, and observe differences in numbers and types of social media activity before and after development and among local and non-local actors. We describe the role social media plays in mediating public discourse in local siting decisions and acts to situate online networks within physical places. We find the corrosive community framework a useful lens to analyze online-community conflicts around wind energy and categorize discourse around wind energy opposition. As public discourse moves increasingly to social media networks, understanding FCPs as a form of community can provide a framework for organizing and analyzing social conflicts and their local-nonlocal connections.

1. Introduction

The rapid development of wind turbines across the United States has given rise to contentious local debates over the positive and negative impacts of wind energy. In communities that host the 400-ft tall towers, the energy technology provides increased revenues to municipalities and landowners, but also brings real and perceived risks that include social inequality, changes to community character, and fear of impacts to health and well-being [1-6]. Much of this contentious local debate has occurred on social media and in online communities. In particular, locally-based Facebook Community Pages (FCPs) have become focal points for public discourse against wind energy development [7]. Social conflict in communities exposed to technological risks has been noted before, with sociologists developing the *Corrosive Community Framework* to understand conflict emerging from a combination of perceived risks to public safety, mistrust and anger at people and institutions deemed responsible, and resentment over who benefits from the technology [8,9]. However, similar research stresses that these risks do not have to materialize to foster socially corrosive dynamics in the community; rather, the perceived risk from new technological development is

enough to have deleterious effects on community cohesion and development [8-11].

Social media provides a new arena of socialization where national and local issues can be discussed, and special interest groups can form around topics, forming new types of communities. A variety of online companies provide social media platforms, but one unique group is the Facebook Community Page (FCP), as it links what is often a specific geography (typically a community) with a specific special interest. Such pages serve as a way for local citizens and others to post and consume relevant content ranging from discussion of local politics to finding lost pets or bidding on for-sale items. In many communities that host wind farms or are have wind farm development potential, anti-wind FCPs have formed that serve as a mechanism for social conflict around wind energy, including messages of health and other technological risks, political discourse directed at local leaders and institutions, and the organization of local campaigns to influence wind energy development proposals, regulatory approvals, and lawsuits.

In this paper, we apply the Corrosive Community Framework to analyze content from two FCPs against local wind energy development in the U.S. state of Ohio. The two FCPs represent non-contiguous

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counties at different stages of wind energy development: a fully developed project and a proposed wind farm that, at the time of the study, had been put on indefinite hold [12]. On the following pages, we provide a brief review of the social science research around wind energy development, a review of the Corrosive Community Framework with a focus on recreancy, and contextual information regarding social media and Facebook. We then catalog and analyze the content on these pages according to three key elements of the Corrosive Community Framework: perceived risk to human health, recreancy, and litigation. We further analyze the difference in the content between FCPs based on their stages of development and the role of local and non-local actors.

We find the Corrosive Community Framework provides a useful lens to analyze online-community conflicts around wind that tease out how messages of opposition are focused and demonstrate how FCPs can link online-based opposition to real places with wind energy development. This paper expands the corrosive community model in two distinct ways: its application to wind energy and its application to online communities. Finally, we discuss the cultural pathways promoting wind energy opposition, and the further research needed on the multiple new and emerging forms of information sharing and interaction needed to understand social conflicts and their local-non-local connections.

1.1. Wind energy in the U.S.

Wind energy development has been expanding rapidly in the U.S. as both an economic opportunity and a way to reduce carbon emissions in response to climate change [13-16]. Over 60,000 turbines have been constructed across large swaths of the rural U.S. since the late 1980 s and development generally receives broad public support for both existing and proposed projects [13,14]. Wind farm facilities vary in their ownership structure, with a mix of multinational corporate energy conglomerates along with some smaller private energy firms, cooperative and municipal systems, and a small number of community-owned projects [6,17].

Wind energy can be a partial solution for rural communities with declining tax bases and limited economic opportunities, especially among communities with longstanding population decline [6,16-20]. Acceptance and support of wind energy in agrarian communities are primarily tied to the economic benefits of development over broader goals of reducing carbon emissions [21-23]. Economic benefits include direct payments to landowners, a range of employment benefits, and tax payments to local governments. Over $289 million is paid annually to landowners who lease to wind companies, roughly an average of $4,816 per turbine per year. Another $761 million is collected annually by local communities through property taxes and other commitments, roughly $12,683 per turbine per year [24]. Communities often expect increased employment activity, although the number of long-term jobs for local residents is not always as great as expected [21,25]. Recent research suggests that those who live closer to wind turbines have more positive perceptions compared to other forms of energy development [26], but in other cases, the relationship is the opposite [27,28], or mediated by other factors such as visibility [16,29].

Scholarly attention on the opposition of wind farms has evolved from viewing opposition as something to strategically overcome to a more nuanced understanding of how perceptions, in a variety of forms, influence social acceptance [14,16,30,31]. This research typically utilizes survey responses, interview data, and content analyses to investigate how acceptance of wind energy development is shaped by many perceptions, including procedural elements, distribution of risks and benefits, and sense of place [16]. Consistent relationships between environmental concerns and wind energy support remain murky as studies show pro-environmental values can lead to support in some cases and opposition in others depending on the particular context and mediating variables [24,29]. Other research examines how media portrayals of wind energy are framed according to the local context of development [8,32,33].

The perception of fairness in the procedural processes (e.g. procedural justice) of siting a wind farm is an important aspect in producing acceptance of wind energy [16,34]. When fueled by perceptions of unfairness in the process and distribution of outcomes, community conflicts stemming from wind energy development can lead to sustained social divisions that can last well after development and may change over time [14,35-37]. Trust in the governance system ushering in new energy systems becomes critical in shaping the perceptions of procedural and distributive justice, and the current governance systems in North America (including at the state and county level) increasingly privilege private landowners and developers [5,38,39] . Non-landowners and other residents have more barriers to meaningfully participate in the siting process, or are left out entirely; such procedural injustice which may shape more negative perceptions of the technology and the governance system implementing its development [40,41].

Although empirical medical research has not validated concerns of adverse health impacts from being exposed to wind energy towers, one of the most popularly cited impacts from wind energy development has been its risk to human health [42,43]. Independent research suggests no physical basis for a link between turbines and health outcomes; yet a range of health problems are nonetheless perceived and reported, from headaches, nausea, and vertigo to rashes, heart problems, and even cancer [42,43]. Public health studies suggest the health problems are psychosomatic, as the reporting of such problems is associated with previously held dispositions regarding annoyance with wind energy, level of experience in the planning process, personality traits, and exposure to literature or conversations regarding infrasound impacts on human health [44-46], leading some researchers to term wind turbine-related health problems "a communicable disease" (pg. 1) [44].

Indeed, simply the act of worrying about a wind energy proposal can cause stress which itself can lead to negative health outcomes similar to what has been reported [11,33,34,47]. It has long been noted the stress and conflict around a development decision can begin before any actual development occurs, and the announcement of such a project is enough to start causing psycho-social impacts [11,47,48]. Perceptions of health risks have been correlated with opposition to wind energy development, although experts have been accused of dismissing the importance of these perceived risks [16,35,45].

1.2. Social media and civic engagement

Social media has become a major communication platform used by citizens, businesses, and government agencies and plays a critical role in the socialization and shaping of risk perception [49,50]. It can facilitate local social interaction that can strengthen close, personal networks and also connect with larger networks not bound by geography, but social media algorithms largely make no distinction between information and misinformation [50,51]. Social media platforms have become more scrutinized in the U.S., particularly after former U.S. President Donald Trump waged a months-long social-media-driven election-related disinformation campaign that culminated in a January 6th, 2021 mob attack on the U.S. Capitol Building in Washington D.C. during a joint session of Congress to certify the election results. All major social media platforms banned Trump and other political conspiracy theorists from using their networks to incite more violence. Facebook has received specific scrutiny because it is the most popular platform and especially popular among older and more rural populations [52-54]. Facebook provides a vital role in aiding local governments in communication, law enforcement, and recovery from disaster events [55].

Increased use of social media is associated with using the platform to consume news stories and current events, and social network sites like Facebook have been used to solicit and encourage a range of civic engagement activities, including voting for certain candidates in election cycles and engaging in political networks of activism [56-59]. The most typical form of engagement remains online-only via participating in the dissemination of news and expressing support for issues online

[58]. Social mobilization in online networks is significantly more effective than off-line informational mobilization alone, and social media's use combining content with faces and identities known to the user can dramatically improve the effectiveness of a mobilization message compared to less personalized messages [56].

However, while populated by humans, the social interactions, content, and news in Facebook are structured and moderated by proprietary algorithms that can influence perceptions of realities [49,60]. More recently, the proliferation of "fake news" – intentionally misleading and/or inaccurate information designed for political gain [61] – on social media sites like Facebook have led to more scrutiny on the role of these sites for circulating mis- or dis-information. Furthermore, the rise of "bot" accounts (automated or spoofed accounts that pretend to be authentic human users) and "botnets" (coordinated networks of bot accounts) have been created with the intent of doing everything from boosting the popularity of celebrities to interfering in presidential elections, and have raised additional doubts over the level of authenticity of interactions experienced on social media platforms [61,62]. After a U.S. Department of Justice investigation documented the role of foreign-originated Facebook botnets to influence the results of the 2016 U.S. presidential election, Facebook purged an estimated 3.8 billion fake accounts from its platform, although the task of removing bot accounts has been referred to as "never-ending" [63].

Other research has pointed out that social-media networks like Facebook, in tandem with electronic device manufacturers, borrow heavily from the gambling and gaming industries to make social media addictive, including the strategic use of audio/visual notifications and stimuli, the incorporation of repetitive motions and tactile sensations, and implementing "reward" schemes that incentivise continued engagement [64]. In 2020, the Oxford Dictionary listed "doomscrolling" as a "New Words of the Year", defined as "the tendency to continue to surf or scroll through bad news, even though that news is saddening, disheartening, or depressing," noting an increased usage of the phenomenon in recent years [65].

One study examining anti-wind Facebook activity in Denmark has shown that extra-local actors can utilize Facebook groups to promote broader regional initiatives [66]. In their study, Borch et al. [66] demonstrate how Facebook has become a space for public discourse in opposition to local wind power development, and lack of engagement by other community members, planners, and developers allow for the unfactual transfer of information and the development of conspiracies around the development process. These authors find that Facebook is an effective mechanism to mobilize opposition to wind energy, particularly about the impacts of noise and infrasound, and the fairness of the process, and find a relatively low but influential number of extra-local actors involved with local anti-wind Facebook groups [66]. The content on the pages was dominated by concerns from low-frequency noise and fairness of the process, followed by landscape identity and health concerns, among other themes.

Social network sites like Facebook Community Pages can integrate local communities and social groups with broader socio-political movements directed from regional networks and non-local organizations and can be especially effective if a local champion with intact local networks promotes the message [56,58]. In the case of wind energy, an anti-wind public interest and lobbying group identified as the "D.C. Energy Advocates" developed a national public relations campaign designed to sway public opinion on wind energy and halt the rollout of wind farm developments in the U.S. [67-69]. Some of the strategies include using key topics like risks to public safety and human health to gain interest, direct social media outreach, assign individuals to manage media accounts and create memes, promote attendance at local hearings and public input events, and provide legal guidance and strategies for communities with wind development proposals.

2. Corrosive communities

The theoretical framework used in this study is based on the Corrosive Community Framework [8-10]. Corrosive communities develop when there is a perceived unequal distribution of risks and benefits stemming from perceived or actual technological disasters (or their potential to occur) [1,70]. Technological disasters have a more negative impact on community dynamics than natural disasters because they challenge the credentials of experts in protecting the public; fault can be attributed to individuals and entities rather than nature; and create communities characterized by distrust, fear of long term health exposure impacts, and promoting cycles of civil discourse that perpetuate conflict. The concept is frequently used to describe how communities respond when a technology-related disaster occurs, including the meltdown of a nuclear reactor [8], the explosion of an oil rig off the coast of Louisiana in 2010 [71,72], the Tennessee Valley Authority's coal ash spill in 2008 [73,74], Hurricane Harvey and the subsequent spread of contaminants in Houston via flooding [75], and federal responses to Hurricane Katrina in 2005 [76,77].

The three characteristics that define corrosive communities are ongoing risks and threats to physical and human health stemming from a disaster, recreancy of experts, and institutions, and ongoing litigation through court challenges and political lobbying [8,10,70]. Threats to physical and human health include how contaminants from disaster may impact the body and remain in the environment, and the psycho-social stress generated from the risks of real and perceived impacts and from the community conflict itself [8,9,72,78,79]. Recreancy refers to a perception "that institutional actors have failed to carry out their responsibilities in a manner that engenders societal trust (71, Pg.295)." Litigation consists of legal challenges, injunctions, lawsuits, and settlements around development decisions, particularly ones with a perceived uneven distribution of risks and benefits [9,70]. We describe recreancy and litigation in more detail below, followed by an integration of the framework with wind energy development.

3. Health impacts (conceptualizing non-disaster in a disaster framework)

A causal link between reported health impacts and wind turbines has not been empirically established, yet frequent media coverage can heighten the perception of risks, and some residents do experience some form of psychosomatic illness associated with the stress of worrying about such risks and other social-psychological disruptions [4,42,44,45]. It is important to note that a technological disaster need not occur for community conflict to perpetuate, as perceived risk is enough to sustain this corrosive discourse [8,10,70]. Freudenburg [70] notes that the perceptions of risk and the associated worry may be more harmful than the underlying risk itself:

"There is growing evidence from empirical studies that the actual occurrence of 'disastrous' physical destruction, however defined, may not be a necessary precondition for the creation of social and psychological stress; instead, ambiguous probabilities of (physical) harm may actually lead to a more severe form of negative psychosocial consequences " (pg 27).

Freudenburg [70] then goes on to warn that local concerns over physical health are often unsubstantiated by probabilistic assessments of risk; nevertheless, the perception of risk combined with a dismissive attitude from the scientific and regulatory community can itself induce psycho-social distress and mistrust in society's management of technology:

"While it is common to hear the argument that 'the good of society' sometimes requires that local concerns be overlooked, a growing body of evidence now points to just the opposite conclusion: it can be the very 'overlooking' of supposedly 'local' concerns that may actually create the greatest risks to the social fabric…" (Pg. 34).

4. Recreancy

Recreancy refers to a perception that experts and institutions lack adequate control of new and emerging risks from society's management of technological development [80]. It is also characterized as a general disposition that experts and decision-makers (along with their larger institutions) are incorrect or lack a full understanding of hazards and cannot be trusted to protect public safety [10,70,78,81]. Social attributes that define the people and the context of places, such as occupation and industrial mix, have been shown to shape perceptions of recreancy and the spatial and temporal scale to which they attribute blame (individual, organization, government) [9,70,71].

Perceptions of recreancy contribute to psychological stress and foster strong emotional reactions because they threaten the ontological security of their social and physical surroundings [70,80]. The social consequences of these perceptions have a paralyzing effect on the social fabric of the community where perceived risks and impacts are heightened, as efforts are characterized by mistrust and competing narratives of the actual events [70,71]. The most common impacts for disaster survivors tend to be related to post-traumatic stress, anxiety, heightened levels of distrust, anger, and depression around the fallout of a disaster [70,78]. These perceptions can further shape the pathways to processes that often involve prolonged social conflict via litigative actions, and responses are significant as perceptions of recreancy can be a source of disruption difficult to alleviate [80].

Recreancy is an antecedent to the emergence of a corrosive community, but questions remain on factors that shape and mediate perceptions of recreancy over time [70-72]. Perceptions of risk can have an absencing and presencing effect, meaning there is a temporal element that can cause risks to become more salient at some times and more absent at others, typically spurred by new information or news of an event [82]. This paper takes the approach that perceptions of recreancy can emerge over time as exposure to new information and increasing distrust of government management of industrial risks can cause people and social groups to re-evaluate their perceptions of prior actions.

5. Litigation

Ongoing lawsuits, settlements, court cases, legislation, regulatory approvals, and other legal proceedings create an additional arena where social tensions become entangled in lengthy, bureaucratic processes, producing a social environment characterized by anger and distrust [70,78]. Perceptions of recreancy are associated with an atmosphere of protracted litigation that serves as a feedback loop amplifying risk and perceived community damage [71,79,83]. Often, legal remedies are instigated by whichever party has more financial capital as the U.S. legal system is more expensive and adversarial than other developed nations [10,70,78].

The social fallout from protracted litigation can create community damage that is separate from the initial damages from a disaster [78]. Indeed, the assignment of blame and pursuing social conflict is a hallmark of technological risk and disaster [84]. Researchers have noted litigation proceedings can accentuate stress and conflict associated with the underlying events, including the identification of several syndromes and disorders used to characterize this turmoil [78,83]. Furthermore, public relation campaigns that aim to create scientific uncertainty with counter-claim assessments are often associated with litigation processes and can be destructive to the social fabric of the community while causing significant delays in the recovery process amid the erosion of social capital [78,83,85].

There is evidence that communities are experiencing similar social dynamics both before and after wind energy development has occurred. The FCPs in this study have a purpose to sow socially corrosive dynamics around wind energy development with strategies that mirror the three common elements of the corrosive community theoretical framework: risks to human health, perception of recreancy, and litigation. A public

interest and lobbying group identified as the "D.C. Energy Advocates" developed a national public relations campaign designed to sway public opinion on wind energy and halt the rollout of wind farm developments in the U.S. [67-69]. The success of this group's ability to infiltrate local wind energy controversies is captured by popular media where this group's presence was noted along with intense community in-fighting (7). After a Freedom of Information Request was granted, a document of the meeting outlined several strategies to generate community conflict around development, including:

> "Identify key topics (e.g. health) and get volunteers to act as a clearinghouse for information and posting timely information for activists on a website. (pg 3)"
> "Legal Department for contract review and guidance on communication efforts, and also **taking developers (etc.) to court on various issues to cause media exposure**…**Take zoning boards to court to rezone as industrial land** to **create chilling effect on signing contracts**. Also **sue for property value loss to small land holders**, and use all legal cases to create media poster child effect. **Sue states regarding RPS**. **Sue state utility commission who don't do their job**. Etc. (pg. 4)"

These strategies highlight a concerted effort to heighten perceptions of human health risks and the use of a legal department for two goals: create a perception of recreancy via suing utility commissions and states, and promote an atmosphere of ongoing litigation by offering legal guidance for landowners wanting to sue and citizens to participate in rezoning efforts (in bold, by authors) [68,69].

5.1. CCF, Facebook, and wind energy

The Corrosive Community (CC) framework helps identify how FCPs operate as socially corrosive online communities around wind energy development and provide an analytic tool to understand how wind energy development can become a divisive development option. While the framework has been mostly applied in cases where a technical disaster has occurred [8,10,70], applying it to an online community against local wind energy has several unique benefits.

The theory has not been applied to wind energy, but the framework can be useful in explaining a wider range of community conflicts, even in cases where no widespread disaster has occurred. Wind energy development is a controversial topic at the local level due to a complicated regulatory process with limited access to decision-making and compensatory structures for all residents [5,31,86]. The development of wind farms links multiple government agencies, corporations headquartered in distant cities, and local landowners who lease their land to site the turbines, all of which gives a community several individuals and institutional culprits to blame when economic benefits do not come to fruition, a common charge leveled against energy industry's presence in rural areas [23,33,86-88]. A high degree of perceived uncertainty around health impacts can exacerbate perceptions of recreancy and may be a driving force behind local wind opposition, and when ignored, can exacerbate social conflict [35,36,71].

Finally, applying the CC framework to online communities is a powerful organizational framework and a novel advancement of the theory. The growing dominance of these online platforms in day-to-day interactions and activities suggests that an increasing amount of socialization will occur mediated via these mechanisms, thus making them an important focal point for social conflict issues and critical components of the cultural pathways [49,51,86]. FCPs can serve as one mechanism of social interaction capable of communicating potential local risks of development and heightening perceived risks from things such as wind energy development, whether they be related to human health, environmental impacts, or economic risks for the community [54,57,89]. Additionally, these forms of interaction may be leveraged by individuals to instigate forms of civic engagement and political

participation, particularly if they consist of individuals with close personal ties [53,58,59]. Applying the framework to virtual environments as representations of real places has significant limitations, particularly in regards to representation, but analyzing the thematic content of these virtual spaces can provide insights as to how these mechanisms operate as a form of social interaction and social reproduction.

6. Methods

The FCPs examined in this study are geographically tied to the northwestern corner of the state of Ohio and represent two areas at different stages of wind energy development at the time of the study (Fig. 1). A content analysis was conducted on the two active, publicly accessible FCPs against wind energy in Northwestern Ohio: Citizens for Clear Skies (CFCS) based in Van Wert County and Seneca Anti-Wind Union (SAWU) based in Seneca County. These FCPs were set to "public", allowing anyone with an internet-connected device to view the content without logging into the Facebook platform and the content is discoverable through a search engine query. A Facebook account is required, however, to formally join the group, post to the group, or interact with members.

6.1. Geographic and FCP context

6.1.1. Pre-development site: Seneca County

Seneca County is located in the northwestern corner of Ohio, approximately 90 km to the east of Van Wert County. In 2018, an application for a 77-turbine, 200 MW wind farm by developer SPower was submitted to the Ohio Power Siting Board. In August of 2019 (after the completion of this study), the proposal was withdrawn to provide an expanded public notice and comment period. After significant opposition was apparent at a Seneca Wind Public Informational Meeting, and citing difficult state regulations, the developers announced the project is now permanently suspended [12] .

SAWU is the FCP that was organized around Seneca County, self-described as "a grassroots group of local citizens that are dedicated to stopping the invasion of 'BIG WIND' into our rural areas." The community page description additionally links to the site Save Our Skyline

Ohio, a blog that frequently shares personal testimonies and paper editorials against wind energy. According to the Page Transparency feature, it was created on November 14th in 2017, and is currently managed by four accounts located in the U.S., although no further information about the geographic location of these accounts is provided. It has been liked by 3,517 people and is followed by 3,691 people.

6.1.2. Post-development site: Van Wert County

Van Wert County is located in the Northwest corner of Ohio and home to industrial wind energy development. The Blue Creek Wind Farm is a 152 turbine, 304 MW project completed in 2012 that spans across 40,500 acres in Van Wert and Paulding counties, with Van Wert hosting 118 of the turbines on private land.

CFCS is the FCP that represents Van Wert County and is self-described as "a forum for citizens of Van Wert County to share concerns related to renewable energy, and it's (sic) effects on our community." CFCS was created on January 29th, 2016, four years after the completion of the Blue Creek Wind Farm. According to the Page Transparency Details, the FCP changed names from "Citizens against Long Prairie Wind Farm" to "Citizens for Clear Skies" on February 10th of 2016. The Long Prairie Wind Farm was a former proposed Apex Energy wind farm purchased in 2014 to help the project meet updated state regulations, but announced its divestment in October of 2018. It is currently managed by four different accounts in the U.S., but no further details are provided about the location of these managers. It has been liked 739 times and is followed by 785 people.

6.2. Data collection

The authors analyzed and coded every post between October 1st, 2018 to March 31st, 2019 (N = 803) throughout April and May. This time was selected out of convenience to the research timeframe and occurred while an active wind farm development application was submitted to Seneca County.

Two rounds of coding were applied to each post, the first identifying the general themes of the content shared on these FCPs (see Fig. 2) and the second round identifying the corrosive community themes of human health and physical safety, recreancy, and litigation (see Fig. 3. The
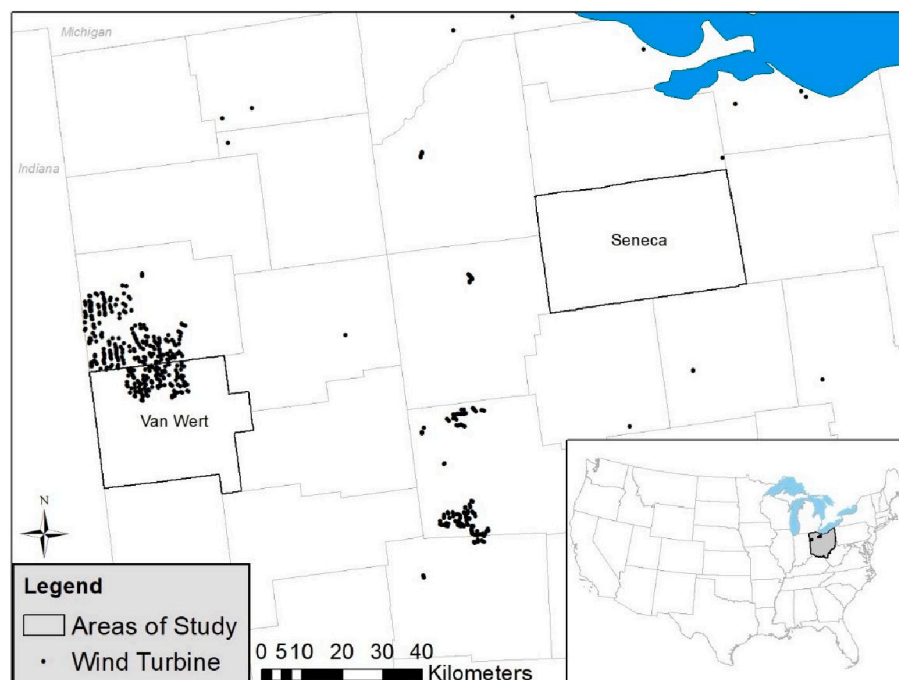

Fig. 1. Locations associated with seneca anti-wind union (Seneca) and citizens for clear skies (Van Wert).

Environmental	Economic	Technological Feasibility	Human Health	Socio-Political	Other
Impacts on Wildlife (bats, eagles, hawks)	Erroneous economic modeling	Slowing wind speeds worldwide	WHO report on infrasound	Public engagement events	General climate change denial
Wildlife Habitat Fragmentation	Criticisms of economic projections	Declining production of wind energy	Exploding turbines near homes and roads	Updates on current wind projects and objections	Memes not related to wind energy
Metal decay and contamination	Increasing electricity costs due to wind	Intermittency of resource	Loss of pristine countryside (quality of life)	Anti-wind advocates at public hearings	Protests against companies
Disruption of migratory patterns	Uneven distribution of economic gains	Wind undermines grid reliability	Leaking contaminants in water supply	Critiques of state/ federal legislation promoting wind	Critiques on non-local politicians not related to wind
		Significance of land space required	Interference with weather Doppler during storms	Critiques of local politicians for wind	

Fig. 2. Wind energy opposition themes.

Human Health	Recreancy	Litigation
Stories of impacted residents (headaches, insomnia, physical health impacts)	Energy experts wrong on wind energy potential in the U.S. and present a danger to national security via unproven energy paths	Updates on blocked wind energy proposals
WHO report on infrasound	Political and economic corruption among county commissioners, developers, and scientists	News/updates on public hearings in the state of OH
Potential harm from explosions and debris	Gov't officials uninformed about the interactions between wind energy, weather systems, and wildlife	Documents of lawsuits from landowners suing wind companies
Contamination of water supply	Gov't and industry work together to cover up negative impacts	Information on county and state re-zoning against wind
Loss of quality of life and psychological comfort	Climate change denial, political memes, and company protests related to institutions, political parties, or companies affiliated with wind	

Fig. 3. Corrosive community themes and examples.

thematic coding scheme was used to identify major themes of local wind energy opposition to understand what the most discussed topics are, and which themes have had more interaction with users, measured by the number of times a post received a "reaction" function on the Facebook platform. Themes were selected from a review of the literature on perceptions of wind energy development and include environmental, economic, technological, human health, and socio-political themes.

This is a similar framework used in other studies around wind energy that identifies technical, economic, environmental, health and safety, political, and aesthetic/cultural as the factors characterizing the influences of attitudes on acceptance [30,31]. However, our study involves a thematic coding scheme that condenses the aesthetic and cultural aspects with political aspects, forming five subcategories: technical, economic, environmental, health and public safety, and socio-political processes. This decision was made based on how the FCPs' messages on aesthetic and cultural impacts regard the socio-political processes of natural resource management and landscape change in rural areas, which includes discussions of private property rights, visual pollution, and lack of public engagement to hear these issues. The latter category of socio-political processes also includes legal proceedings related to wind farm proposals and follow-ups on ongoing policy developments.

Several Facebook posts with no content, photos, or that did not apply to wind energy were categorized as "other". These examples also included articles and memes associated with debunking climate change, support for conservative political principles unrelated to energy policy, messages protesting companies who purchase wind energy, and personal attacks on politicians without specifically referencing wind energy

or related policy.

In terms of corrosive community elements, it was more clear to classify the content. For example, a majority of the posts coded as risks to human health and public safety would contain a photo or a video of a turbine malfunction leading to a fire and projectile that could threaten rural residents and commuters on nearby highways. In other cases, attention would be called to various reports that demonstrate a health impact from low-frequency noise, although these impacts are not yet substantiated by empirically validated medical assessments. Cases of recreancy were identified by content attributing fault to a person, institution, or political party for welcoming risks from wind energy development for economic and political gains, frequently touching on issues of private–public corruption between local developers and wind energy companies. Cases of litigation include posts that contain updates on wind energy proposals, calls to attend public hearings in opposition to development, various lawsuits drawn up by private landowners against wind companies, and information on how to implement rezoning efforts to prevent wind energy development.

All of the content without a connection to wind energy specifically did have a connection to a broader view of recreancy in that the specific political leaders and corporations presented have a connection to wind energy. The depiction of these political leaders in a negative light via posts containing cartoon characterizations and memes indicating incompetence to handle the duties socially entrusted to them. Although many of these posts had no substantial content regarding wind energy, the motivation behind the content was clearly to slander the intelligence of political leaders such as Chancellor Angela Merkel of Germany or U.S. Representative Ocasio-Cortez, both known for their support for policies

that call for more renewable energy and less dependence on fossil fuels.

Each media post is analyzed on the content of the post and the number of shares, reactions, and comments it receives. Shares involve Facebook users (both individuals and group entities) taking content from these pages and re-posting it on their personal page. Reactions are part of a feature that Facebook uses that allows users to quickly indicate their attitude towards a topic by selecting one of six reaction responses and is a more passive engagement tool. Comments require Facebook users to sign in on a profile, which allows them to add a comment or content underneath a selected post.

The nature of both sharing content on a page and commenting comes with an identifier, either as a distributor of content or creator of commentary and represents the highest form of engagement [89]. Privacy settings allow users to share posts from other FCPs without revealing who is sharing the content, so while the number of shares is easy to see, knowing who shared those messages is not possible. Reactions are a bit less personal, as privacy settings can be adjusted to hide the identity of the user who reacted to a given post. Comments are the most personal, as they involve interactions that are not pre-scripted and often include an expression tied to a specific user that once established, remains frozen in time on the Facebook Page until the user decides to remove it through the delete feature [89].

To ensure inter-coder reliability, two of the authors reviewed coded 45 posts on themes for wind energy opposition and themes of recreancy, with 95.6% accuracy (43/45) for opposition themes and no discrepancies between the corrosive community themes. This led to a consultation where we noted how some of the content contained multiple themes, where the commentary from the originator of the post to decipher which aspect of the content the poster wishes to focus on. In cases where there was no comment by the originator of the content, the authors assess a theme based on key conclusions from the shared content. For example, users may post a link to a website or article and write an associated note with the post which might include a takeaway from the subject matter and would then be classified according to what the user identifies as the primary topic. In another example, articles may contain all of the anti-wind themes (not technologically or economically feasible, ecologically disastrous, human health impacts) as a broader reason to oppose policies that support wind energy development (Renewable Portfolio Standards, Production Tax Credit) or the local development of a wind farm. In these scenarios, the coding scheme used would classify it as a "socio-political" theme due to opposition stemming from a current policy or proposal and would also include all content that provided updates on current state policies and litigation efforts on local

proposals.

7. Findings

7.1. Themes of opposition

In total, 803 posts were coded between the pre-development (SAWU) and post-development (CFCS) FCPs (see Fig. 4). Overall, SAWU had 459 posts (57%) and CFCS had 344 (43%). Coded posts for both CFCS and SAWU are displayed below. The first noticeable trend is that both FCPs' most frequently posted content related to the socio-political process of wind energy development, covering 50% of the posts for the pre-development FCP and 37% of the posts for the post-development FCP. Second, it is evident by these posts that there is less focus on the environmental impacts of wind energy for both FCPs (6–7%). Third, the rate of economic aspects and technological feasibility posts were fairly consistent, making up from 16 to 17% of the content across both FCPs. Fourth, the rate of posts on human health aspects was higher for the post-development FCP (13%) than for pre-development (6%).

7.2. Themes of corrosive community aspects

The most frequent corrosive community element for both groups is recreancy, accounting for 45% of the pre-development posts and 57% of post-development posts (see Fig. 5). The second most corrosive community element for both groups is litigation, with 42% and 24% for the pre and post-development FCPs respectively. The difference in the rate of posts regarding litigation is due to the ongoing coverage of events related to the Seneca Wind Farm proposal. Posts regarding the mental and physical health impacts were not as common, representing only 11% of SAWU and 19% of CFCS posts. Many of the posts that were coded for human health in the initial coding phase ended up in the mental and physical health corrosive community element, which also included several posts that were coded for environmental impacts that mentioned the potential of human health.

7.3. Content of Posts: Users, Activity, and Locality

The producer of the content being distributed by the two FCPs was also documented (see Fig. 6). In cases where the content is a written text expressing an opinion, then the attribution is to the FCP. If the content provides a link to a story or video, the producer of that content is recorded. In many cases, the FCP will share a post from another
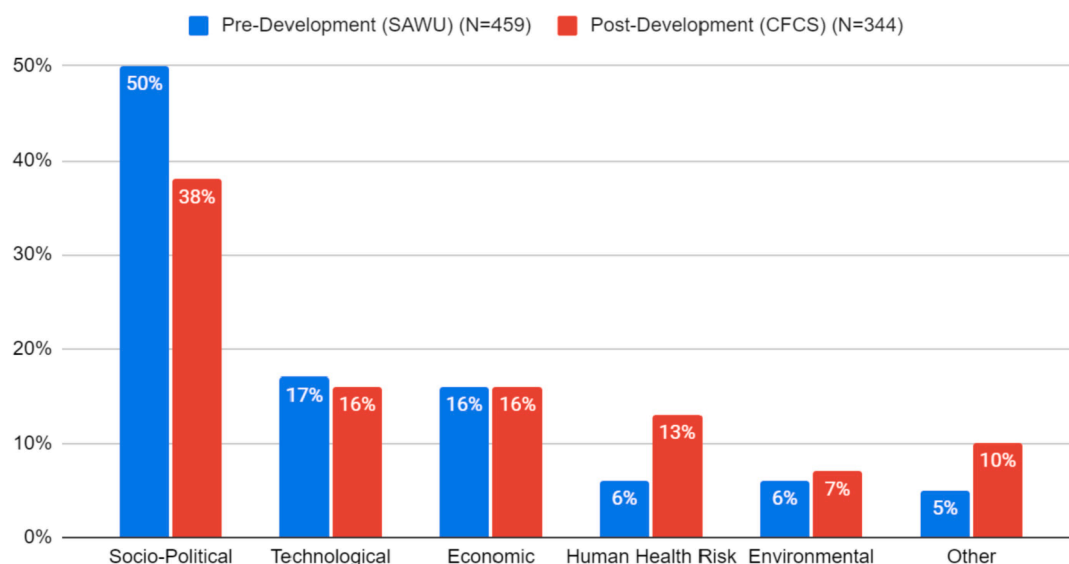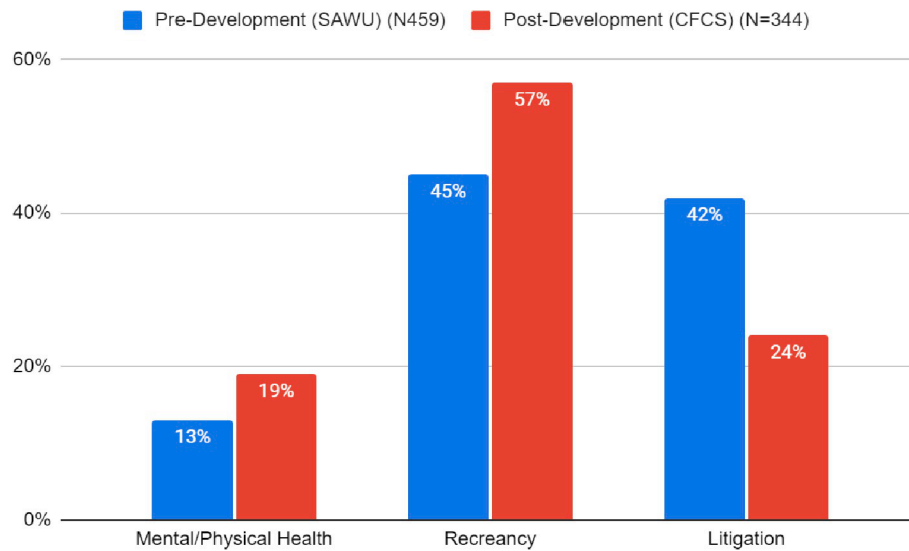

Fig. 4. Wind energy themes by FCP.

Fig. 5. Corrosive community themes by FCP.

FCP	Contributor	# of Posts	% of Content	Shares (Mean)	Reactions (Mean)	Comments (Mean)
Pre-Development (SAWU)	SAWU (FCP)	292	63.6%	10,114 (34.6)	16,953 (58.1)	3,043 (10.4)
	Advertiser Tribune	27	5.9%	578 (21.4)	1,115 (41.3)	146 (5.4)
	Seneca County Resident 1	16	3.5%	289 (18.1)	656 (41)	58 (3.6)
	CFCS (FCP)	10	2.2%	148 (14.8)	391 (39.1)	30 (3)
	Seneca County Resident 2	9	2%	182 (20.2)	349 (38.78)	89 (9.9)
Post-Development (CFCS)	CFCS (FCP)	47	13.6%	391 (8.3)	390 (8.3)	77 (1.64)
	SAWU (FCP)	31	9%	58 (1.87)	258 (8.32)	7 (.2)
	Coalition for Rural Property Rights (FCP)	20	5.8%	24 (1.2)	79 (3.95)	4 (.2)
	D.C. Energy Advocate member	20	5.8%	15 (1.2)	44 (3.38)	3 (.2)
	Save Jasper County (FCP)	13	3.8%	39 (3)	115 (8.9)	5 (.4)

Fig. 6. List of top contributors of content.

individual or group, to which that individual or group is attributed to the posted content. Below is a list of the top five contributors to the pre and post-development FCPs, along with the total number of shares, reactions, and comments their posts have generated as a reflection of their interaction with the page and public. Individual names are not identified by name, but listed as either county residential affiliations or as identified members of the D.C. Energy Advocates special interest group.

For the pre-development FCP SAWU, the top contributor was itself, generating 292 posts or over half (63.6%) of the content of the page. On average, these posts generated about 35 shares, 58 reactions, and 10 comments and made up a significant portion of the shared content. The next contributor of content is the Advertiser-Tribune, a local newspaper that produced several articles as various public meetings and contested litigation was taking place regarding the local wind project. 27 posts with this content generated about 21 shares, 41 reactions, and 5 comments per post This content was not against development, but rather provided updates on the project and siting process. A county resident responsible for 16 (3.5%) of the posts, which generated about 18 shares,

41 reactions, and 4 comments per post, and another resident generated 9 posts (2%) with about 20 shares, 39 reactions, and 10 comments per post. Finally, the post-development FCP in this study was the 4th highest contributor with 10 (2.2%) posts, generating 15 shares, 39 reactions, and 3 comments per post.

For the post-development FCP, a significant amount of content is posted by other FCPs and includes a frequent poster involved with D.C. Energy Advocates. The top producer of content was itself, as CFCS generated 47 posts (13.6%) that received an average of 8 shares, 8 reactions, and 2 comments per post. The pre-development FCP Seneca Anti-Wind Union was the second-highest generator of content, with 31 (9%) posts that received an average of 2 shares and 8 reactions per post. Coalition for Rural Property Rights, another FCP against wind energy development but does not represent a specific geography, had 20 posts (5.8%) that received about one share and four comments per post. Similarly, a D.C. Energy Advocate member was responsible for 20 content posts.

Content was also assessed on whether the issue covered applied

specifically to the local context or involved non-local matters for both FCPs. An initial observation is that the pre-development FCP was more focused on local content (76.25% of posts) than the post-development FCP (31.98%). A breakdown of the local and non-local content by corrosive community theme is presented in Fig. 7 and highlights a few similarities and differences between the two FCPs. First, local litigation is the most represented thematic category for the pre-development FCP with 179 posts, followed by 136 local posts on recreancy, and 32 local posts on mental and physical health. Second, non-local content for the pre-development FCP was significantly lower, with a majority of this content covering recreancy themes (70 posts), followed by non-local mental and physical health impacts (30 posts) and litigation (12 posts). From this trend, we see the pre-development FCP focusing primarily on local litigation and limited in the non-local litigation content, while recreancy is a predominant theme in both the local and non-local content.

The post-development FCP varies from the pre-development FCP on both the volume of content, the degree of the localness of the content, and the corrosive community themes present in the content. First, the category most represented in the post-development site (149 posts) regards non-local recreancy, but the second-largest category is on local recreancy (46 posts). Second, of the 67 posts covering mental and physical health, 85.07% are regarding non-local events or context. Third, content involving litigation was split between local (41 posts) and non-local (41 posts) context.

To assess the interaction of these themes and local contexts, each category of local and non-local corrosive community themes is examined by the average number of shares, reactions, and comments. Aside from the higher volume of interaction for the pre-development FCP SAWU, several noticeable trends can be observed from the breakdown.

First, local content receives more interaction than non-local content for nearly all categories except for the post-development FCP CFCS themes for recreancy and litigation, where the difference in means is less than one (see Fig. 9). Second, the content with the highest rate of shares is on local mental and physical health impacts for the pre-development FCP, with an average of 73.22 shares per post. However, this average is inflated due to one post regarding the impact of turbine height on emergency helicopter services in the area, which generated 708 shares at the time of the study. Without this outlier, the mean would be 42.46 shares per post, slightly smaller than the 43.67 average for non-local mental and physical health content.

Third, differences between the two FCPs highlight how the stage of development may coincide with how people interact with FCPs. The pre-development FCP had the highest rate of local and non-local shares, reactions, and comments on mental and physical health impacts, and the post-development FCP follows suit when it comes to the number of shares regarding local mental and physical health impacts, but the FCP CFCS had a higher rate of reactions for local and non-local litigation. Furthermore, the non-local topic that generated the most shares was on recreancy rather than health impacts. While the low rate of comments for the post-development FCP limits the ability to make meaningful

Fig. 7. Posts by local and non-local content.

interpretations, the comments on the pre-development FCP suggest users are more likely to comment (with personal identifiers tied to the comment) on content regarding mental and physical health, followed by recreancy, then litigation.

8. Discussion

Noting differences in thematic content, the local context of the information, and the rates of interactions across posts, this study reveals differences between FCPs against local wind energy that represent different stages of development. The pre-development FCP SAWU was more active during the time of study than the post-development FCP CFCS, but both FCPs in this study frequently shared content from the other page. Along with posts from other FCPs, it is clear that a coordinated network of wind energy activism exists on Facebook in the U.S., similar to what Borch et al. [66] found in Denmark, where non-local actors may participate in local issues. While this study did not perform a network analysis, there is evidence that multiple non-local users do post content on these FCPs.

The most popular wind energy opposition theme in the two FCPs analyzed are regarding the socio-political impacts, which may be influenced by the ongoing state legislation negotiation of the legality of the wind energy proposal in Seneca County, and the discussion of state House Bill 401 which would allow local townships to conduct a referendum to halt wind farms, even after approval by the state legislature. There is more content regarding human health risks around wind energy for the post-development FCP CFCS than the pre-development FCP (13% to 6%, respectively). This could be a result of turbine presence in the post-development FCP, as concerns regarding perceived health risks are more germane to residents living near turbines, whereas a focus on the socio-political process may be a way to raise awareness and encourage more engagement and participation in the development process. Similar to other research[31,37], environmental and aesthetic themes were less evident than these processes.

The most popular themes of the corrosive community vary by stage of development, where the pre-development FCP is more focused on local litigation and the post-development FCP generates more content on non-local recreancy. Content on mental and physical health risks that receive the most shares for local content for both pre-development and post-development FCPs, indicating a wider dispersion of health risk content compared to recreancy and litigation (Fig. 9). This suggests that physical and health risks are still a primary topic of concern for the local residents, and while these FCPs provide content to corroborate claims of health impacts, it is not as frequently posted as content related to the process of development and perception of recreancy. In turn, this exposure could be shaping and shifting previous assessments of how local institutions and developers are managing risks of development.

The degree to which content was local also varied, where the pre-development FCP focused more on local content and the post-development FCP produced more non-local content (Fig. 7.) This suggests that FCPs around already developed projects are more centered on amplifying pre-development FCPs to strengthen a form of informal bridging social capital that can be relied on for resources and social support. The pre-development FCP's focus on local litigation appears to be a way to introduce information regarding the development process and to encourage civic engagement with the issue via voting for a particular candidate or signing an initiative, while the post-development FCP offers more content regarding non-local human health risks (Fig. 8). Interestingly, it is the smallest represented theme, non-local human health risks, that generates the most shares (10.6) per post, highlighting the special role of these extra-local actors in local FCPs.

The high rates of reactions and shares compared to the number of comments may be a sign that users on these pages are using the content to get more information regarding wind energy development rather than opening a dialogue to debate information (90). Research demonstrates that the health impacts from wind energy are psychosomatic (45, 46),
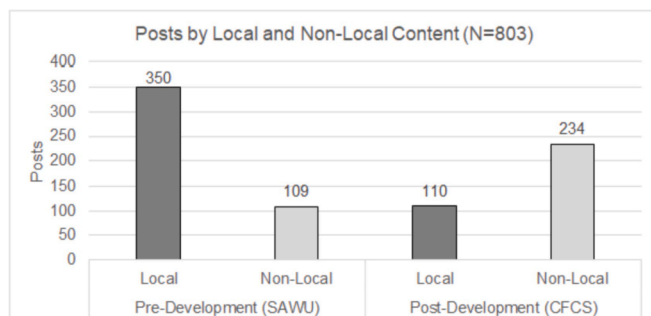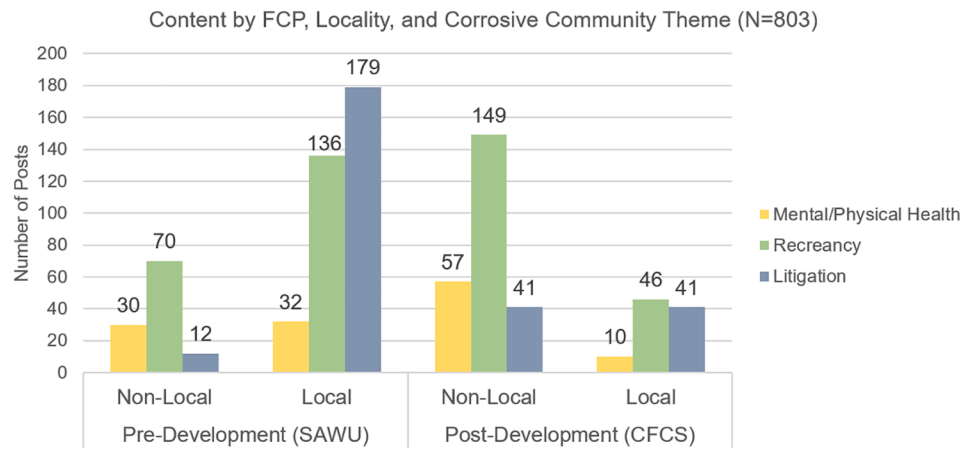
Fig. 8. Interactions with content by FCP, locality, and corrosive community theme.

		Local			Non-Local		
		Shares	Reactions	Comments	Shares	Reactions	Comments
Pre-Development (SAWU)	Mental/Physical Health	73.22	60.16	13.59	43.67	49.07	9.17
	Recreancy	28.43	52.18	10.23	27.24	39.89	6.33
	Litigation	20.49	56.45	7.59	16.25	42.5	4.17
Post-Development (CFCS)	Mental/Physical Health	10.6	8.5	1.3	2.58	5.88	0.37
	Recreancy	6.04	7.89	1.83	6.18	5.28	0.61
	Litigation	3.2	14.23	1.73	3.51	8.49	0.46

Fig. 9. FCP by corrosive community theme, locality, and interactions.

and if users are using these anti-wind FCPs for information, they may perceive greater risks living near turbines, which can result in more concerted local opposition to wind farms, particularly if these communities are deliberating on approving such projects. The dominance of recreancy posts suggests that anti-wind FCPs contribute to shaping perceptions of recreancy, which drives emotional responses like anger and distrust [71,80]. Embracing themes of recreancy can be a powerful way to motivate individuals who may be indifferent to development to take up a more oppositional position, particularly if there is a perception of uncertainty around health impacts related to exposure.

As society receives more information from social media like FCPs, new information and opinions can be shared, including attitudes and perspectives about past events. Combined with the fact that wind turbine syndrome is viewed as a communicable disease, the intersection of perceived health risk from the turbines and recreancy of both experts dismissing these claims and broader institutions promoting the rollout of renewable energy makes wind energy an ideal, non-disaster application of the framework.

9. Conclusion

The Corrosive Community Framework is applicable to wind energy development, a non-disaster case because the unique and combined nature of perceived health risks from technology and perceived recreancy of leaders and institutions have led to an increasingly litigative environment around development. The rising use of social media produces a new mechanism for communication used by various special interests to communicate to specific and general audiences [49,51,55]. Specifically, FCPs connect virtual spaces to real geographies and promote the corrosive community characteristics by:

1) Increasing perceptions of human health and public safety risks related to wind by sharing news of disasters and misinformation over health assessment risks.
2) Encouraging perceptions of recreancy by providing counter-claim technical assessments, leveling accusations against decision-

makers, and personally ridiculing local and non-local supporters of wind
3) Contributing to a complex litigative environment by providing updates on various lawsuits against developers, encourage activism to influence regulatory proceedings, and offering legal and zoning advice to halt or prevent wind energy development

In our case, these FCPs especially facilitate dynamics of the corrosive community by frequently sharing content regarding the risks to human health and public safety to create scientific uncertainty. These platforms allow for extra-local actors to participate in very local affairs, and we do find evidence of several actors sharing the same information through a coordinated anti-wind development network [67,68]. This in turn introduces a new network into seemingly isolated FCPs that may keep controversial topics like wind energy on the minds of residents by consolidating and sharing information frequently, giving the perception that the public has been misled on the dangers of this form of development. Furthermore, these networks encourage a range of civic engagement behaviors that include pursuing lawsuits against local developers, landowners, and governments while providing legal advice and strategies for individuals more interested in getting involved.

Rural communities facing similar contexts related to wind energy development can expect similar dynamics, and there is evidence of other FCPs in other states with wind energy. Communities with wind energy development or high potential for its development are likely to already have a regional FCP to provide unsolicited members, and as long as one community member engages with the content, others in the geographic community vis-a-vis Facebook become exposed to messages regarding wind energy development. Future success rates of wind energy proposals may be influenced by these FCPs if they recruit a local champion and sow a corrosive community that once established, can paralyze future development projects that require collaboration.

This study also reveals spatio-temporal dynamics of online corrosive communities by highlighting how the stage of development can influence both the locality of the content and the types of messages deployed by these FCPs. One can expect anti-wind FCPs near pre-development sites to focus more on local litigation and ways to be civically engaged

with the process, while FCPs near post-development sites are more likely to combine human health risks from exposure. By providing counter-claim assessments and information critical on the decision-making process leading to wind, FCPs attempt to paint the developers and local leaders' past actions as recreant as this new information has come to light.

While previous research connects the concept of recreancy regarding disasters to the erosion of social capital and civic engagement [83,85], findings from this study suggest these FCPs demonstrate a more complicated relationship with social capital. The concepts of "bridging" and "bonding" social capital may be more apt for community studies involving the Corrosive Community Framework where extra-local actors are involved. The FCPs examined here appear to be building an online, bridging social capital to extra-local actors and other FCPs, while building bonding social capital among those who oppose wind energy, while simultaneously eroding the bridging social capital across groups *within* communities. They spread risks via content through social media that focus on the recreancy of leaders and offer a form of bridging social capital in the form of a network designed for local recruitment and dissemination of human health risks, recreancy, and ongoing litigation around wind energy.

Future research should examine both unique, online community mechanisms that facilitate the spatial–temporal development of perceptions of recreancy as well. The gradual onslaught of social media content may lead people to re-evaluate previous assessments of development decisions as recreancy, even if perceived malfeasance was not occurring at the time. Given the apparent success of other social media campaigns in U.S. politics, research on these networked groups should continue to investigate the impacts of national public relations campaigns in shaping local outcomes of wind energy proposals.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] E. Pedersen, Health aspects associated with wind turbine noise - results from three field studies, Noise Control Eng. J. 59 (1) (2011) 47–53, https://doi.org/10.3397/1.3533898.

[2] J. Baxter, R. Morzaria, R. Hirsch, A case-control study of support/opposition to wind turbines: Perceptions of health risk, economic benefits, and community conflict, Energy Policy 61 (2013) 931–943, https://doi.org/10.1016/j.enpol.2013.06.050.

[3] T.M. Groth, C. Vogt, Residents' perceptions of wind turbines: An analysis of two townships in Michigan, Energy Policy 65 (2014) 251–260, https://doi.org/10.1016/j.enpol.2013.10.055.

[4] B. Deignan, E. Harvey, L. Hoffman-Goetz, Fright factors about wind turbines and health in Ontario newspapers before and after the Green Energy Act, Health Risk Society. 15 (3) (2013) 234–250, https://doi.org/10.1080/13698575.2013.776015.

[5] J.B. Jacquet, The rise of 'private participation' in the planning of energy projects in the rural United States, Soc Nat Resour 28 (3) (2015) 231–245, https://doi.org/10.1080/08941920.2014.945056.

[6] J.B. Jacquet J. Fergen The vertical patterns of wind energy: The effects of ownership on rural communities in the Prairie Pothole Region of the United States The Journal of Rural and Community Development 13 2 2018 130 148 https://journals.brandonu.ca/jrcd/article/view/1527/351.

[7] Wieners, B. and D. Hasemyer. 2018. Weather Channel's "United States of Climate Change: Killing Green." Video produced by M. Venegas, Weather Films. Retrieved from https://features.weather.com/us-climate-change/ohio/.

[8] W.R. Freudenburg T.R. Jones Attitudes and stress in the presence of technological risk: A test of the Supreme Court hypothesis Social Forces 69 4 1991 1143 1168 https://www.jstor.org/stable/2579306.

[9] W.R. Freudenburg, Risk and recreancy: Weber, the division of labor, and the rationality of risk perceptions, Soc. Forces 71 (4) (1993) 909–932.

[10] J.S. Picou, B.K. Marshall, D.A. Gill, Disaster, Litigation, and the Corrosive Community, Soc. Forces 82 (4) (2004) 1493–1552, https://doi.org/10.1353/sof.2004.0091.

[11] J.B. Jacquet, R.C. Stedman, The risk of social-psychological disruption as an impact of energy development and environmental change, J. Environ. Plann. Manage. 57 (9) (2014) 1285–1304, https://doi.org/10.1080/09640568.2013.820174.

[12] sPower, sPower Announces the Suspension of its Seneca Wind Project Retrieved on January 2nd, 2021 https://senecawind.spower.com/2020-01-21/ 2020.

[13] Hoen, B.D., J.E. Diffendorfer, J. T. Rand, L.A. Kramer, C.P. Garrity, and H.E. Hunt. 2018. United States Wind Turbine Database (ver. 3.3, January 14, 2021): U.S. Geological Survey, American Wind Energy Association, and Lawrence Berkeley National Laboratory data release, https://doi.org/10.5066/F7TX3DN0.

[14] M. Wolsink, Wind power implementation: The nature of public attitudes: Equity and fairness instead of 'backyard motives', Renew. Sustain. Energy Rev. 11 (6) (2007) 1188–1207, https://doi.org/10.1016/j.rser.2005.10.005.

[15] National Renewable Energy Laboratory (NREL). 2011. "Wind energy: an opportunity for rural income, jobs, and economic development." February 12th. Retrieved from https://www.nrel.gov/news/program/2011/1395.html.

[16] J. Rand, B. Hoen, Thirty years of North American wind energy acceptance research: What have we learned? Energy Res. Social Sci. 29 (2017) 135–148, https://doi.org/10.1016/j.erss.2017.05.019.

[17] M. Munday, G. Bristow, R. Cowell, Wind farms in rural areas: How far do community benefits from wind farms represent a local economic development opportunity? Journal of Rural Studies 27 (1) (2011) 1–12, https://doi.org/10.1016/j.jrurstud.2010.08.003.

[18] J. Sowers, Fields of Opportunity: Wind machines return to the plains, Great Plains Quarterly 26 (2) (2006) 99–112.

[19] J. Firestone, H. Kirk, A strong relative preference for wind turbines in the United States among those who lie near them, Nat. Energy 4 (2019) 311–320, https://doi.org/10.1038/s41560-019-0347-9.

[20] N. Bowen-Ellzey Wind energy development as an economic development strategy for rural areas 2011 Ohio State University Extension Fact Sheet 11-CMD-849.

[21] M.C. Slattery, B.L. Johnson, J.A. Swofford, M.J. Pasqualetti, The predominance of economic development in the support for large-scale wind farms in the U.S. Great Plains, Renew. Sustain. Energy Rev. 16 (6) (2012) 3690–3701, https://doi.org/10.1016/j.rser.2012.03.016.

[22] K.K. Mulvaney, P. Woodson, L.S. Prokopy, Different shades of green: A case study of support for wind farms in the rural midwest, Environ. Manage. 51 (5) (2013) 1012–1024, https://doi.org/10.1007/s00267-013-0026-8.

[23] T.M. Groth, C.A. Vogt, Rural wind farm development: Social, environmental and economic features important to local residents, Renewable Energy 63 (2014) 1–8, https://doi.org/10.1016/j.renene.2013.08.035.

[24] American Wind Energy Association (AWEA). 2019. "US wind power grew 8 percent in 2018 amid record demand." Press release 4/09/19. Retrieved from https://www.awea.org/2018-market-report_us-wind-power-grew-8-percent-in-2018.

[25] J. Fergen, J.B. Jacquet, Beauty in motion: Expectations, attitudes, and values of wind energy development in the rural U.S, Energy Res. Social Sci. 11 (2016) 133–141, https://doi.org/10.1016/j.erss.2015.09.003.

[26] J.B. Jacquet, Landowner attitudes toward natural gas and wind farm development in northern Pennsylvania, Energy Policy 50 (2012) 677–688, https://doi.org/10.1016/j.enpol.2012.08.011.

[27] E. Pedersen, P. Larsman, The impact of visual factors on noise annoyance among people living in the vicinity of wind turbines, Journal of Environmental Psychology 28 (4) (2008) 379–389, https://doi.org/10.1016/j.jenvp.2008.02.009.

[28] J. Swofford, M. Slattery, Public attitudes of wind energy in Texas: Local communities in close proximity to wind farms and their effect on decision-making, Energy Policy 38 (5) (2010) 2508–2519, https://doi.org/10.1016/j.enpol.2009.12.046.

[29] S.K. Olson-Hazboun, R.S. Krannich, P.G. Robertson, Public Views on Wind Energy in the Rocky Mountain Region of the United States: Distinct Attitudes, Exposure, and Other Key Predictors of Wind Energy, Energy Res. Social Sci. 21 (2016) 167–179, https://doi.org/10.1016/j.erss.2016.07.002.

[30] P. Devine-Wright, Y. Howes, Disruption to place attachment and the protection of restorative environments: A wind energy case study, Journal of Environmental Psychology 30 (3) (2010) 271–280, https://doi.org/10.1016/j.jenvp.2010.01.008.

[31] D. Bell, T. Gray, C. Haggett, J. Swaffield, Revisiting the 'social gap': public opinion and relations of power in the local politics of wind energy, Environmental Politics 22 (1) (2013) 115–135, https://doi.org/10.1080/09644016.2013.755793.

[32] M. Fischlein, J. Larson, D.M. Hall, R. Chaudhry, T. Rai Peterson, J.C. Stephens, E. J. Wilson, Policy stakeholders and deployment of wind power in the sub-national context: A comparison of four U.S. states, Energy Policy 38 (8) (2010) 4429–4439, https://doi.org/10.1016/j.enpol.2010.03.073.

[33] J.C. Stephens, G.M. Rand, L.L. Melnick, Wind energy in US media: A comparative state-level analysis of a critical climate change mitigation technology, Environmental Communication 3 (2) (2009) 168–190, https://doi.org/10.1080/17524030902916640.

[34] R. Phadke, Public deliberation and the geographies of wind justice, Science as Culture 22 (2) (2013) 247–255, https://doi.org/10.1080/09505431.2013.786997.

[35] S. Fast, W. Mabee, J. Baxter, T. Christidis, L. Driver, S. Hill, J.J. McMurty, M. Tomkow, Lessons learned from Ontario wind energy disputes, Nat. Energy 1 (2016) 15028, https://doi.org/10.1038/nenergy.2015.28.

[36] C. Walker, J. Baxter, D. Oulette, Adding insult to injury: The development of psychosocial stress in Ontario wind turbine communities, Soc. Sci. Med. 133 (1) (2014) 358–365, https://doi.org/10.1016/j.socscimed.2014.07.067.

[37] S.B. Mills, D. Bessette, H. Smith, Exploring landowners' post-construction changes in perceptions of wind energy in Michigan, Land Use Policy 82 (2019) 754–762, https://doi.org/10.1016/j.landusepol.2019.01.010.

[38] K.S.D. Shaw, A.D. Hill, L. Boyd, J. Monk, E.F. Reid, Einsiedel, Conflicted or constructive? Exploring community responses to new energy developments in Canada, Energy Res. Social Sci. 8 (2015) 41–51, https://doi.org/10.1016/j.erss.2015.04.003.

[39] D.L. Bessette, S.B. Mills, Farmers vs. lakers: Agriculture, amenity, and community in predicting opposition to United States wind energy development, Energy Res Soc Sci 72 (2021) 101873, https://doi.org/10.1016/j.erss.2020.101873.

[40] V. Brummer, Community energy – benefits and barriers: A comparative literature review of community energy in the UK, Germany, and the USA, the benefits it provides for society and the barriers it faces, Renew. Sustain. Energy Rev. 94 (2018) 187–196, https://doi.org/10.1016/j.rser.2018.06.013.

[41] J. Firestone, B. Hoen, J. Rand, D. Elliot, G. Hubner, J. Pohl, Reconsidering barriers to wind power projects: community engagement, developer transparency and place, J. Environ. Plann. Policy Manage. 20 (3) (2018) 370–386, https://doi.org/10.1080/1523908X.2017.1418656.

[42] L.D. Knopper, C.A. Ollson, Health effects and wind turbines: A review of the literature, Environ. Health 10 (78) (2011), https://doi.org/10.1186/1476-069X-10-78.

[43] A. Farboud, R. Crunkhorn, A. Trinidade, 'Wind turbine syndrome': Fact or fiction? J. Laryngol. Otol. 127 (3) (2013) 222–226, https://doi.org/10.1017/S0022215112002964.

[44] J. Taylor, C. Eastwick, R. Wilson, C. Lawrence, The influence of negative oriented personality traits on the effects of wind turbine noise, Personal. Individ. Differ. 54 (3) (2013) 338–343, https://doi.org/10.1016/j.paid.2012.09.018.

[45] J. Taylor, N. Klenk, The politics of evidence: Conflicting social commitments and environmental priorities in the debate over wind energy and public health, Energy Res. Social Sci. 47 (2019) 102–112, https://doi.org/10.1016/j.erss.2018.09.001.

[46] Simon Chapman Alexis St. George Karen Waller Vince Cakic Matteo Convertino The pattern of complaints about Australian wind farms does not match the establishment and distribution of turbines: Support for the psychogenic, 'communicated disease' hypothesis PLOS ONE 8 10 2013 e76584 10.1371/journal.pone.0076584 10.1371/journal.pone.0076584.g001 10.1371/journal.pone.0076584.t001 10.1371/journal.pone.0076584.t002.

[47] R.J. McCunney, K.A. Mundt, C.W. David, R. Dobie, K. Kaliski, M. Blais, Wind Turbines and Health: A Critical Review of the Scientific Literature, J. Occup. Environ. Med. 56 (11) (2014) 108–130, https://doi.org/10.1097/JOM.0000000000000313.

[48] W.R. Freudenburg, Social Impact Assessment, Ann. Rev. Sociol. 12 (1) (1986) 451–478.

[49] K. Rider, D.M. Wood, Condemned to connection? Network communitarianism in Mark Zuckerberg's 'Facebook Manifesto', News Media Soc. 21 (3) (2019) 639–654, https://doi.org/10.1177/1461444818804772.

[50] Malecki, K. M. C., J. A. Keating, and N. Safdar. 2020. "Crisis communication and public perception of COVID-19 risk in the era of social media." Clinical Infectious Diseases: 1-6. https://doi.org/10.1093/cid/ciaa758.

[51] Gefter, A. 2007. The Difference between "Real" and Online Is No Longer Clear-Cut. In: Engdahl, S., Ed., Online Social Networking, Farmington Hills, MI: Greenhaven Press.

[52] Duggan, M., N. B. Ellison, C. Lampe, A. Lenhart, and M. Madden. 2015. "Social Media Update 2014." Pew Research Center, January. Available at https://www.pewresearch.org/internet/2015/01/09/social-media-update-2014/.

[53] N.B. Ellison, C. Steinfield, C. Lampe, Connection strategies: Social capital implications of Facebook-enabled communication practices, News Media and Society 13 (6) (2011) 873–892, https://doi.org/10.1177/1461444810385389.

[54] R.P. Yu, N.B. Ellison, C. Lampe, Facebook use and its role in shaping access to social capital among older adults, J. Broadcast. Electron. Media 62 (1) (2018) 71–90, https://doi.org/10.1080/08838151.2017.1402905.

[55] S. Hofmann, D. Beverungen, M. Rackers, J. Becker, What makes local governments' online communications successful? Insights from a multi-method analysis of Facebook, Gov. Inform. Quart. 30 (4) (2013) 387–396, https://doi.org/10.1016/j.giq.2013.05.013.

[56] R.M. Bond, C.J. Fariss, J.J. Jones, A.D.I. Kramer, C. Marlow, J.E. Settle, J. H. Fowler, A 61-million-person experiment in social influence and political mobilization, Nature 489 (7415) (2012) 295–298, https://doi.org/10.1038/nature11421.

[57] S. Valenzuela, Unpacking the use of social media for protest behavior: The roles of information, opinion expression, and activism, American Behavioral Scientist 57 (7) (2013) 920–942, https://doi.org/10.1177/0002764213479375.

[58] E. Nekmat, K.K. Gower, W.J. Gonzenbach, A.J. Flanagin, Source effects in the micro-mobilization of collective action via social media, Inform. Commun. Soc. 18 (9) (2015) 1076–1091, https://doi.org/10.1080/1369118X.2015.1018301.

[59] S. Gaby, N. Caren, Occupy online: How cute old men and Malcolm X recruited 400,000 US users to OWS on Facebook, Soci. Mov. Stud. 11 (3–4) (2012) 367–374, https://doi.org/10.1080/14742837.2012.708858.

[60] Bromwich, J. E. and M. Haag. 2018. "Facebook is changing. What does that mean for your news feed?" The New York Times, January 12th. Retrieved on January 5th, 2021. http://www.nytimes.com/2018/01/12/technology/facebook-news-feed-changes.html.

[61] A. Gelfert Fake news: A Definition Informal Logic 38 1 2018 84 117 https://doi.org/10.22329/il.v38i1.5068.

[62] R. Lever "Fake Facebook accounts: the never-ending battle against bots". Phys Article Last accessed on April 16th 20201 2019.

[63] Mueller, R. S., Helderman, R. S., Zapotosky, M., & United States. (2019). The Mueller report. New York: Scribner.

[64] C. Montag B. Lachmann M. Herrlich K. Zweig Addictive features of social media/messenger platforms and freemium games against the background of psychological and economic theories International Journal of Environmental Research and Public Health 16 14 2019 2612 https://10.3390/ijerph16142612.

[65] Oxford Languages 2020: Words of an Unprecedented Year Accessed on April 6th, 2021. Retrieved from https://pages.oup.com/ol/word-of-the-year-2020 2020.

[66] K. Borch, A.K. Munk, V. Dahlgaard, Mapping wind-power controversies on social media: Facebook as a powerful mobilizer of local resistance, Energy Policy 138 (2020) 111223, https://doi.org/10.1016/j.enpol.2019.111223.

[67] Checks and Balances Confidential, 'subversive' campaign documents show fossil fuel-funded advocacy groups coordinating with local anti-wind groups 2012 https://checksandbalancesproject.org/confidential-subversive-campaign-documents-show-fuel-funded-advocacy-groups-coordinating-with-local-anti-wind-groups/.

[68] Energy Advocates Conference (EAC). February 1-2, 2012. Retrieved January 5th, 2021. https://www.documentcloud.org/documents/3943777-D-C-Energy-Advocates-Conference-Participants.html.

[69] R. Porter National PR Campaign Proposal Retrieved January 5th, 2021. https://checksandbalancesproject.org/wp-content/uploads/2012/05/national_pr_campaign_proposal.doc 2012.

[70] W.R. Freudenburg, Contamination, corrosion and the social order: An overview, Current Sociology 45 (3) (1997) 19–39, https://doi.org/10.1177/001139297045003002.

[71] M.R. Cope, T. Slack, T.C. Blanchard, M.R. Lee, It's not whether you win or lose, it's how you place the blame: Shifting perceptions of recreancy in the context of the Deepwater Horizon oil spill, Rural Sociology 81 (3) (2016) 295–315, https://doi.org/10.1111/ruso.v81.310.1111/ruso.12096.

[72] M.R. Cope, T. Slack, J.E. Jackson, V. Parks, Community sentiment following the Deepwater Horizon oil spill disaster: A test of time, systemic community, and corrosive community models, J. Rural Stud. 74 (2020) 124–132, https://doi.org/10.1016/j.jrurstud.2019.12.019.

[73] Ritchie, L. A., J. Little, and N. M. Campbell. 2018. "Resource loss and psychosocial stress in the aftermath of the 2008 Tennessee Valley Authority coal ash spill." Int J Mass Emerg Disasters 36 (2): 179-207. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6454919/.

[74] L.A. Ritchie, D.A. Gill, M.A. Long, Factors influencing stress response avoidance behaviors following technological disasters: A case study of the 2008 TVA coal ash spill, Environ. Hazards 19 (5) (2020) 442–462, https://doi.org/10.1080/17477891.2019.1652142.

[75] K. Lynn, Rising recreancy: flood control and community relocation in Houston, TX, from an environmental justice perspective, Local Environment 22 (3) (2017) 321–334, https://doi.org/10.1080/13549839.2016.1195802.

[76] D.S. Miller, Looting in the aftermath of Hurricane Katrina, Space and Culture 9 (1) (2006) 71–73, https://doi.org/10.1177/1206331205283762.

[77] D.A. Gill, Secondary trauma or secondary disaster? Insights from Hurricane Katrina, Sociological Spectrum 27 (6) (2007) 613–632, https://doi.org/10.1080/02732170701574941.

[78] B.K. Marshall, J.S. Picou, J.R. Schlichtmann, Technological disasters, litigation stress, and the use of alternative dispute resolution mechanisms, Law Policy 26 (2) (2004) 289–307, https://doi.org/10.1111/j.0265-8240.2004.00013.x.

[79] D.A. Gill, L.A. Ritchie, J.S. Picou, J. Langhinrichsen-Rohling, M.A. Long, J. W. Shenesey, The Exxon and BP oil spills: A comparison of psychosocial impacts, Nat. Hazards 74 (3) (2014) 1911–1932, https://doi.org/10.1007/s11069-014-1280-7.

[80] L.A. Ritchie, D.A. Gill, C.N. Farnham, Recreancy revisited: Beliefs about institutional failure following the Exxon Valdez oil spill, Soc. Nat. Resour. 26 (6) (2013) 655–671, https://doi.org/10.1080/08941920.2012.690066.

[81] Alves, M. A., A. M. P. Ometto, and P. C. V. Guimaraes. 2018. Chapter 20: Blame and Litigation as Corporate Strategies in the Context of Environmental Disasters in The Routledge Companion to Risk, Crisis and Emergency Management. Edited by R. P. Gephart Jr., C. C. Miller, and K. S. Helgesson. Routledge: New York.

[82] K. Bickerstaff, P. Simmons, Absencing/presencing risk: Rethinking proximity and the experience of living with major technological hazards, Geoforum 40 (5) (2009) 864–872, https://doi.org/10.1016/j.geoforum.2009.07.004.

[83] L.A. Ritchie, Individual stress, collective trauma, and social capital in the wake of the Exxon Valdez oil spill, Soc. Inquiry 82 (2) (2012) 187–211, https://doi.org/10.1111/j.1475-682X.2012.00416.x.

[84] K.T. Erikson, A New Species Of Trouble: The human Experience Of Modern Disasters, WW Norton & Company, 1995.

[85] L.A. Ritchie, D.A. Gill, Social capital theory as an integrating theoretical framework in technological disaster research, Soc. Spect. 27 (1) (2007) 103–129, https://doi.org/10.1080/02732170601001037.

[86] R.F. Hirsh, B.K. Sovacool, Wind turbines and invisible technology: Unarticulated reasons for local opposition to wind energy, Technol. Cult. 54 (4) (2013) 705–734, https://doi.org/10.1353/tech.2013.0131.

[87] R. Gramling, W.R. Freudenburg, Opportunity-threat, development, and adaptation: Toward a comprehensive framework for social impact assessment, Rural Sociol. 57 (2) (1992) 216–234.

[88] J.T. Mueller, M.M. Brooks, Burdened by renewable energy? A multi-scalar analysis of distributional justice and wind energy in the United States, Energy Res. Social Sci. 63 (2020) 101406, https://doi.org/10.1016/j.erss.2019.101406.

[89] A. Abitbol, S.Y. Lee, Messages on CSR-dedicated Facebook Pages: What works and what doesn't, Public. Relat. Rev. 43 (4) (2017) 796–808, https://doi.org/10.1016/j.pubrev.2017.05.002.