



Original research article

## Political efficacy and familiarity as predictors of attitudes towards electric transmission lines in the United States<sup>☆</sup>



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### ABSTRACT

Public opposition to the construction (i.e., siting) of new high voltage overhead transmission lines is not a new or isolated phenomenon. Past research has posited a variety of reasons, applied general theories, and has provided empirical evidence to explain public opposition. The existing literature, while clarifying many elements of the issue, does not yet fully explain the complexities underlying this public opposition phenomenon. The current study demonstrated how two overlooked factors, people's sense of political efficacy and their familiarity (i.e., prior exposure) with transmission lines, explained attitudes of support and opposition to siting new power lines.

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## 1. Introduction

High voltage overhead transmission lines (HVOTLs) transmit electricity over long distances, enabling the interconnection and integration of disparate areas into regional economies, and more recently provide a means to bring renewable energy from sources such as wind turbines that are often at great distances from urban areas. However, their specific placement and route selection (i.e., siting) between two points at large distances, such as a power plant and a substation, are not a given. In fact, the siting of HVOTLs has historically been met with considerable public opposition. As such, HVOTL siting has been a topic of research for social scientists for more than 30 years. Casper and Wellstone [14] showed that public opposition leads to social upheaval that can cause schedule delays, and adds significant “soft costs” to the project. This issue continues to be seen in current HVOTL siting cases, such as the siting of the Tehachapi Renewable Transmission Project in Chino Hills, California [10]. The desire to understand and communicate to energy policy makers, researchers, and practitioners this tension between the needs of the many for energy, and the needs of the few adversely affected by the required energy infrastructure, has been the mission of many journals, including *Energy Research & Social Science* [50], and is the focus of this study.

In an effort to explain public opposition to the siting of HVOTLs, the media often puts forth the “Not-In-My-Backyard” (NIMBY) reaction [7,35–37]. Many in academia, however, favor place attachment as a more robust theoretical explanation. *Place attachment* is the notion that people have positive affect toward the physical location they inhabit, which leads to a sense of affiliation or attachment to that place [1,3,15,16,18–22,25].

In testing place attachment, many researchers have found evidence supporting this theory as an explanation for public opposition to siting of components of energy infrastructure, such as wind turbines (e.g., Ref. [25]) and HVOTLs. With respect to HVOTLs, Cotton and Devine-Wright [15] noted that place attachment and landscape change were common denominators in the public discourse of siting HVOTLs. Cotton and Devine-Wright [16] also found that the public’s conceptualization included concerns about the effects of HVOTL siting on the sense of place (i.e., place attachment).

Devine-Wright [21] empirically tested the extent to which place attachment and project related factors explained public opposition to HVOTL siting more accurately than NIMBY. Results indicated that people’s objections to siting HVOTLs nearby was somewhat related to demographic factors (e.g., gender, age, education, and length of residence) and place attachment, but more strongly related to specific project related variables (e.g., positive and negative impacts of the project, procedural justice, and trust in the developer and activist groups). Thus, those who were more emotionally or “actively attached” to their physical environment were more opposed to siting HVOTLs nearby than those who were not attached, but the statistical results also support the conclusion that the reasons the public opposed the siting of this HVOTL nearby were more related to project-specific factors than place attachment or demographic factors. Carlisle et al. [13] obtained similar findings in their investigation of utility scale solar facility siting in the southwest region of the United States (U.S.).

### 1.1. Research objective

The place attachment explanation accounts for some of the public opposition to HVOTL siting, but there may be other explanations. The purpose of this study was to investigate how two alternative factors contribute to the explanation of public opposition to the siting of new HVOTLs. Specifically, this study investigated whether respondents’ level of political efficacy (i.e., the degree to which a person believes their individual political behaviors or actions affects political outcomes) and whether familiarity (i.e., whether respondents can see an existing HVOTL from where they live or not) explained attitudes of support and opposition to siting new HVOTLs. Investigating these two factors is in line with calls from previous researchers (e.g., Refs. [27,32,59]) to develop a more comprehensive understanding of the nature of collective action (i.e., opposition and support) for energy technologies such as HVOTLs. In the next section, we describe how the political efficacy and familiarity constructs are theoretically related to attitudes towards HVOTL siting.

### 1.2. Political efficacy

The notion of political efficacy has been around for several decades. Campbell et al. [12] defined it as, “The feeling that individual political action does have, or can have, an impact upon the political process, (i.e., that it is worth while to perform one’s civic duties). It is the feeling that political and social change is possible, and that the individual citizen can play a part in bringing about this change.” (pg. 187). This sense of political empowerment is central to any measureable public opposition to the siting of unwanted infrastructure, in that without a sense of political efficacy, people

would not have the requisite motivation to engage in behaviors opposing unwanted infrastructure changes.

Past research by Wolsink [63,64] on wind energy, which was later cited by Devine-Wright [18,19], showed that a person’s sense of political efficacy helps explain public opposition to wind development. More generally, the comprehensive framework created by Huijts et al. [32] includes political or outcome efficacy as an important psychological factor influencing the acceptance of energy technologies.

Wolsink [63] investigated the reasons for public opposition to wind power. Survey data collected previously (for Ref. [62]), indicated that 5% of the error variance associated with negative attitudes and oppositional behaviors towards the wind farms was explained by political efficacy. In a follow up investigation, Wolsink [64] analyzed data collected from multiple surveys administered between 1986 and 2002. Wolsink’s data showed that the combination of political efficacy and other observed variables has a direct relationship with the latent dependent variable, resistance to local wind developments, and that other observed variables were mediated or partially mediated (i.e., explained) by the latent variable, wind power attitude.

Wolsink’s [64] research supports the idea that political efficacy is an important theoretical aspect to public opposition to siting wind turbines. Yet, there is an absence of research explicitly examining the relationship between political efficacy and public opposition to HVOTLs. It is worth noting, however, that Priestley and Evans [44] found that those who were older, had higher-status occupations, and who had lived in the neighborhood longer viewed the lines more negatively than those who were younger, had lower-status jobs, or had recently moved to the neighborhood. Campbell [11] also showed that older Americans tend to participate more in politics, and as a result, often affect policies and outcomes that benefit them. This positive feedback loop likely contributes to an increased sense of political efficacy in older individuals. Furthermore, in her work on political efficacy, Nabatchi [40] asserted, “Wealthy, educated individuals with professional careers tend to have higher perceptions of political efficacy.” (pg. 259). Taken together, these findings give credence to the idea that those who were older, had higher-status occupations, were more educated, and were wealthier had a stronger sense of political efficacy and viewed the lines more negatively. In essence, there is evidence that political efficacy is associated with oppositional attitudes towards HVOTLs; however, no research to our knowledge has been published to empirically show this relation.

### 1.3. Familiarity

Few studies have examined the extent to which participants’ prior experience and exposure to HVOTLs (i.e., familiarity) affects attitudes towards HVOTLs. Those that did obliquely studied aspects of familiarity and results were discrepant between studies. Soini et al. [49] found that participants in Finland tended to agree that it was possible to get used to the presence of HVOTLs over time. This finding was the second highest positive perception of HVOTLs, superseded only by participants’ agreement that HVOTLs are required and are thus a justified disturbance to the natural landscape.

On the other hand, Cotton and Devine-Wright [15] reported that people tended to strongly disagree with the assertion that the ubiquity of overhead power lines in the existing landscape would mitigate their negative effect on place attachment. Furthermore, Devine-Wright et al. [24] found higher levels of familiarity were associated with stronger agreement that new power lines should be placed underground regardless of cost. These authors concluded that familiarity breeds contempt for new overhead power lines, pylons, or substations—not more positive attitudes.

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