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Geographic proximity to coal plants and U.S. public support for extending the Production Tax Credit

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HIGHLIGHTS

- Proximity to coal power plant increases support for Production Tax Credit.
- Attitudes toward global warming influence support for PTC.
- Raising awareness of health threat increases PTC support if living near coal plant.

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ABSTRACT

The Production Tax Credit (PTC) is an important policy instrument through which the federal government promotes renewable energy development in the United States. However, the efficacy of the PTC is hampered by repeated expirations and short-term extensions, and by the general uncertainty surrounding its future status. We examine the factors driving variation in public support for the extension of the PTC using a nationally representative, internet-based survey. Americans living near a coal-fired power plant are significantly more likely to support extending the PTC than are their peers who are more insulated from the externalities of burning coal. The evidence for this dynamic was strongest and most statistically significant among subjects experimentally primed to think about the adverse health effects of burning coal. Raising awareness of the public health ramifications of generating electricity from fossil fuels holds the potential to increase support for renewable energy policies among those living in proximity to coal plants, even in a highly politicized policy debate.

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1. Introduction

Scholars have long documented strong public opposition to the construction in their local communities of essential, but potentially hazardous facilities ranging from landfills, to toxic waste processing centers, to coal and nuclear power plants (Easterling, 1992; Hunter and Leyden, 1995; Jenkins-Smith and Kunreuther, 2001). For example, in the 2008 MIT Energy Study, Ansolabehere and Konisky (2009) find that more than three quarters of Americans oppose the construction of a new coal-fired power plant within 25 miles of their home. The logic driving this opposition is clear. Many of the externalities associated with producing electricity from coal, such as exposure to airborne pollutants and contamination of water supplies with heavy metals including

mercury, are borne most acutely, albeit not exclusively, by those living closest to the plants themselves (Levy and Spengler, 2002; Keeler et al., 2006; Pope et al., 2006; Chikkatur et al., 2011). In addition to adverse health effects, home prices and rents fall in the wake of a new power plant being built in the immediate vicinity (Davis, 2011).

Recent studies explore whether a similar phenomenon is driving opposition to wind energy. In the abstract, the American public strongly supports more investment in wind energy (Krohn and Damborg, 1999; Nisbet and Myers, 2007; Klick and Smith, 2010). However, many major wind energy projects arouse considerable opposition from residents of the local communities in which the wind farms would be situated (Gipe, 1995; Kontogianni et al., 2014). Though wind energy does not pose the same human health risks as energy derived from traditional fossil fuel sources, it stimulates public concerns about negative impacts on marine life and birds, an unpleasing esthetic appearance, noise from the spinning turbines, and a concomitant negative impact on local property values

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(Firestone and Kempton, 2007; Kaldellis et al., 2012; Premalatha et al., 2014; Groth and Vogt, 2014). The economic rationale behind opposition to local energy generation, whether from fossil fuels or renewable sources, is clear. Many of the costs of power generation are concentrated locally, while the benefits are distributed widely. For example, a study of opinion toward the massive Cape Wind project among residents of Cape Cod, Martha's Vineyard and Nantucket indicates that support would increase dramatically if Cape Wind was to be the first of many more large-scale wind projects, with the result being a much bigger increase in renewable energy production capacity as well as a more equitable distribution of costs (Firestone and Kempton, 2007).

Some studies find evidence consistent with a "not in my back yard" (NIMBY) effect. For example, Swofford and Slattery (2010) find that whereas 72% of their sample living between 10 km and 20 km from a wind farm supported wind energy, only 38% of those living within 5 km did so. However, other studies find little evidence of a significant relationship between proximity and opposition to wind power (Van der Horst, 2007; Ladenburg, 2008; Wolsink, 2000). Still others find a positive relationship in which residents of communities with wind farms are more supportive of wind power than residents of communities with no direct experience with the realities of wind energy (Simon, 1996; Braunholtz, 2003; Jacquet, 2012).

The bulk of extant literature examines whether proximity to a type of energy generation affects support for that form of energy. We ask a related, though distinct question: whether proximity to a traditional energy source, specifically coal-fired power plants, influences support for policies to promote safer substitutes. Specifically, we examine whether proximity to a coal-fired power plant increases support for the Production Tax Credit (PTC), which for two decades was the most important policy instrument through which the United States government endeavored to promote the growth of renewable energy.

In contrast to most European nations, such as Germany where feed-in tariff programs fostered a boon in renewable energy production, the United States relies heavily on grants and tax credits at the federal level to spur the development of alternative energy (Menz, 2005; Gan et al., 2007). One of the most important federal policy instruments to promote the growth of renewable energy is the federal Production Tax Credit (PTC), which is widely credited with fostering significant growth in wind energy by making electricity generated from wind economically competitive with that generated from conventional sources (Bird et al., 2005; Wiser et al., 2007).

However, the ephemeral nature of the PTC has undermined its effectiveness. The Energy Policy Act of 1992, which created the PTC, provided for its expiration in June of 1999. Congress has enacted legislation extending the tax credit multiple times since then. However, the credit has expired on numerous occasions before receiving congressional re-authorization. Most recently, in January 2013 Congress granted a one-year extension of the credit via the American Taxpayer Relief Act of 2012. However, the 113th Congress failed to act, and the PTC expired on December 31, 2013.

The political uncertainty surrounding the PTC has produced highly suboptimal policy outcomes. The short-term extensions and expirations of the PTC fostered a boom-bust cycle of investment in alternative energy that slowed development of American alternative energy manufacturing, increased costs, and ultimately limited generation capacity (Wiser et al., 2007; Lu et al., 2011). In a similar vein, Barradale (2010) argues that uncertainty over the PTC's future affects not only patterns of physical investment, but also contract negotiations over power purchasing agreements, which in turn hampers the development of wind energy.

Public support for the PTC is essential to securing the credit's extension and to building political pressure for a shift in policy toward a long-term tax credit that would reduce uncertainty, spur

investment, and stimulate more effectively the growth of renewable energy production. Understanding the dynamics driving Americans' willingness to back measures to decrease reliance on coal is also critically important to understanding the larger contemporary political battle over the Obama administration's efforts to use the EPA to regulate power plant emissions (Weisman, 2014).

While a wealth of research explores the factors governing variation in support for renewable energy directly and various policy instruments to promote it (inter alia, Firestone and Kempton, 2007; Greenberg, 2009; Klick and Smith, 2010; Delshad et al., 2010; Cacciatore et al., 2012; Truelove, 2012), virtually no scholarship exists on the factors influencing support for the PTC and its extension. Public polling data on the PTC is also all but non-existent. A search of the comprehensive holdings of the Roper Public Opinion Archives did not reveal a single question querying public support for the PTC and its extension.

To address this lacuna we use a nationally representative U.S. internet survey to examine public support for the PTC. We break new theoretical ground by examining whether support for the PTC is influenced by Americans' differential exposure to the externalities of coal-generated electricity. We further investigate whether any relationship between distance from coal-fired power plants and support for the extension of the PTC is moderated by an experimental manipulation administered to half of our sample specifically mentioning the adverse health effects of air pollution from coal-fired plants.

2. Hypotheses

Previous research on proximity and support for renewable energy has conceptualized the opinion formation process as a cost-benefit calculation (for an overview and critique, see Wolsink, 2000). The benefits of renewable energy, low or zero emission electricity generation, are essentially a public good. By contrast, the costs of renewable energy generation are concentrated on those who live in close proximity to the generation facility. As a result, support for renewable energy should be high in the abstract, but significantly lower among those close to a renewable facility who will pay its costs most directly. Instead of examining who pays the costs of renewable energy generation, we focus more intently on who stands to benefit the most from renewable energy. While all may benefit from renewable energy production, the benefits may be more intense for some citizens than for others.

In our current fossil fuel driven economy, those living in closest proximity to coal power plants pay a disproportionate share of the costs for obtaining cheap energy from conventional sources that produce more pollution. These individuals are more likely to benefit from increased energy production from renewable sources with fewer detrimental externalities. As a result, we hypothesize that Americans living near coal-fired power plants should be more likely, *ceteris paribus*, to support the extension of the PTC, which imposes costs broadly on all taxpayers to decrease the nation's dependence on fossil fuels for electricity generation. By extension, as distance from a coal burning plant increases, local exposure to the externalities of coal lessens, and support for the PTC should wane.

We further hypothesize that priming individuals to think about the public health ramifications of generating electricity from fossil fuels will strengthen the relationship between proximity to a coal plant and support for the PTC. Raising the salience of the health consequences of burning fossil fuels could conceivably increase support for renewable energy among the population as a whole. However, it should also heighten the importance of proximity, increasing the probability that those who live close to coal-fired power plants will think about the localized health consequences of

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