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The influence of extractive activities on public support for renewable energy policy

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ABSTRACT

Notable spatial variation in public opinion on climate change and energy policy has been demonstrated at various geographic scales (Howe et al., 2015). Understanding the source of this variation is useful for policy-makers, energy developers, and utility providers in predicting how different locales may respond to newly proposed policies and energy developments, particularly those encouraging renewable energy. Using nationally representative survey data from 2008 to 2015, we employ hierarchical linear regression to examine variation in public support for renewable energy policy, focusing on how residence in areas with extractive activities may be related to attitudes toward renewable energy policy. We test the influence of several county-level indicators, including oil production, gas production, and economic dependence on the mining sector. We also test for individual factors, including political ideology, belief in anthropogenic climate change, and several socio-demographic variables. Results suggest that individuals living in both mining-dependent counties and counties with natural gas production are somewhat less likely to support renewable energy policies than individuals living outside such places. At the individual level, belief in anthropogenic global warming is the strongest predictor of renewable energy policy support, and liberal political ideology, being more educated, and being female are also positively associated with policy support.

1. Introduction

Renewable energy technologies such as solar photovoltaic cells and wind turbines have been deployed at a rapid rate across the United States in the last fifteen years. The installed capacity of utility-scale wind energy – currently the largest renewable energy source – has grown rapidly, from 2539 MW at the end of 2000–89,077 MW by the end of the third quarter of 2017 – a 3395% growth over seventeen years (AWEA, 2017). Solar energy has also grown rapidly – including both utility-scale and rooftop solar, and solar energy installed capacity in the US was 49,300 MW at the end of 2017 (SEIA, 2017). Such rapid deployment has meant that an increasing proportion of the public is now aware of renewable energy systems. The construction of these new industrial facilities upon the landscape has spurred a variety of public reactions, both positive and negative, and opposed citizens can influence whether or not renewable facilities are permitted and built (Ogilvie and Roots, 2015).

There are many factors – social, political, physical, economic, technological – that drive or constrain the transition to a cleaner energy economy, but the role of both policy and the political environment are vital (Edenhofer et al., 2011). Governments can incentivize renewable energy investments, manufacturing, and construction through various policy tools. They can create space for renewable energy in the market by setting pollution standards and penalties for fossil fuels energy production. The use of policy tools to encourage the growth of renewable energy, however, is a political choice made by elected officials, whom all have constituents they must answer to. The politics of energy policy can thus become polarized amongst both political leaders and in the general public based on ideological stances regarding the right of the government to 'intervene' in the free market, for example by incentivizing one energy source over another through subsidies, as well as the decades old 'jobs v. the environment' debate in which regulation of polluting energy sources is portrayed as an attack on blue-collar Americans.

Much of the research seeking to understand the factors related to social opposition or support for renewable energy technologies and policy has occurred through community-scale studies and comparative case study analysis. Less work has been done at larger scales to identify

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broad, generalizable patterns that could help policymakers and developers understand the factors that influence public support for renewable energy. Understanding these dynamics is critically important, perhaps now more than ever given Americans' increasing political divisions over environmental and energy issues (Brulle et al., 2012). It is also an important piece of the larger national debate over regulation of carbon-intensive energy production, which took a turn with the 2017 inauguration of a Republican president and a Republican-controlled Congress.

This paper examines the predictive strength of several individual-level characteristics in understanding public support for renewable energy policy, as well as one group-level characteristic: the influence of living in a county with extractive activities. Local reliance on extractive industries has been shown to help predict public support for different energy sources (Boudet, 2011; Boudet et al., 2016; Bell and York, 2010; Forsyth et al., 2007; Freudenburg and Gramling, 1994; McAdam and Boudet, 2012), but less is known about whether this dynamic is at play regarding public opinion of renewable energies and policies. As such, the present research examines the following two research questions: 1) Does local presence of extractive industry activities influence public opinion about renewable energy policy? 2) What individual-level factors help predict public support for renewable energy policy?

2. Literature review

2.1. Renewable energy policy and politics in the United States

In the United States, renewable energy policy is characterized by uncertainty, contention, and fragmentation, which has stunted investments in renewable technologies (Barradale, 2010; Busby, 2008; Elliot, 2013; Ernst, 2013; Hess, 2016; Shrimali et al., 2015). Political polarization is high over environmental issues like climate change (Brulle et al., 2012), and this extends to the debate over regulation of carbon-intensive electricity sources, such as coal. The debate between political party leaders over emerging clean energy technologies has become increasingly divisive in recent years. For example, pointing to the current political polarization over the Production Tax Credit (PTC), a policy encouraging development of wind energy, Goldfarb and colleagues (2016) note that this has not always been the case. In fact, the PTC was a bipartisan issue in the 1990s, but became increasingly polarized in the 2000s. The chance to renew the PTC for a five-year period arose before the Senate in 2015. Forty-four Democrats were in favor with only one opposing the renewal, however, only three Republicans were in favor with fifty opposed. Such political polarization regarding energy policy amongst leaders and elites has also been shown to increase polarization amongst the public (Bolsen and Cook, 2008).

The United States has no federal mandate requiring increased deployment of renewable energy. Rather, the US has relied on federal tax incentives, grants, and state-level policies to encourage renewables development (Gan et al., 2007; Komor, 2004; Menz, 2005). Two of the most important federal policies supporting the development of renewable energy are two tax credit policies, the Production Tax Credit (PTC) and the Investment Tax Credit (ITC). The PTC provides a $0.023/kWh corporate tax credit to developers of wind, geothermal, and biomass electricity generating facilities, applicable for the first ten years of production. The ITC, by contrast, offers a 30% tax credit for individual purchasers of solar systems on residential and commercial properties. Originally enacted in 1992, the PTC is in a phase-down process set to end in 2019. The ITC is enacted through 2023.

State-level renewable energy portfolio standards (RPS) are another important policy tool encouraging the growth of renewable energy. These policies are enacted by states and mandate that a certain percentage of electricity sold in that state by electric utilities be produced from renewable energy sources. Currently, 29 U.S. states and the District of Columbia have RPS mandates, and seven states have non-binding "goals." The specific renewable energy target for electricity production varies widely by state, from ten percent in Wisconsin to thirty-three percent in California (Barbose, 2013), and recent efforts to increase RPS laws in some states have been met with fierce opposition from both policymakers and industry groups.

A third avenue for supporting renewable energy is federal investment in renewable energy research and development. Federal funding for renewable energy research and development increased significantly under the Obama administration, though public support for such investments was negatively affected by the 'Solyndra debacle' of 2011, in which solar panel manufacturer Solyndra filed for bankruptcy and defaulted on a $500 million federal loan from the US government (Bishop, 2014; Carlisle et al., 2015).

The use of policy and funding tools such as these depends greatly on the issue priorities of presidential administrations, which can vary widely. Even if a president is motivated by environmental concerns, political contention and 'veto players' (Bayulgen and Ladewig, 2016) can delay or halt the continuation of policies and the passage of legislation that would encourage more rapid growth of renewable energy. An example of this was President Obama's Clean Energy and Security Act of 2009, which would have established a carbon cap and trade system and further spurred the transition to a clean energy economy. The bill was approved by the House of Representatives, but was never brought to the Senate floor for a vote. Even when the executive branch of government tries to bypass the legislative branch, certain interests and powerful players can halt progress. This was the case with President Obama's Clean Power Plan, which aimed to reduce carbon dioxide emissions by about one-third by 2030 through growth in renewable energy deployment and regulation of existing power plants. In February 2016, the Supreme Court halted legal enforcement of the plan. Conservative party leaders and industry vigorously denounced the plan based on concerns about the economic effects and job losses – Senate Minority Leader Mitch McConnell called it "a dagger in the heart of the American middle class" (Condon, 2016).

2.2. Public opinion on renewable energy technologies and policy

Researchers analyzing general public opinion of renewable energy have found widespread support (Greenberg, 2009; Klick and Smith, 2010; Leiserowitz et al., 2017; Nisbet and Myers, 2007; Stoutenborough et al., 2015a; Truelove, 2012). However, a "social gap" exists in public views on renewable energy, and public support for renewable energy in the abstract is often complicated by community opposition to proposals for nearby construction of renewable energy facilities (e.g. Bell et al., 2013, 2005).[1] As such, the majority of research is focused on opposition or support at the local level (Bell et al., 2013; Kontogianni et al., 2014). Utility-scale renewable energy systems are highly visible, cover large areas of land, and may pose threats to citizens' local place attachment, place meanings, and place-based identities (Devine-Wright, 2009, 2011; Jacquet and Stedman, 2013). Indeed, much of the research examining local opposition to renewable energy development has found evidence suggesting opposition commonly arises from aesthetic and place-based concerns (Devine-Wright, 2011; Phadke, 2011), feelings that local community autonomy is trammeled by outside interests (Bohn and Lant, 2009; Haggett, 2011; Leitch, 2010; Pasqualetti, 2011), and concerns about distribution of the benefits and burdens of large-scale renewable systems (García et al., 2016; Haggerty et al., 2014; Ottinger, 2013).

Less research has examined why public opposition may occur at the more general, abstract level in terms of citizens' energy and policy

[1] The effect of proximity on local individuals' support for renewable energy facilities is mixed in the literature, with some studies indicating a negative association between support and closeness, other studies finding a positive association, and still others finding no association at all (see for example Jacquet, 2012; Krause et al., 2016; Olson-Hazboun et al., 2016).