



Original research article

Green Priorities: How economic frames affect perceptions of renewable energy in the United States

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ABSTRACT

This study focuses on the power of economic frames in shaping public perceptions on renewable energy. We use panel survey with embedded experimental treatments that randomly assign different economic frames for the costs and benefits of renewable energy. We find that economic frames affect how people think about renewable energy and framing renewable energy policies in terms of costs, i.e. high electricity bills, has more impact on attitudes than framing it in terms of economic benefits. Positive frames in which renewable energy is linked to greater job creation and economic development are less effective. We theorize this asymmetrical framing effect may be happening because individuals evaluate the direct economic costs to themselves to be more important than broad, dispersed economic benefits to society. It may also be because people generally have more information about the benefits of renewable energy but less so about the personal economic costs. When exposed to information that renewable energy might be directly costly to them, individuals react to the negative treatment more. There has been relatively little systematic experimental research on renewable energy attitudes and as such our study makes an important contribution to the literature by examining the relative effectiveness of economic cost and benefit frames on public opinion toward different dimensions of renewable energy. Our findings may also inform policymaking by emphasizing the power of couching renewable energy in ways that individuals can connect with directly and on a personal level.

1. Introduction

There is growing consensus among scientists and policymakers that the world needs to transition from using fossil fuels as a primary source of energy to using more renewables. A key element in this transition to clean energy is public acceptance and support. Governments and companies need the commitment of large swaths of the public as they make difficult decisions about how much to spend, where to site the renewable projects, how much cost to pass on to consumers, how and

what kind of regulations to design, etc. Survey after survey in most countries in the West show that there is a high degree of acceptance of renewable energy sources with approval ratings well above 80% [1].¹ Yet, despite such broad public opinion favoring renewables, the actual implementation of renewable energy projects and the consumption of renewables by large fractions of the populations are still limited.² Even in states and localities where strong public support has led to pro-renewable policies, there are changes in attitudes over time and in some cases a reversal of policies favorable to renewable energy.³

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¹ Specifically, in the EU on average 90% of the population perceive an increase of renewables in the energy mix to be important [2]. In the US, 83% of Americans say increasing the use of renewable energy sources is a top or important priority for the country's energy policies [3], with many indicating strong support for alternative energy sources such as solar power [4].

² For example, in 2014 the share of renewables in overall consumption was 7.29% in UK, 8.91% in the US, 13.38% in Germany, and 5.53% in Japan [5]. Even beyond basic consumption levels, there are countless accounts of strong local opposition in communities across the world that feel severely limited in their quality of life by renewable technology systems installed nearby [6–8].

³ For instance, there are many proposals to end once-popular net metering, a process in which solar energy owners and producers can be credited for adding electricity back to the grid. Legislation has been proposed to end net metering in Indiana, Missouri, and Connecticut. Other legislation has aimed to roll back statewide clean energy targets in North Carolina, New Hampshire, and Ohio. There was also a bill to outlaw utility-scale wind and solar in Wyoming, and a measure seeking a two-year moratorium on new wind projects in North Dakota. For more details, see <https://insideclimatenews.org/news/24032017/renewable-energy-clean-energy-solar-wind-power-states-climate-change>.

Demographic characteristics, entrenched value and belief systems, and contextual factors such as type of technology or ownership structure shape public opinion but they cannot explain much of the volatility of public support for renewables. It seems that most people exhibit conditional support for these new technologies based on the changing perceptions of their costs and benefits. The fast pace of technological changes in this sector, the complexities of integrating these unconventional sources of energy to the existing infrastructure, and the general lack of prior experience with these technologies (and policies) make it difficult for consumers to make these cost and benefit calculations on their own. As a result, they typically defer to others (media and/or politicians and policymakers) and accept their framing of the issues. As with many other controversial public policies, renewables have their own advocates and opponents who offer multiple competing frames that draw attention to different aspects of renewable energy. In this context, the question of which frames are effective in changing which aspects of public opinion becomes critical in assessing the success of energy transitions and is the subject of this study.

We specifically focus on the effectiveness of *economic* frames given the extents to which rhetoric about renewable energy transitions and policies are increasingly being couched in economic terms. For example, opponents of initiatives to advance solar energy have in recent years attacked net metering bills for creating “free riders” and wasting government resources. Proponents of coal have framed environmental policies as being part of a “war on coal” and blamed efforts to expand renewables as costing jobs and hurting various sectors of the American economy [9]. Recent climate campaigns by conservative think tanks or business interest groups have also increasingly framed rhetoric in the context of the costs that consumers face [10]. In other circumstances, citizens’ concerns with unemployment, tax rates, or pocketbook issues such as electricity bills/personal expenses have affected support for social policy, political candidates, or attitudes towards climate change [58,11–13]. Meanwhile supporters of renewables – even environmental groups – are increasingly underscoring the economic benefits of renewables in terms of the jobs created, and the spillover economic development effects on local communities in the form of health care and environmental cleanup costs that are avoided.

We are furthermore interested in comparing the effectiveness of *positive* and *negative* economic frames in changing public opinion on renewable energy. We ask three questions: first, when renewable energy is framed as involving a high economic cost, are people’s attitudes likely to change negatively? Second, if renewable energy is framed positively in terms of increased jobs and economic growth, do their attitudes become more positive? Third, what aspects of people’s beliefs or perceptions of renewable energy are most sensitive to this tradeoff? We answer these through a panel survey with embedded experimental treatments that randomly assign different economic frames for the costs and benefits of renewable energy.

Our study finds that economic frames are powerful in that they affect how people think about renewable energy. It demonstrates that people assess the reliability and policy significance of renewable energy through the prism of economic wellbeing. We also find that framing renewable energy policies in terms of costs, i.e. high electricity bills, has more impact on attitudes towards renewable energy than framing it in terms of economic benefits. Positive frames in which renewable energy is linked to greater job creation and economic development are less effective. We theorize that this asymmetrical framing effect may be happening because individuals evaluate the direct economic costs to themselves to be more important than broad, dispersed economic benefits to society. It may also be because people (especially our sampled group) generally have more information about the benefits of renewable energy but less so about the personal economic costs. Therefore, when exposed to this novel idea that renewable energy might be directly costly to them, they may be reacting to the negative treatment more strongly than they are to the positive treatment.

There has been relatively little systematic experimental research on

clean energy attitudes and as such our study makes an important contribution to the literature by examining the influence of economic frames and the relative effectiveness of cost and benefit emphasis frames on public opinion. We believe that our findings can also inform policymaking by emphasizing the power of couching renewable energy in ways that individuals can connect with directly and on a personal level. Considering that there is a strong correlation between public support for renewable energy and government policy [14], understanding which communication frames are the most effective can be key to getting the right policies in place to make the clean energy transition possible.

2. Background and literature review

The growing literature on energy behavior examines the influence of a handful of variables on attitudes towards renewable energy [15]. Some suggest that opposition and conflicts over energy developments are explained by differences in underlying political and environmental values and beliefs as well as emotional attachments to places [6,16–21]. Others look at socio-demographic characteristics such as age, gender and social class to understand variation in public support [22]. And yet others analyze contextual factors such as technology type and scale proposed, ownership structures, the distribution of benefits, the use of participatory approaches to public engagement and spatial proximity to sources of renewable energy to account for different levels of public acceptance [6–8,23–26].

We operate on the assumption that although there may be strong advocates and opponents of renewable energy based on demographic characteristics and entrenched value and belief systems, most people exhibit conditional support for these new technologies based on their anticipated effects. Given the complexity of issues at hand and the fact that these energy sources are relatively new and not yet completely entrenched in a clear political and ideological camp, public opinion on renewable energy does not diverge substantially across partisan or ideological lines. In fact, studies show that in contrast to conventional energy sources, renewables are embraced by both parties in the US, albeit with varying degrees of enthusiasm [3,4,27] and that even in red states green energy laws can easily pass with broad support [28]. All this implies that a particular framing of the benefits and costs of renewable energy technologies by the media, politicians or policymakers might be very effective in changing how people think about renewable energy.

A frame is a central organizing story that provides meaning to particular events or information. A major premise of framing theory is that an issue can be viewed from a variety of perspectives. Entman ([29], p. 52) argues that frames “promote a particular problem definition, causal interpretation, moral evaluation and treatment recommendation for the item described.” Framing effects “occur when (often small) changes in the presentation of an issue or an event produce (sometimes large) changes of opinion” ([30], p. 104). Through framing, people develop a particular conceptualization of an issue or they reorient their thinking about an issue [31]. As such, frames lead individuals toward specific policy positions by either making certain considerations more important than others or by changing the content of certain considerations.

Framing theory is increasingly being used to understand communication and behavior on climate change and mitigation policies. Yet, the empirical evidence on the relative effectiveness of positive (benefit) vs negative (loss) frames on climate behavior is fairly mixed and inconclusive. For instance, Davis [32] finds that loss-framed messages result in higher interest among participants and a greater intention to act in an environmentally responsible way than gain-framed messages. On the other hand, Spence and Pidgeon [33] find that gain-framed information is more effective than loss-framed information in promoting positive attitudes towards climate change mitigation because climate mitigation is conceptualized by participants as a prevention

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