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Red states, green laws: Ideology and renewable energy legislation in the United States

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ABSTRACT

We develop a novel, mixed methods approach to examine the relationship between political ideology and support for renewable energy and energy efficiency (REEE) policies. Through qualitative analysis of interviews with state-government legislators in the U.S., we show that when legislators evaluate and justify their support for and opposition to different types of renewable energy and energy efficiency (REEE) policies, they distinguish bills based on frames that are related to ideological differences (e.g., tax decreases, government efficiency, regulation, mandates, government spending). In turn the qualitative distinctions among bills are associated with quantitative differences in levels of support and success for the policies. Using data from a longitudinal analysis of 188 major state-government laws passed from 2004 to 2014 and a cross-sectional set of 709 passed and unpassed laws from 2011 to 2012, we show that REEE policies configured as mandates (e.g., renewable portfolio standards) have consistently lower levels of support than for similar REEE policies configured as tax reductions, reduction of government waste by increasing building efficiency, authorization of local government action, and regulatory reduction. Thus, via both quantitative and qualitative analysis, we show that there are important ideology-associated differences in REEE policy that point to opportunities for more successful policy design.

1. Introduction

Although there have been multiple opportunities since 1990 for the world's political leaders to develop policies that would slow or reduce greenhouse gas emissions, the resulting policy reforms to date have fallen far short of targets suggested as necessary by climate science. Such policy failures suggest that an important task of social science is to understand the conditions under which governments do and do not respond to environmental and energy problems. The politics of energy governance is now recognized as an important area of research in the social science of energy [1,2]. We argue that a better understanding of political ideology is an important resource for developing a theory of environmental-energy reform and for understanding the practical problem of crafting policy to increase its likelihood of gaining broad political support.

This study focuses on the U.S., where ideological differences with respect to energy policy are currently pronounced. Because the U.S. is a continental country with widespread variation at the state government level on this issue, the scope of the analysis is similar to other "international" studies, such as comparisons across European countries. An important dimension of this variation in the U.S. is the difference between "red" (or conservative) and "blue" (or progressive, also described as "liberal") states and state legislators. These differences refer to a range of issues, but one of the central divisions involves ideological disagreements over the proper role of government intervention in the economy.

These differences have international implications, not only because of the influence of the U.S. globally but also because of the importance of similar ideological divisions in other countries. Fundamental political differences have increasingly affected energy policy aimed at greenhouse gas reduction, especially in the Anglophone world such as Australia and Canada [3]. More broadly, neoliberal ideology is now influential across a wide range of countries, where market-oriented preferences can be used to justify inaction on decarbonization policies.

We argue that attention to the specific connections between ideology and types of renewable energy and energy efficiency (REEE) legislation can provide insights into the problem of understanding the politics that underline energy policy [1]. Specifically,

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we examine how various frames associated with conservative ideology—e.g., support for tax cuts and deregulation, opposition to government mandates and cost increases, and support for business development—are both explicit points of reference in the discourse of state legislators and are quantitatively associated with differential support for REEE laws in state legislatures.

Although the focus of this study is on REEE legislation in state governments in the U.S., we use this specific research problem to develop a broader contribution to the analysis of the political conditions of environmental and energy reform. In terms of the 75 research questions outlined by Sovacool [1] as central for the energy research and social science field, we utilize a mixed-methods approach (questions 1–5) that enables an analysis of ideology and framing (questions 5–10) to develop a better understanding of the underlying principles of energy governance (question 56).

2. Theoretical and policy background: ideology and the sociology of environmental reform

2.1. Theoretical background

This study contributes to the interdisciplinary field of the social science of energy policy with a focus on environmental sociology. The sociology of environmental and energy reform can be divided into the study of the conditions that shape changes in policy and practices (e.g., [4]) and the evaluation of the effectiveness of such changes in ameliorating environmental and social problems (e.g., [5,6]). Although the focus of this project is on the first of the two areas (the conditions that affect reform), we assume that research in the second problem area shows that policy reforms are often less effective at solving environmental problems than originally envisioned [7].

Previous research has documented several clusters of important conditions that affect the opportunities for reform, among them the role of interests, such as the mobilization of social movements [8,9] and the extent to which industries are divided and accustomed to regulatory intervention [10]; and the role of institutions, such as diffusion dynamics and institutional isomorphism, including for renewable portfolio standards [11,12], and variance in government structure, such as the strength of the executive appointment powers over government agencies [13]. Our focus is on another important factor: the role of ideology, which is frequently a strong or even the strongest predictor of attitudes and outcomes related to environmental issues. Ideology has been linked to the perception of threat to catastrophic change [14], attitudes toward government spending on environmental protection [15], and REEE policy adoption [11,16–18].

Our contribution to this literature is to examine variation in the level of support across REEE policy types from the perspective of ideology. Unlike some of the studies in political science and policy, we do not treat ideology as a single variable (such as a measure of citizen ideology) and then use it in a multivariate model to predict policy adoption. Instead, we are interested in how policy design distinctions are related to meaningful ideological distinctions that in turn inform how legislators view, evaluate, and support different types of REEE policy. Recent research has shown that political differences over environmental policy vary across issue type and may fluctuate over time [19], and in a study of the California legislature it was shown that differences between types of green-energy laws are related to ideological differences [20]. However, to date no research has explored the connection between ideology and REEE policy type in a systematic way across a broad range of REEE policies.

The concept "political ideology" is understood here as a broad system of models of and for action that informs both political attitudes and policy adoption and implementation [21]. An ideology becomes meaningful through its contrastive relationship with other ideologies. In the U.S. and many other advanced industrial countries, the primary ideological opposition is between "conservatism," which prefers market-based policy instruments when necessary and low government regulation of markets where possible, and "liberalism," which focuses on the role of government in remedying market imperfections related to inequality, unemployment, environmental destruction, health, and safety. Other ideologies are important in some circumstances (such as developmentalism and socialism), but our focus here will be on the right-left contrast that is described in the U.S. as conservative versus liberal ideology. As we will show in the qualitative analysis, these conflicts are often explicit points of reference in debates over the proper role of government with respect to markets and energy reform.

Unlike an approach to ideology that keeps in it a "black box" as either a binary variable of conservative versus liberal or as a continuous variable, we develop a more fine-grained approach to the study of ideology and legislation by using the concept of frames that can be attached to policy differences. Frames are related to ideology as "innovative amplifications and extensions of, or antidotes to, existing ideologies or components of them" [22,23], but frames also serve as meta-communicative signals to allow actors to understand what "game" they are in, such as cooperation versus conflict [24]. Thus, we treat ideology as a broad system of meaning (e.g., conservatism) that includes a variety of frames (e.g., reduce government spending, reduce regulation, cut taxes) that actors use to evaluate and negotiate policy proposals. In turn, the use of frames and ideologies is part of a strategic political process of producing coalitions among actors in order to affect political outcomes [25,26]. Articulating a frame is a social process that requires amplification and communication, as our interviews of state legislators show.

To develop this approach of the analysis of ideologies, frames, and policy types, we use a mixed-methods approach. This strategy allows us to show how legislators draw on and articulate the frames as they evaluate, criticize, or defend bills. It also allows us to develop hypotheses about potential differences in the level of support within the REEE policy field across different policy designs. This approach has the benefit of providing a novel theoretical contribution to the analysis of ideology and policy outcomes and of offering potential practical insight into the problem of building broad political support for REEE legislation.

2.2. Ideology and conflict in the REEE policy field

There is a documented tendency for attitudes toward environmental policy to become more polarized in the U.S. especially after 1990 [15]. In turn, the polarization on environmental policies is part of a broader political polarization on a range of issues [27,28]. In addition to issue polarization, there is also a trend for both houses of a state legislature to be controlled increasingly by one party [29]. This party polarization became especially pronounced after the 2014 elections, when the number of partisan state legislatures controlled by Republicans reached 68 out of 98, the highest level in the party's history [30]. In 24 states Republicans controlled both houses of the legislature and the governor's office, whereas Democrats had complete control of the three bodies in only six states [30]. The increasing control of legislatures by Republicans, and the influence of the conservative "Tea Party" wing within that party, has coincided with issue polarization in the legislatures with respect to REEE.

At the state government level, by 2015 the conservative American Legislative Exchange Council included about one-quarter of state legislators among its members [31]. ALEC has worked with state legislators to reverse central REEE policies such as renewable

energy and energy efficiency portfolio standards (REEPS) and net metering. A report on state government legislation in 2013 indicated that 26 of 121 bills for REEPS called for their roll-back, and the report attributed the support for roll-backs to ALEC-inspired legislation [32]. In some cases modifications of the standards also weakened support for solar and wind energy, for example by adding large hydropower in Connecticut (SB 1138, 2013) or waste heat in Ohio (SB 315, 2012).[1]

Although state legislatures rejected many of the attempts to roll-back or weaken REEE laws, there are several examples of successful roll-backs. In 2008 the Ohio legislature approved a sweeping law in support of REEE policies (SB 221) with strong bipartisan support, but in 2014 the new legislature approved a law to freeze the state's alternative portfolio standard (SB 310) with sharply divided votes. Similar reversals occurred in other states, including Kansas, North Carolina, and West Virginia. Furthermore, state legislatures and governors have also restricted previous efforts to require environmental certification of public building construction and renovation (usually to protect local timber and plastic industries), and they have also allowed utilities to weaken net metering programs by charging additional fees.

In this context, a simplistic analysis would be to portray the conflicts over REEE in state governments as follows: conservatives, mainly on the right wing of the Republican Party, oppose all REEE policies and are following cues from the utilities and fossil-fuel industries; whereas liberals on the left wing of Democratic Party support all REEE policies, including those that involve strong government mandates, and support a position in line with environmentalists. This formula provides a rough map of American politics with respect to REEE policy especially since the election of President Obama in 2008, but in this study we develop a more nuanced portrayal of the relations between conservative and liberal ideology in the REEE policy field.

To provide one example of how the political landscape for REEE legislation may be more complicated than a simple party polarization model would predict, Table 1 shows examples of REEE laws approved in 2013 and 2014 in all-Republican state legislatures as recorded in the Advanced Energy Legislation Tracker of the Center for the New Energy Economy of Colorado State University (for all states with Republican control of the legislature, $N = 24$). This "red states, green laws" phenomenon suggests the need for a nuanced analysis of support for, and opposition to, REEE policy. As a starting point, we note the absence of any laws supportive of REEPS and carbon emissions trading; thus, there is prima facie evidence that some types of laws have become non-starters in Republican-controlled states, but opportunities still exist for other types of REEE laws that can appeal to conservatives of both parties and to Republican-dominated state legislatures. This study will map out what those opportunities are.

2.3. Hypotheses

We argue that although there is powerful opposition to broad policy reforms that would hasten a transition toward greater reliance on REEE, it is possible to design policy in a way that reduces the potential for legislative bills to trigger frames connected to fundamental ideological disagreements. We therefore test the proposition that REEE bills can be classified in terms of frames that are linked to ideology and that these differences are related to differences in the level of support for the bills in state legislatures.

The background analysis suggests that REEPS laws have become very controversial in several states and that ALEC has targeted them for reversal. These bills are portrayed as contrary to conservative values because they impose government mandates on the economy and because they may result in extra cost burdens on residential and business ratepayers. Therefore, our foundation hypothesis is the following:

Hypothesis 1. Bills that involve the creation of a new REEPS, the expansion of the REEPS, or the additional of a solar carve-out to the REEPS will receive the lowest level of support among REEE legislation types.

We also note from Table 1 that some types of REEE legislation have remained relatively well supported even in conservative states that are dominated by Republican legislatures. These include laws that mandate efficiency standards for government buildings, which eliminate wasteful government spending, a concern of conservatives; and laws that provide tax credits for solar energy and other renewable energy, because the laws involve tax reductions. We also hypothesize that REEPS goals (as opposed to mandates) will be less controversial to conservatives because they are not mandates [12,20].

Hypothesis 2. Bills that support government building efficiency, enact solar tax credits, or provide for voluntary REEE goals will receive a relatively higher level of support from legislators in comparison with REEPS laws.

We also expect that property-assessed clean energy (PACE) laws will appear to be consistent with conservative values because they do not involve government spending. Instead, they authorize bond issues to enable businesses and homes to purchase solar energy and energy efficiency improvements. However, they do involve an expansion of the role of government into the financing arena, so they could become controversial to conservatives. Likewise, net metering appears to be consistent with the conservative frames of enabling private enterprise and consumer choice, but utilities have increasingly argued that net metering results in undue burdens on their revenue streams and causes transfers from other customers to net metering customers. We hypothesize that these laws will receive higher level of support than the REEPS laws. However, we have broken these two law types out as a separate hypothesis because we think the case is less clear-cut that they will be more highly supported.

Hypothesis 3. Net metering and PACE laws will receive relatively higher level of support from legislators in comparison with REEPS laws.

Finally, in the cross-section data set we had a residual series of categories that did not match the primary REEE law types indicated in hypotheses 1–3. Thus, we added another hypothesis about additional categories of laws that support REEE but do not support a particular type of technology or policy instrument. Because conservatives are concerned with reducing regulatory burdens on households and businesses, we reason that the reduction of regulations may receive relatively higher levels of support than REEPS laws [20]. Likewise, bills that merely authorize a local government entity to engage in an activity (such as providing licenses for solar contractors) would not involve government spending or interventions in the private sector and therefore might receive higher levels of support in comparison with REEPS laws.

Hypothesis 4. REEE laws that reduce regulatory burdens for the private sector and households or that authorize government

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[1] Laws are referenced by year, bill number, and house (SB of SF for senate bill or file and HB, HF, or AB for house bill or file or assembly bill). In most cases it is possible to use this information to find details about the bill at the state legislature's web site.

Table 1
"Green Energy" Laws in states with Republican Legislatures, 2013–2014.

Law type	State	Year	Bill	Summary	House vote	Senate vote
Building efficiency						
	FL	2013	SB 1594	Municipalities, schools can enter performance-based contracts for RE and EE	117–0	38–0
	MS	2013	H 1266	Newly constructed state buildings meet or exceed ASHRAE standards	118–0	53–0
	MS	2013	HB 1281	Requires ASHRAE standards for commercial buildings	115–2	53–0
	MS	2013	H 1296	State energy plan with energy efficiency goals	116–0	53–0
	MS	2014	SB 2521	Authorizes public entities to enter performance-based contracts for RE and EE	122–0	52–0
	PA	2014	HB 1672	Authorizes state agencies to test technologies to increase EE	176–16	50–0
	TN	2013	HB 794	Creates EE schools council	93–0	32–0
	TN	2013	HB 1268	Efficiency goals for state buildings	90–0	23–0
	TX	2013	SB 533	Improves review process for EE contracts for higher education and government buildings	150–0	30–0
	UT	2013	202,310	International energy code for buildings	74–0	24–0
Net metering						
	AR	2013	HB 2019	Allows up to four months of net excess generation to carry over at the close of year	91–0	34–0
	SC	2014	SB 1189	General solar support, long-term shift to value of solar tariff	105–0	37–0
	VA	2013	HB 1695	Net metering added for agricultural customers	94–3	40–0
PACE						
	AR	2013	SB 640	PACE authorization but not for local governments	51–13	30–5
	TX	2013	SB 385	PACE authorization implementation	133–14	30–0
	UT	2013	SB 221	PACE authorization	70–3	25–0
Tax credits						
	FL	2013	HB 277	Property tax exemption for solar installation	119–0	39–0
	NE	2013	LB 104	Tax break for wind farm components	38–2	NA
	OK	2013	SB 343	Extends tax credit for coal and large renewable energy	57–29	29–10
	SC	2013	HB 3644	Clean energy tax incentives	78–18	34–7
	UT	2013	HB 176	Incentives for renewable energy and energy efficiency upgrades	68–3	23–0
	VA	2014	SB 409	Expands solar credit from thermal to electric	90–9	40–0

actions will receive higher levels of support in comparison with REEPS laws.

3. Methods and analytic strategy

3.1. Overview of the three analyses

The research that follows is based on three analyses that approach the relationship of ideology and variation in levels of support for types of REEE bills from three different but complementary angles. In all three cases the unit of analysis is the REEE bill (if passed, the REEE law).

1. A qualitative analysis based on 14 semi-structured interviews with legislators and aides that examines their perspectives on the different types of REEE laws with respect to conservative and liberal ideology.
2. A longitudinal, quantitative data base of different REEE bill types that includes the percent "yes" vote in the lower house of the state legislatures. This is based on a unique data set of 188 passed laws for the years 2004–2015 for all 50 state legislatures.
3. A cross-sectional, quantitative data base of different REEE bill types that includes both the percent "yes" vote in the lower house and also failed bills. This is based on a unique data set of 709 laws and unpassed bills in a stratified sample of 16 states for the 2011 and 2012 sessions of state governments.

By using three approaches to the problem of ideology and variation in support for different types of REEE bills and laws, we are able to show convergence across the methods and to develop a robust, mixed-methods analysis of the underlying research question about the importance of ideology in affecting levels of support for different types of REEE laws.

Although the studies cited in the literature review suggest that ideology is an important factor in determining the odds of adoption of a REEE bill, our analysis is not designed to evaluate the claim that ideology is the most important factor in gaining greater or lesser support for a REEE bill or for the fate of a bill as passed or failed.

We do not attempt to predict the odds of adoption of a bill and the role of ideology in comparison with other factors. Rather, we are focused on average levels of support for different types of REEE bills and how those differences in levels of support vary in predictable ways that are associated with ideology.

3.2. Description of the three data sets

We use three unique data sets that are the result of over 1500 h of data gathering. Identifying the laws requires long and tedious searches through state government databases followed by reading and analyzing legislative history for each law. Moreover, the interviews are the result of approximately four months of tracking down state legislators.

The first data set is based on the semi-structured interviews with state legislators or their aides. We selected both Republican and Democratic legislators who had recently sponsored REEE laws. Selections were made to gain a balance of Democrats and Republicans from different parts of the country. This data set involves 14 interviews of 30 to 190 min with seven Democratic and seven Republican legislators from nine different states selected from all four regions of the country. Five states had complete Republican control of the legislature, and the other four were either Democrat controlled or mixed.

The second data set, for the longitudinal analysis, is for the 11-year period from 2004 to 2014. We chose this period because it covers rising and declining state-level legislative activity for REEE and because it covers a period of both Republican (2004–2008) and Democratic (2009–2014) presidential administrations. During this period there was ongoing gridlock in the federal government, and consequently attention for this policy issue has tended to focus on state governments.

The third data set, for the cross-sectional analysis, is based on a stratified sample of 16 state legislatures from the 2011–2012 sessions. We chose this time period because it is the most recent for which we had complete data at the time when we began analysis; it is also of historic interest because it is the first complete session that occurred after the mobilization in 2010 to defeat the

Table 2
States sampled for the cross-sectional analysis.

Region	State	Population, 2010	House 2011–12	Senate2011–12	Governor2011–2013
Midwest	IA	3,090,416	Dem	Rep	Rep
	IL	12,882,135	Dem	Dem	Dem
	MN	5,420,380	Rep	Rep	Dem
	OH	11,536,504	Rep	Rep	Rep
Northeast	CT	3,596,080	Dem	Dem	Dem
	MA	6,692,824	Dem	Dem	Dem
	MD	5,928,814	Dem	Dem	Dem
	NY	19,378,102	Rep	Dem	Dem
South	FL	18,801,310	Rep	Rep	Rep
	NC	9,848,060	Rep	Rep	Dem
	TX	25,145,561	Rep	Rep	Rep
	VA	8,260,405	Dem	Rep	Rep
West	CA	33,871,648	Dem	Dem	Dem
	CO	5,268,367	Dem	Rep	Dem
	OR	3,930,065	Dem	Tie	Dem
	WA	6,971,406	Dem	Dem	Dem
		180,662,077(58.5%)			

national cap-and-trade legislation. By this time there was considerable opposition to REEE policy in state legislatures, especially for new or additional REEPS measures. The selection of states was stratified to balance regions and political party dominance. The sample represents over half of the country's population. (See Table 2.) The states were selected so that four were from each region of the four main regions of the country. States were also selected so that there was a mixture of party control over the legislatures (some completely controlled by Democrats, some by Republicans, and some mixed). Before settling on the 16 states, we rejected some states from the sample where there were few laws passed or where vote records were unavailable.

3.3. Analytical strategy for the first data set (semi-structured interviews)

Qualitative analysis is used to show that the connections between ideology and law type are actually salient as cultural models in the minds of state legislators. The interview began with a discussion of the recently passed or failed law and the issue of bipartisan support, then it moved to a discussion about how the legislator viewed the likelihood of gaining support for different types of REEE laws, with categories used for bill types that follow the three hypotheses. As the legislators discussed laws, we asked for reasons, and these prompts usually led to the articulation of frames that were connected with ideology. We also asked questions about which interest groups played the most influential role in affecting policies. Although the data analysis for this section does not specifically test the hypotheses, the analysis provides evidence that ideological differences are salient in the contrasts among the types of bills.

3.4. Analytical strategy for the second data set (longitudinal analysis)

The longitudinal analysis examined laws passed in all 50 states from 2004 to 2014 that represent the most significant legislation in support of REEE during this period. Because there is no standard list of such laws, the selection process occurred by cross-checking multiple sources. We began with the Database of State Incentives for Renewables and Efficiency, then added all major laws identified from other databases, including the Department of Energy and Environmental Protection Agency, PACE Now, the Center for Climate and Energy Solutions, the Home Performance Resource Center, the American Council for an Energy-Efficient Economy, National Conference of State Legislatures, and the Advanced Energy Legislation Tracker. Seven types of REEE laws were included, and

we included only laws that were supportive of REEE. Once laws were selected, we then found them on the state governments' legislative bill trackers and searched for details of the bill content and the legislative history.

Because this analysis was conducted prior to the third analysis, we did not include the variables for the fourth hypothesis. We included the following laws:

- REEPS (three categories): new standards, changes in standards, and solar carve-out provisions. New standards are mandates such as 20% renewable energy by 2025; changes in standards are included if they are non-trivial, such as an increase in the overall renewable portfolio standard from 10% to 25% within a designated time frame; and solar carve-out provisions are included if they are new authorizations or significant increases in existing standards.
- REEE portfolio goals are voluntary goals for utilities, and they are classified separately from REEE portfolio standards because we reasoned that if ideology played a role, there would be more support for goals than for standards.
- Government building efficiency: establishes energy efficiency standards for state and/or municipal buildings other than schools. Residences and businesses are not included.
- Net metering: establishes or alters net metering provisions, usually in a significant way such as by increasing the capacity or subscriber limit or by expanding net metering to new categories of utilities and customers.
- PACE (Property assessed clean energy) laws: first-time authorizations of residential and/or commercial buildings but not for minor changes in PACE financing or for implementation clarification.
- Solar tax or fee reduction: tax credit for solar energy generation, or limit on permitting fees, for homeowners and businesses that buy photovoltaic systems (can include solar and wind together).
- We also encountered omnibus REEE bills, which included a variety of measures. Although we do not have a specific hypothesis related to ideology for these bills, we have included them in the analysis.

For the dependent variable, we use the percent vote "yes" for the lower body of each legislature (the "house" or "assembly") rather than for the senate because in several states the senate votes were not available. The average percentage of Democrats and Republicans in the legislature across all laws was nearly balanced (56% Democrats). The state legislatures generally do not report on the vote by political party, only by individual name. Furthermore, in some states roll-call votes are not available. We did reconstruct this information for one legislative session in a Democrat-controlled

state [20], and we found that the variation in the vote came mainly from Republicans, who voted at a rate of 56% for renewable energy legislation in comparison with 98% for Democrats. Nevertheless, we recognize that there are conservatives in the Democratic Party, especially in Southern states, and that even moderates in both parties are attuned to conservative "red flags" in legislation such as increased spending and regulations. Thus, we focus on the overall vote.

Because of the relatively small size of the data set and our goal of comparing across types of legislation, we chose to use bivariate analyses for this data set.[2] As stated in the hypotheses, the bivariate analyses compare REEPS changes as the baseline against other laws because this type of law is the best example of a policy instrument that conservatives associate with government mandates and liberal ideology. We used *t*-tests for unequal variances in comparison with REEPS changes because the changes were not significantly different from new REEPS laws and because we could make comparisons with the cross-sectional data set, which had no new REEPS laws.[3]

3.5. Analytical strategy for the third data set (cross-sectional analysis)

Bills were selected based on a search using the term "energy," and searches with supplementary terms such as solar, wind, and energy efficiency were conducted to check that we did not miss bills. Bills were excluded for the following reasons: minor wording changes, minor authorizations, general bills with a small section devoted to energy issues, forms of energy other than REEE (e.g., nuclear, fossil fuels), transportation (e.g., biofuels, fuel efficiency), appliance efficiency, biofuels unless related to electricity, and opposition to REEE. In other words, this is a data set comprising the population of bills that were supportive of REEE for the electricity and building sectors in the sample of states described above. Bills were defined as passed if they passed both houses of the legislature regardless of a veto or signature by the governor. We coded both passed ($N = 158$) and unpassed ($N = 551$) bills. At some later point some of the unpassed bills might be passed in a future session, so this data set should be considered a cross-sectional snap-shot.

We attempted to maintain consistency with the categories of the longitudinal analysis, but there were some changes to the definitions of the same categories:

- REEPS change: these changes were often of a more incremental nature than in the longitudinal data set (such as adding a qualifying energy source).
- Net metering: we included feed-in tariffs and more minor provisions than in the longitudinal data set, such as incremental inclusions of new types of energy.

We also had many bills and laws that did not match the set of categories in the longitudinal data set. As a result, we added five additional categories that enabled us to capture all of the REEE bills and classify them into a category:

- Authorization: allows a government entity to undertake an action in support of REEE, usually a local government that is restricted by a state-government regulation.

- Other building efficiency: provides support for energy efficiency measures in schools, and in commercial and residential buildings, and includes miscellaneous measures to support government building efficiency (includes some tax credits for building efficiency measures).
- Other financial incentives: financial incentives other than solar tax credits and fee reductions, including tax credits for geothermal and other renewable energy; grant and loan programs for REEE; modifications in the financing of PACE programs; business incentives; and on-bill financing programs.
- Reduce regulation: facilitates REEE by reducing regulatory hurdles such as for siting and permitting.
- REEE other: requires a study, regulates REEE, establishes a commission, defines licensing requirements, or modifies greenhouse gas rules.

As Hypothesis 4 indicates, we only expected to see significant differences from REEPS bills for bills that reduce regulations or that authorize government action.

We pursued two analytical strategies. The first was similar to the strategy for the longitudinal analysis: the percent yes vote for all legislators is calculated, and the results are compared with the REEE standard changes laws in bivariate analyses. This strategy allows us to compare across the two analyses and see what level of consistency exists. In addition, a multivariate analysis was conducted using the dependent binary variable of whether or not a bill was passed. We include bipartisan bill sponsorship and state-fixed effect controls in all models. The fixed effect estimator by state is most appropriate for this dataset for at least four reasons: (1) we are interested in estimating the impact of bill characteristics which vary within states, (2) we want to correct for the bias generated by correlated unobservables at the state level, (3) the relatively small number of clusters make it challenging to apply other methods such as hierarchical linear models, and (4) the states were selected according to the stratification strategy described above. Due to the binary nature of the dependent variable, the logistic estimator is most suitable. The state-dummy variable is included in all models to control for state-level factors that might impact the outcome variable.

4. Results

4.1. First data set: interviews

The results are discussed by bill type in an order that follows hypotheses 1–3. The analysis that follows will focus on five bill types: REEPS, building efficiency, solar tax credits, net metering, and PACE laws. We did not discuss voluntary REEE goals in great detail during the interviews; they were noncontroversial except from the perspective of liberals, who thought that they were too weak or ineffective.

4.1.1. REEPS

Although we focused on views of REEPS, we also included questions on the perceptions of other mandates such as cap-and-trade or carbon taxes. In the more conservative states with Republican legislatures, especially in the South, the idea that a legislature would pass a REEPS, carbon tax (even "fees"), or cap-and-trade law is a non-starter. For example, with respect to cap-and-trade, a legislator in Arkansas (Republican) stated, "That is something the federal government might try to do, but not in this state." Likewise, a legislator from South Carolina (Democrat) commented, "Not in South Carolina. We're far off from California; that's another country," and a Republican legislator from Utah voiced similar concerns: "When it seems like government is dictating something to a busi-

ness, that is a negative here. If you do it by tax credit, or make it optional, that is okay, but mandates don't play well up here." A Mississippi Republican commented, "Generally, I prefer a market approach. I think if it is profitable to do it, somebody will do it. I don't want to put people at disadvantage, or businesses at a disadvantage." Likewise, a South Carolina Republican commented, "Business and industry are opposed to it. The cost gets passed on to the consumer, and we are not ready to mandate that." A Republican from Iowa also questioned the mandates and the problem of costs: "Energy is cheaper without the mandate. Where do you find the justification for that?" In summary, these statements pointed to the salience of two frames associated with conservative ideology: unnecessary government mandates and government interventions in the economy that create unnecessary costs for consumers and businesses.

4.1.2. Building efficiency

We expected high support for building efficiency for government buildings because of resonance with the conservative frame of cutting wasteful government spending, and several legislators indicated that it was relatively easy or at least moderately easy to gain passage for such bills. As a Democrat from South Carolina commented, "That's easy. You save money on future energy use. It's smart to do it from the initial buying of the building." Likewise, a Mississippi Republican commented, "We are all interested in cutting costs in government, and using energy efficiency to do it makes sense." However, with respect to efficiency for private sector buildings, a Republican legislator from Arkansas stated, "I think lawmakers should carefully study them, so that they aren't putting too much burden on business and industry. Because it is essentially more regulation and more cost." These comments show that the positive conservative frame of reducing wasteful government spending is important in support for building efficiency, but when building efficiency standards are applied to the private sector, the frames become negative and shift to mandates and cost burdens.

4.1.3. Solar tax credits

We expected that tax credits would generally appeal to conservatives because they resonate with the conservative frame of cutting taxes. For example, a Republican in the liberal state of Massachusetts commented, "Anything you can do to cut taxes, even tax credits, will bring a smile to the Republican caucus, and even for a lot of Democrats." Likewise, a Democrat in Florida developed a bill that prohibited local governments from increasing property taxes due to solar installations, and the Republican-controlled legislature passed it: "It sat well with the Republicans since it is less tax and that kind of thing." The interviews also revealed an additional frame that was associated with solar tax credits: business development and job creation. As the Republican legislator from Virginia commented: "If a bill creates jobs, or creates investment, that is, if it generates economic activity by reducing governmental burdens on business—a jobs bill, a red-tape cutting bill—these are far and away the most popular bills. Solar has been doing this well. They have been stressing this—the job creating aspects of solar."

Although the tax-cutting frame was evident, we found that conservative concerns with balanced budgets and government revenue tempered support for solar tax credits. For example, a Republican legislator from Arkansas indicated that tax credits were possible but only "within reason." In Virginia, a Republican legislator noted, "We are very wary of tax credits. . . We did a study and found many tax credits on the books, and they were eating away at the bottom line of the budget." A Mississippi Republican commented, "You don't want to give away all taxable income, all state revenue. But something that encourages people to be more energy efficient and seek out those energy alternatives, that is better than a mandate."

Democrats in California and Colorado also pointed to difficulties involved in changing the tax code.

4.1.4. Net metering

With respect to net metering, several legislators, both Republicans and Democrats, mentioned how difficult the issue had become due to opposition from utilities. We suggest that the frame of support for net metering based on enabling consumer choice, which resonates with conservative ideology, has tended to give way to a frame of opposition based on an unfair business burden to utilities. A Republican from Utah explained the utility perspective clearly: "There is no consideration for the capital investment by utilities and their investors for transmission lines, getting the power to your house. Utilities should get a discounted rate because they are providing the lines connecting it to your home. And it puts other ratepayers in the penalty box because their rates are going to go up, because they are paying to compensate for the person who installed solar or wind and is selling the power through net metering." Likewise, a Republican from Iowa commented, "They get full retail credit for every hour they generate. Who in their right mind would think that is close to fair?" A Democrat from Arkansas added a perspective here on the clash of frames: "It could be easy or hard. You can make a business argument for it as a do-it-for-yourself, as an independence thing. . . .and sell it that way to the Republicans. If it's not controversial, it would be easy. But if the big utilities are against it, then it would be hard."

4.1.5. PACE

We also expected to see a clash of frames for PACE laws. On the one side, the conservative frame of a limited government role in the economy led to opposition. As a Republican from Arkansas commented, "A lot of people. . .didn't like it. It's more government; it's more regulation." Likewise, in Colorado, a state with both strong liberal and conservative constituencies, the supporters of PACE had to overcome opposition from banks, which articulated the conservative frame that financing of energy improvements for buildings should be in the private sector. Supporters had to make changes to appease the banks, and they also brought in conservative businesspeople who testified in favor of the bill by noting that PACE-funded investments can help businesses hedge future energy costs. So the advocates had to frame PACE as a pro-business bill that did not disrupt the terrain of the banks. Likewise, in Utah, a very Republican state, a Republican legislator commented on how opposition to PACE legislation was overcome: "There were some people in the body who thought we were putting onto municipalities something that wasn't their concern; that is, that we were using public entities for private financing. But I said, no, it's not that at all. It's just a lower interest rate for development. And when they saw it that way, there wasn't really opposition after that."

This comment provides another example of the clash of conservative frames: opposition based on the limited role of government in the economy and support based on enabling business development.

4.1.6. Summary

The qualitative data show that frames associated with political ideology—specifically, limiting the role of government, limiting government mandates, reducing regulations, reducing cost burdens on consumers and the private sector, and supporting the needs of the private sector—were important points of reference in the justifications that legislators used to support or oppose REEE legislation. Thus, we show a pattern of frame utilization that is consistent with our expectations in hypotheses 1–3.

Table 3
Major renewable energy and energy efficiency laws, 2004–2014.

Law type	Number of laws (Passed)	Percent yes vote, Both parties, Lower house
Government building efficiency	32	93[**]
Net metering	32	95[***]
Omnibus REEE	28	88[*]
PACE	24	88
REEE portfolio goal	9	92[*]
REEE portfolio standard new	11	81
REEE portfolio standard change	22	80
Solar carve-out	10	85
Solar tax credit	20	94[***]
Summary	188 (total laws)	89 (mean)

[*] $p < .05$.
[**] $p < .01$.
[***] $p < .001$, bivariate comparison with REEE portfolio standard change.

4.2. Second data set: longitudinal analysis

Table 3 presents the results of the longitudinal analysis. As hypothesis 1 predicted, the laws that support a REEPS (new, change, or solar carve out) have the lowest level of support indicated as the average percent vote "yes" across the REEPS bills. As hypothesis 2 predicted, law types that are most consistent with conservative ideology—government building efficiency (cut wasteful spending), REEE portfolio goals (not mandatory), and solar tax credits (cuts taxes and fees, develops local business)—have a significantly higher level of support than REEPS change bills. Consistent with hypothesis 3, PACE laws are in between, but the difference from REEPS changes is not significant ($p = .06$). However, contrary to our expectation, net metering had a high level of support. We reason that because many of the net metering laws were passed before the utilities and ALEC began the campaign against them, they were relatively noncontroversial at the time of passage. Thus, it is possible that justifications based on consumer choice and market development were more prominent when these laws were passed.

We also examined the timing of the laws to determine if there were changes in levels of support after 2009. In that year President Obama took office and began the implementation of his green jobs programs, which in turned triggered a counter-mobilization by the fossil-fuel sector and political conservatives. The mobilization was directed especially against proposed federal legislation in support of carbon regulation and a national renewable energy portfolio standard, but it also included state government policies. Although one might expect that the level of legislative support for REEE policies would decline after 2009, we found that for laws passed in 2010 and later the average level of voting support (88.1%) was only slightly lower than laws passed between 2004 and 2009 (90.4%). Likewise, there is no correlation between the year of the law (2004 through 2014) and the percent vote yes ($r = -.05$). Thus, the overall pattern of support for REEE laws over time does not show a sharp drop. However, we also found that the number of approved laws peaked in the years 2008 and 2009, that is, at the crest of the broad political movement in support of green jobs that occurred as part of the Obama presidential campaign in 2008. There were 28 major laws passed in 2007, 33 in 2008, and 29 in 2009, then a decline after that peak.

4.3. Third data set: cross-sectional analysis

The cross-sectional data are presented in Table 4. It is notable that there were no new REEPS laws or REEE goal laws in this data set. There were REEPS changes, but these were incremental (adding a qualified energy source) rather than major (increasing an overall standard percentage level). Overall, the results in Table 4 are consistent with the longitudinal data in Table 3 and with our three hypotheses. REEPS laws received the lowest level of support of all law types (hypothesis 1). Building efficiency for government buildings and solar carve-outs had high support, but the averages were only for two laws in each case (hypothesis 2). Other types of building efficiency laws (for residences, the private sector, and schools) had an average support level of 89%, both of which were about average for the data set. These data are consistent with the qualitative data, which suggest that as building efficiency laws shift away from the core conservative concern of reducing government spending and begin to appear more as mandates on schools, homes, and businesses, they lose support. Support for solar tax credits or fee reductions was high, as in the longitudinal data set, and support for reduction of regulations to support REEE was also high. Both of the latter were significantly higher than REEE portfolio changes. Support for net metering was higher than for REEE portfolio changes, a finding that is again consistent with the longitudinal data.

We also computed the ratio of passed to not-passed laws. A ratio above 1 means that the percentage of passed bills is greater than the percentage of failed bills. For example, for the net metering laws, the ratio is $(15/158/(38/551) = 1.38$. This calculation suggests that laws that reduce regulations on REEE or that provide a tax credit or fee reduction for solar have the highest likelihood of passing. Thus,

Table 4
Summary of the cross-sectional dataset of passed and unpassed laws from 2011 to 2012.

Law Type	Number of laws passed	Number of laws not passed	Percent yes vote, Both parties, Lower house	Ratio: Percent of all bills passed to percent of all bills failed
Government building efficiency	2	9	100	0.77
Net metering	15	38	92[*]	1.38
Omnibus REEE	1	5	96	0.70
PACE	0	10	NA	0
REEPS new	0	0	NA	0
REEPS goal	0	0	NA	0
REEPS change	23	60	85	1.34
Solar carve-out	2	5	98	1.39
Solar tax or fee reduction	11	15	95[**]	2.56
Authorization	18	39	92	1.61
Other building efficiency	18	63	89	1.00
Other financial incentives, credits	8	104	92	0.27
Reduce regulations on REEE	27	29	94[*]	3.25
REEE other (regulations, studies, etc.)	33	174	91	0.66
Summary	158 (Sum)	551 (Sum)	91 (Average)	

[*] $p < .05$.
[**] $p < .01$, bivariate comparison with REEPS (Renewable Portfolio Standard) change.

Table 5
Likelihood of a REEE bill passing.

Independent and control variables	Model 1 b (se)	Model 2 b (se)
Partisan sponsorship		
Bipartisan cosponsor (reference level = partisan sponsor)	1.6484***	1.6934***
	(0.2842)	(0.2894)
Bill characteristics		
Reduce regulations	1.4416***	1.4462***
	(0.3461)	(0.3758)
Solar tax credit or fee reduction	1.4626**	1.4219**
	(0.5235)	(0.5409)
Authorization	1.1907**	1.1957**
	(0.3731)	(0.3982)
Net metering	0.2437	0.2251
	(0.3910)	(0.4154)
Other building efficiency	0.7260*	0.6935
	(0.3439)	(0.3725)
Other financial incentives		−0.9875*
		(0.4494)
REEE Portfolio standard change		0.7082*
		(0.3510)
Constant	−1.4813	−1.2453
	(0.8122)	(0.8704)
Number of observations	667	667
Nagelkerke R square	0.35	0.37

* $p < .05$.
** $p < .01$.
*** $p < .001$.

we show that not only do these types of laws gain higher levels of "yes" votes when passed, but they also are more likely to be passed than other types of laws. The comparison of ratios also suggests that bills that authorize government action, usually to enable local governments to implement REEE projects, also tend to be favored for passage. In general, the cross-sectional data set is consistent with the hypothesis that attention to issues that will not trigger conservative ideology objections can help legislators to craft bills that are more likely to gain bipartisan support. In other words, if legislators cleverly design REEE bills so that they reduce regulations, reduce taxes and fees, and reduce restrictions on local governments without increasing costs, then the bills may have greater success.

The multivariate analysis shows the odds of a bill being passed, with patterns similar to the analysis of the vote ratio. (See Table 5.) Note that because this is a fixed-effects model, state-level variables are included as controls, but they are not shown in the table. In this analysis, bills listed in Table 4 with a small N (passed plus not passed) were not included, and REEE Other was not included because we can perfectly predict the last variable given the information that the first seven bills provided. Reducing regulations, granting solar tax credits, and authorizing government action had the highest levels of significance, and financial incentives other than solar tax credits or fee reductions reduced the likelihood of a bill being passed. These results are consistent with our overall thesis that bill characteristics that do not trigger concerns with fiscal conservatism can increase support.

5. Conclusion

Using three unique data sets (qualitative, longitudinal, and cross-sectional), we develop the argument that attention to political ideology as reflected in policy design for REEE bills can affect the potential for a legislator to gain broader support for the bill. In other words, even though there has been some hardening or polarization of positions with respect to REEE policy in the U.S. (and also in some other countries), there are some ways to mitigate these ideological divisions. We show how policy instruments associated with liberal ideology (e.g., government mandates that cause con-

sumer and business burdens) have lower levels of support, and we show with the qualitative data that the lower levels of support are associated with political ideology. We also show that types of legislation that are more consistent with conservative ideology can and do gain higher levels of support.

Although this study offers an immediate, concrete policy insight by providing some strategies for legislators and advocates who are struggling to build consensus for REEE policy reforms, it also makes a broader contribution to the social studies of environmental and energy policy reform. Although studies of the conditions affecting environmental policy adoption have recognized the importance of ideology, these studies tend to treat ideology as a simple independent variable that predicts an attitudinal or policy outcome. Putting ideology in a black box as a predictor variable has generated insights into its relative importance as an explanatory factor among the causes of environmental reform, but the analytic strategy has limitations. First, if one hopes to develop a theory of environmental and energy reform that has some potential policy implications and that might serve to guide advocates and policymakers toward effective policy solutions, then the strategy offers little in the way of concrete guidance. Second, if one hopes to develop a theoretically more complex approach to the role of ideology in the politics of energy and environmental policy, it is helpful to break down the concept of ideology and attach it to more specific frames.

This study has suggested a way forward for the combined policy and theory problem: develop hypotheses that are based on frames linked to ideology that can be identified explicitly in political discourse and can be linked to differences among types of bills. We found evidence that an analytical strategy based on frames associated with ideological differences could provide insight into levels of support and the potential for political agreement across ideological and partisan divisions. The results are broadly convergent across qualitative and quantitative analyses, and they suggest strategies that legislators could employ when crafting new bills.

Although the focus of this analysis is limited geographically and historically, there is some potential for generalization. The polarization between liberals and conservatives in the U.S. on environmental and energy issues is part of a broader historical pro-

cess by which the private sector has built an institutional field of lobbyists, public relations firms, think tanks, political action committees, and other organizations [33,34]. This institutional field has led to a long-term political shift in the U.S. away from the liberal-progressive ideologies that dominated the politics of the mid twentieth century toward neoliberal ideologies that have influenced both parties increasingly since the 1980s. These trends are particularly salient in the U.S. and in some other Anglophone countries, such as Canada and Australia, where conservative politicians have also opposed the extension and development of green-energy policies. However, neoliberal thought has also influenced the economics profession and policymakers in a broader range of countries [35–37]. Clearly, there are differences across countries in the degree to which conservative (or neoliberal) and liberal (or social democratic) ideologies are dominant, just as there are significant differences across the states in the U.S. Thus, the relationship among political ideology, policy design and frames, and energy and environmental policy is likely to be of general interest in a range of countries, and there is reason to assume that it will be of increasing salience in the future.

Acknowledgement

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