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Kindred Spirits or Intergovernmental Competition? Policy learning and the adoption of energy policies in the American states (1990 – 2010)

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ABSTRACT

The innovation of environmental policies and their subsequent diffusion throughout the U.S. states has been the subject of significant academic attention using event history analysis. Using an event history analysis, a traditional geographic model for policy diffusion is tested against a model where states learn from peer groups, defined by political culture. There is evidence for state learning within peer groups but less support for diffusion across state borders. Policy characteristics, environmental conditions, economic resources, and political constraints and opportunities are tested as drivers of differences in policy adoption. More than any other factor, politics and political culture explains the adoption of energy and climate change policies. These results also suggest that restricted models that test geographical mechanisms of policy diffusion likely omit important characteristics that are correlated across states, leading to biased findings regarding the geographical state diffusion models in the extant literature.

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Kindred Spirits or Intergovernmental Competition? The innovation and diffusion of energy policies in the American states (1990 – 2008)

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1. Introduction

With global coordinated action towards climate change seemingly at a standstill (see Jordan and Huitema, this volume), the hopes of addressing climate change through policy initiatives has fallen to national and subnational governments encompassing a 'Madisonian' approach to climate change (Victor, House, and Joy 2005), or alternatively, a climate regime complex (Keohane and Victor 2010). According to these alternative models, states may not pursue climate protection directly, but rather, focus policy efforts on an array of agricultural, forestry, transportation, renewable energy, and energy development policies that match local conditions (Matisoff 2008). These policies create a polycentric web of national, state, and regional policies that address the drivers of climate change. Ostrom (2009) argues that this approach encourages policy experiments at multiple levels, develops methods for assessing benefits and costs of each policy, and builds on the successful collective action efforts of medium- and small-scale governance units. Nevertheless, Ostrom (2009) does not address the conditions that lead to the diffusion of successful policy experiments across a political landscape.

With the U.S. energy-based carbon footprint totalling 5,835 million metric tons in 2008, the U.S. is the world's second largest emitter of CO_2 (totalling 19 per cent of global energy-related emissions) and has a larger carbon footprint than all of Europe combined (Energy Information Administration 2012). Energy use is broadly responsible for U.S. carbon dioxide emissions. We focus on state level policies because the majority of policy innovation and activity related to climate change in the U.S. has been at the state level (Rabe 2004) and future U.S. efforts to leverage the Clean Air Act to regulate carbon emissions will likely rely heavily on state innovation and implementation efforts (Nordhaus 2007; Richardson 2011). Further, following a rich history of policy diffusion research in the U.S. (see Boushey (2010) for a review), the U.S. states offer an ideal environment to study the adoption and diffusion of public policies.

Climate change programs can encompass a wide array of activities. State climate change policies may take a wide variety of forms including energy efficiency programs, financial incentives for renewable energy sources, financial incentives for alternative fuels, or regulations targeting the transportation or electricity generation sectors. Climate change policies may be adopted to address public bads, such as air pollution, producing a positive externality of GHG reduction. Other programs attack GHG emissions more directly by promoting carbon accounting and methane recovery, or seeking to implement a regional carbon-trading program. Renewable Portfolio Standards (RPS), are an example of an energy policy that require that a percentage of electricity generated or purchased in the state must come from renewable sources. As a result, highly CO_2 intensive coal power may be displaced with renewable energy, lowering the GHG footprint of a state.

In this paper, we focus on energy efficiency and renewable energy policies, which have the potential to address the largest source of carbon emissions in the U.S. State legislatures have pioneered a variety of energy policies during the past two decades, yet there is insufficient insight regarding the specific conditions under which states elect to adopt these policies. We contribute to the empirical literature by testing the conditions that lead to the adoption and diffusion of energy policies in the U.S. Further, we contribute to the theoretical literature by contrasting several different approaches to measuring the diffusion mechanism and comparing the drivers of diffusion across several different types of policies. This research is of importance to those substantively interested in the adoption and diffusion of energy and climate change policies, as well as those interested in the broader questions of policy diffusion, and how most accurately to test competing hypotheses regarding the drivers of policy adoption and diffusion.

This paper is part of a larger effort to better understand why governments innovate climate change policy. In this paper, we examine policy innovation through the lens of policy diffusion, building upon Madisonian theories of federalism, which suggest that successful policy experiments by states will be mimicked and adopted by other states. In contrast, this approach says little about the initial invention of a policy or the subsequent effectiveness of adopted policies, though we provide some brief observations regarding the initial innovation of these policies in the U.S. setting (for a more complete discussion on the invention of climate change policies see (Bauer and Steurer, this volume; Jacobs, this volume; Schaffrin, Seubert, and Sewerin, this volume).

We examine state energy policies along dimensions of economic development, intergovernmental competition, and several mechanisms of diffusion across states, while testing for the economic, political, and geographic characteristics within states that make them more likely to adopt a particular policy. We seek to expand upon previous policy diffusion research by incorporating policy characteristics and provide empirical evidence by understanding the precise conditions under which policy innovation and diffusion are likely to occur.

We empirically assess the motivations for the adoption and diffusion of eight different state energy policies that promote renewable energy development and energy efficiency. We assess programs and policies that are likely to be adopted due to economic development and competition across states, against those whose adoption ought to be less influenced by interstate competition for economic development. We test numerous specifications of policy diffusion to improve upon weaknesses in existing diffusion research. Results derived from multiple models allow us to reach new conclusions about policy innovation and diffusion in the U.S.

2. Policy Diffusion Theory: diffusion versus internal determinants

Policy diffusion is a function of factors both internal and external to a state (Massey and Beiesbroek forthcoming). External factors include social learning, economic competition, imitation, or coercion (Shipan and Volden 2008). Under the most traditional theory of policy diffusion, and in the Madisonian tradition, U.S. states serve as laboratories of policy experimentation (Elazar 1972) and policy learning is exhibited when states mimic the successful policy experiments of other states.

Theorists have suggested that these diffusion trends are driven by communication by state legislators and bureaucrats, as well as a variety of networks aimed at delivering climate friendly technology and moving towards a low carbon economy (Bauer and Steurer, this volume). Numerous intra-state organizations such as the Council of State Governments, the Federal Commission on Intergovernmental Relations, the Citizen's Conference on State Legislatures, the National Governor's Conference, or professional associations such as the National Association of State Budget Officers, the National Association of State Conservation Officers may serve to promote policy learning and promote policy diffusion (McLendon, Heller, and Young 2005; Walker 1969). Because policymakers are thought to attend conferences and communicate regionally, these empirical models have tested this theory by suggesting that states are more likely to mimic neighbouring states, and that policies are likely to diffuse across state borders (Berry and Berry 1990; Lyon and Yin 2010; Matisoff 2008).

Several weaknesses exist with this specification of policy diffusion. First, with decreasing costs of transportation and communication, it does not seem as likely that geographic constraints are responsible for driving policy diffusion. While states may choose to look to geographical neighbours as peer states, they may look for comparisons or for policy experience in other parts of the country or world. Second, empirical research testing policy diffusion has produced mixed results. Berry & Berry (1990) find policy diffusion in state lottery adoptions; however, more recent studies that examine energy policy diffusion have failed to find compelling evidence of policy diffusion across state borders, once internal characteristics are controlled for (Lyon and Yin 2010; Matisoff 2008; Stadelmann and Castro forthcoming).

Instead, research that tests the internal determinants model against the regional diffusion model suggests that the internal determinants model - and specifically, the political resources / motivations component of the internal determinants model seems to drive policy change (Lyon and Yin 2010; Matisoff 2008). However, as Matisoff (2008) notes, similarities across states may drive policy diffusion. States may mimic other states that share similar political, economic, and geographic resources. Existing research suggests the difficulty of statistically isolating the influence of internal determinants from shared characteristics and determinants of other states. Research that better informs why certain types of policies are adopted can help researchers understand how and why policy innovation occurs, and how it diffuses across states. Further, while regional diffusion has been found in some cases and not others – current research employing event history analysis methodology has been limited to studies that examine the adoption of one policy, rather than through a comparison of the adoption of multiple policies. Examining multiple policies allows us to contrast the motivations of adoption across different types of policies.

Different types of policies may follow different diffusion processes. We consider two of these possible diffusion processes for two types of policies. First, neighbouring states may adopt policies due to economic competition amongst states. Second, policy learning may occur by states imitating cultural cohorts, rather than geographical cohorts. We test these two mechanisms for diffusion across two policy types, characterized by the amount of economic competition generated by each policy type. We expect that policies that promote economic development will diffuse geographically; we expect that policies that have less economic development implications will diffuse via political cohorts. We test these external drivers of policy diffusion against the internal determinants model of policy adoption.

2.1. Competition drives Policy Diffusion

We expect some policies to diffuse across state lines due to intergovernmental competition (Baybeck, Berry, and Siegel 2011). According to this theory, states strategically compete for locational choices made by individuals and firms, including business investment decisions and consumer behaviour. Several recent studies support the economic competition hypothesis. Shipan and Volden (2008) demonstrate that smaller cities are less likely to adopt anti-smoking regulations until larger neighbours do so. Boehmke and Witmer (2004) suggest that early adoption of Indian gaming contracts results from social learning, while later adoptions or modifications to contracts result exclusively from economic competition. And Berry and Baybeck (2005) demonstrate that competition drives the adoption of state lotteries, while levels of state-determined welfare benefits are not influenced by competition. Woods (2006) finds that states respond to competitor states by reducing environmental regulatory enforcement stringency. In contrast, Saikawa (2013) finds that developing countries implement more stringent emissions standards as an economic development tool.

In the area of climate change policy, we categorize policies aimed at economic development and directed towards firms as highly competitive and hypothesize that intergovernmental competition among states drives the adoption of these policies. Policies such as a Renewable Portfolio Standards (RPS) or tax credits for renewable energy development may result due to competition amongst states, as states attempt to provide a business environment that can attract renewable energy development. RPS have long been employed as a rural economic development tool by states (Wiser and Langniss 2001), and tax credits to corporations have been employed as a mechanism to drive business investment and economic development. If states guarantee a market for renewably generated electricity through the establishment of an RPS, it provides a clear regulatory incentive for business investment in renewable energy development in that state or in neighbouring states.[1] Renewable energy policies are frequently promoted as a mechanism to attract jobs and economic growth (Wei, Patadia, and Kammen 2010).

Berry and Jaccard (2001) argue that RPS use is spreading. For RPS and similar policies, the spreading phenomenon of certain clean energy policies may be due to a relationship between regional diffusion and policies that lead to competition between neighbouring states (Hays and Glick 1997).

[1] The implementation of RPS is a bit more complex, since RPS programs generally allow the trading of Renewable Energy Credits, providing a strong harmonization pressure on states, but in general, renewable energy must be sourced from a state with the RPS standard and RPS standards are thought to encourage renewable energy development.

In contrast, some policies are less likely to be the outcome of intergovernmental competition. Personal tax rebates and other individualized incentives are unlikely to generate economic competition and may be less likely to diffuse amongst states. While states compete for consumer spending or for business investment, personal tax credits and energy efficiency regulations do not provide a direct economic payoff to states because they reduce spending and tax revenue. Yusuf and Neill (2013) identify non-economic development-related policies as those that focus on increasing energy efficiency and reducing energy costs. Public benefit funds, tax incentives for energy efficiency and renewables, net metering standards, and energy efficiency mandates for public buildings all may promote environmental goals, but the adoption of each of these programs appears to be less economic development-driven than policies aimed at the strategic locational preference of a firm or result in increased revenue for the state.

2.2. States Emulate and Learn From Kindred Spirits

Social learning, imitation, or policy emulation are common hypotheses in the policy diffusion framework. Shipan (2008) distinguishes between social learning and imitation and argues that social learning is the purposeful adoption of a successful policy experiment while imitation lacks purpose. Boehmke and Witmer (2004) suggest an interpretation of adoption among neighbouring states that entails learning and emulation. Berry (1994) uses factor analysis to derive geographic state clusters and subsequently finds evidence for policy diffusion.

We depart from existing literature by testing multiple groupings of states. We test whether states have a fixed group of states from which they learn or emulate, which we call their Kindred Spirits. These state cohorts are determined by a variety of cultural, ideological, geographic, and historical factors, rather than geographical neighbours. Grossback et al (2004) concludes that states are more likely to mimic states that are ideologically similar while (Case, Rosen, and Hines Jr 1993) conclude that states mimic states due to fiscal and demographic similarities. Reese, Larnell and Sands (2009) employ a similar framework, finding that the adoption of tax incentives at the local level follows a largely path-dependent trend entailing the cumulative addition of old policies to new ones (i.e., marginal change). Tavits (2003, p651) further suggests that policy adoption is determined largely by "political and policy histories of policy choices," as opposed to one that entails active learning. In this analysis, we do not attempt to measure whether learning or emulation is active or passive, due to difficulties in quantitatively distinguishing these motives. Rather, we seek to observe, measure, and verify different patterns of diffusion.

Walker (1969) grouped states into five factor loadings which he titles: the South, New England, Mountains and Northwest, Mid-Atlantic, and Border, Great Lakes and California; however, Walker's categories are not geographically contiguous and are not mutually exclusive. Walker remains agnostic regarding specific similarities across states that make them more likely to view each other as cohorts. Walker's groupings are based solely on a factor analysis based on the relative order of adoption of 88 policies between 1870 and 1966. While some states, such as New York and Pennsylvania, are grouped with Mid-Atlantic States and New England, other states, such as Kansas, Colorado, and Arizona, remain ungrouped. Walker provides a model of interstate relationships based on the proclivity to adopt various policies, in large part due to the attitudes and preferences of state decision makers, and highlights the role of communication among state subsets.

While these state groupings have geographic components, the most important characteristic is a political path dependency across groupings. Thus, we expect that state history matters and despite the lapse of nearly five decades since Walker's (1969) state groupings, the logic of path dependency maintains the continuity of the Walker "regions." We expect that states with similar policy histories are more likely to learn from each other. To check for robustness, we also test specifications that use Census regional groupings and Census sub-region groupings (included in the online appendices).

2.3. Internal Determinants

The internal determinants model explains policy adoption as a function of state motivation to innovate and obstacles of innovation (Glick 1981; Gray 1973; Regans 1980; Walker 1969). Stream (1999) identifies five categories of internal determinants: political context, fiscal health, problem severity/demand, and regulatory environment. In the context of climate change policy, these characteristics may include major domestic determinants such as low air quality, important industries to the state, state energy production and consumption patterns, the state regulatory environment, political activism, state geographical and fiscal characteristics, economic capacity, the availability of alternative energy resources, the strength of local environmental interest groups, and the political ideology of the public regarding the role of government in shaping individual energy consumption choices.

2.3.1. Energy Policies: Problem Severity & Demand

States pursue climate change policies for various reasons, including pressures to: promote economic development, improve environmental quality, and improve energy efficiency. Wei, Patadia and Kammen (2010) find that energy efficiency programs and renewable portfolio standards create more jobs per unit energy than coal and natural gas. Additional economic development benefits from corporate investment are generated by tax credits and other investment incentives (Peterson, 1981).

The demand for energy policies in states with abundant supplies of alternative energy sources is likely to be conditional on the wealth of the state. In rural and low income areas, RPS is a common economic development tool (Langniss and Wiser 2003), and wind turbines can provide farmers and rural residents with increased income. At the same time, wealthier areas may be more likely to oppose wind due to complaints about obstructing or altering views or due to the noise from the turbines. We expect wealthier areas with high wind resources to have less activity to promote wind electricity production. In contrast to wind, solar is highly expensive and has been thought of as a conspicuous good or status symbol. We expect that states' solar resources will be positively associated with energy policies, especially in wealthier areas.

Another motivation to adopt energy programs likely stems from the need to improve the environmental quality and energy efficiency of a state. States that have air quality problems and are out of compliance with National Ambient Air Quality Standards should be motivated to shift electricity consumption away from coal and oil and towards renewable sources (Matisoff, 2008). Further, energy efficiency gains can reduce the need for new electricity plants, reduce peak load burdens, and keep rates low. If states have more carbon intense economies, there are more opportunities for low cost efficiency gains.

2.3.2. Internal determinants: Political context

States with liberal citizens have repeatedly been demonstrated to be more willing to adopt energy policies to influence program participation and it is important to control for the willingness of each state to use the authority of government to solve perceived policy problems (Lyon and Yin 2010; Matisoff 2008). In addition, environmental interest group*s* are likely to lobby for these types of policies, and states more reliant on carbon intensive industry or fossil fuel production may be less likely to adopt energy programs.

2.3.3. Internal determinants: Fiscal health

States that have wealthier populations and a larger tax base are thought to have a greater capacity for regulatory innovation and regulatory enforcement. Further, states that have wealthier citizens demand more from their governments and expect the government to provide clean air and greater environmental quality, as well as to promote increased energy efficiency and the use of renewable energy. And states with higher electricity rates may have more economic incentive or slack available to invest in renewable energy and energy efficiency programs.

2.3.4. Internal determinants: Regulatory Stringency

There is mixed evidence regarding the relationship between citizen and government activity and corporate performance. Woods (2006) finds that states respond to competitor states by reducing enforcement stringency. In contrast Potoski (2001) finds that states race to the top in air quality. Similarly, the record on the relationship between business investment, environmental performance and regulatory stringency is mixed (Maxwell and Decker 2006; Porter and van der Linde 1995). Further, we lack time variant data on regulatory stringency across states. We proxy for regulatory stringency in particular by using two measures of citizen engagement (voting turnout and environmental interest group membership rates), which have been demonstrated to be highly correlated with regulatory stringency (Viscusi and Hamilton 1999). We expect that states that already have higher regulatory stringency will be more likely to pursue further energy efficiency and renewable energy policies.

3. Data and Methods

3.1. Methods: Event History Analysis

We employ event history analysis (EHA) to test the likelihood that a state will adopt a policy in a given year. EHA is a well-established model in the policy diffusion literature popular for testing both internal and external determinants (e.g., Berry and Berry 1990), with particular attention paid to regional effects (Mooney 2001), which explains the occurrence of an event (e.g., policy adoption) based on individual state and policy diffusion variables.

The adoption of a policy in each state is coded as a "1" for the year of adoption and "0" if the policy has not been adopted. Once a state adopts a policy, it drops out of the data set. This coding indicates that a particular policy can only be adopted once for each state (although it can be renewed or strengthened). The model is estimated as a logit model.[2] We estimate this model with robust standard errors, a series of regulatory dummy variables, and a time trend to control for additional geographic and temporal heteroskedasticity. This model assumes that at any given time after 1990 states are considering the possibility of adopting a policy and will adopt it once a certain threshold

[2] An alternative specification with a Cox hazard model produced very similar results.

is exceeded. It assumes that the baseline probability of adoption for each is equivalent for each state, given the set of variables we control for in our model.

To represent the "pressure" for a state to adopt based on the diffusion level of that particular policy for both neighbouring and Walker regions, a variable is coded detailing the percentage of states within the respective region that have adopted a relevant policy in that year or earlier. We employ two specifications modelling different mechanisms at policy diffusion and model two additional specifications based on Census region and subregion (included in the online appendices). First, we model a neighbouring states model, where states are hypothesized to mimic their neighbours, and policies spill over across state borders. A second specification utilizes Walker regions, based on Walker's (1969) state groupings.

Using three models we test the diffusion of the two policy types for a total of 24 event history analyses allowing us to gauge the extent to which these policies motivate competition or emulation between states. The random effects logit model provides results that will be compared in three ways. First, we can test the factors that drive the adoption for each of the eight policies by using hypothesis tests on the parameter coefficients. Second, we can explore a comparison between the internal determinants model and the extent to which our policy diffusion variables are correlated with state characteristics to better understand the drivers behind policy diffusion. Finally, by comparing the effect of the two policy diffusion variables across the eight policies, we can gain a better understanding of the relationship between policy type (high-competition or low competition) policies tends to be driven by competition or emulation.

3.2. Dependent variable: policy adoption

Policy adoption data for the 48 contiguous states (Alaska and Hawaii are excluded because they have no neighbouring states) begin in 1990, the first year for which most policy-relevant data could be obtained and the year that the first Intergovernmental Panel on Climate Change report was released, concluding that global climate change was likely caused by human behaviour. Beginning in 1990, state agencies have kept track of greenhouse gas emissions and their efforts to combat them.

The adoption year of the eight policies, three representing highly competitive policies (RPS, renewable energy corporate tax credits, energy efficiency corporate tax credits) and five representing low-spill-over policies (net metering, personal tax credit – efficiency and renewable, public building energy standards, public benefits funds), were obtained from the Database of State Incentives for Renewable Energy which contains information on state energy efficiency and renewable energy policies (Interstate Renewable Energy Council, 2010). The online appendices include a detailed description of each of the eight policies and samples of legislation particular to representative states. While the Database of State Incentives for Renewable Energy provides data on dozens of different policies, we selected only those that appear to most clearly exhibit or not exhibit economic competition, based on classifications from prior research. Table 1 categorizes the policies according to whether they competitive non-competitive.

<<insert table 1 about here>>

3.3. Independent variables:

Descriptive statistics, sources, and units for the variables discussed in this section are included in the online appendices.

3.3.1. Problem Severity and Demand

We measure the motivations for states to adopt energy and renewable policy by measuring state geographic resources, air quality, energy consumption and production, and carbon intensity. Wind potential is measured as the total percentage of U.S. electricity consumption that could be produced by state wind generation (Elliot and Schwartz 1993). Solar potential is coded as annual average global radiation for each state (kWh/M^2/day). Biomass potential is measured in thousand dry tonnes / year / capita and is obtained from table 10 in Milbrandt (2005). Air quality is measured using the average percentage of a state's population living in a nonattainment area for six major criteria air pollutants: NO_x, SO_2, CO, Pb, 1 hour Ozone, and PM-10 (Matisoff 2008). The carbon dioxide intensity of a state is measured in tons per thousand of current 2010 dollars of Gross State Product (GSP) (Energy Information Administration, 2012).

3.3.2. Political Context

The ideology of a state's citizens is measured using a citizen ideology index, which seeks to measure the mean position on a liberal-conservative continuum of the "active electorate" in a state, which is scaled from 0 (conservative) to 100 (liberal) (Berry, Ringquist, Fording and Hanson 1998).Sierra club membership is obtained directly from Sierra Club. Energy production per capita is collected from the EIA.

3.3.3. State Financial Capacity

GSP per capita data is drawn from the U.S. Bureau of Economic Analysis. State revenue data is drawn from the U.S. Census of State Governments.

3.3.4. Regulatory Stringency

We employ civic engagement as a proxy for regulatory stringency using voter turnout, which has a well-established relationship with regulatory stringency (Viscusi and Hamilton 1999).

3.3.5. Additional Control Variables

In addition, we include dummy variables measuring whether or not state electricity restructuring is active, state size and population density.

4. Results and Discussion

<<insert Tables 2 - 3 about here>>

Table 2 shows logistic regression results for the internal determinants specification without accounting for spill-over or policy learning. Table 3 summarizes the impact of the inclusion of the diffusion metric in policy diffusion with the set of internal determinants included in Table 2. Complete statistical results, as well as results from the Census region and subregion specifications are listed in the online appendices.

4.1. Internal Determinants Hypotheses

Without controlling for external pressures that drive policy adoption, we explain as much as 50 per cent of the variation of a state's likelihood of adopting a policy in a particular year (see Table 2). We also find powerful relationships between specific state characteristics and the likelihood of adoption.

4.1.1. Problem Severity and Demand

States demonstrate a mixed record at tailoring policies to take advantage of unique geographic attributes. Solar density is negatively correlated with adopting net metering standards, but positively correlated with passing building efficiency standards.

Wind potential is significant and positive for several policies by itself (corporate renewables, public benefits, net metering) but with less of an increase in likelihood of adoption at increasing levels of gross state product per capita for net metering adoption and public benefit funds. Biomass resources are negatively correlated with the adoption of RPS, and corporate incentives for renewables.

Some policy adoptions, such as RPS and Public Benefit Funds are associated with worse air quality, suggesting that states adopt these programs to improve air quality. States with more energy consumption are more likely to adopt tax incentives for net metering, suggesting that high energy demand may lead states to pursue distributed generation.

4.1.2. Political Context

Perhaps the most consistent finding between this manuscript and previous and accompanying research is that more liberal states are more likely to adopt policies to address energy efficiency and renewable energy. Increasingly liberal states have a greater likelihood of adopting RPS, corporate tax incentives for efficiency, public benefit funds, and personal tax for renewables. Climate change is a political challenge, more than an economic or technological challenge. And environmental group membership is correlated with net metering. This result demonstrates that states are responsive to citizen ideology and organized environmental interest groups, but less responsive to other problem characteristics. (In contrast, results from an international model suggest little influence for NGO influence on policies (Stadelmann and Castro forthcoming).

CO_2 intensity is negatively correlated for net metering and personal tax incentives for renewables. This suggests that carbon intense industry may also lobby against certain new energy programs promoting renewables or energy efficiency. This result is consistent with the political market hypothesis and previous findings that states with larger reliance on the fossil fuel industry were less likely to adopt energy regulations (Matisoff 2008).

4.1.3. Fiscal Health

State revenue is statistically significant as a motivation for public benefit funds and corporate incentives for energy efficiency. Given the structure of PBF, which allows utilities to recoup costs of energy efficiency projects, it is unsurprising that states with larger government budgets may have the capacity and funding to design and implement these types of programs. Combined with results that suggest that incentives for efficiency suggest that additional slack in budgets may be helpful to adopt efficiency initiatives. Higher electricity prices are correlated with higher incentives for public benefit funds.

4.1.4. Regulatory Stringency

Voting turnout positively influences the likelihood of adoption for RPS, suggesting that citizen engagement is a mechanism to improve policy adoption. State product per capita is significant and positive for corporate tax incentives for efficiency and public benefit funds.

4.2. External Drivers of Policy Diffusion

Including state adoption patterns, we can explain up to 62 per cent of a state's likelihood of adopting a policy in a given year (see tables in online appendices). Controlling for neighbouring state and Walker region adoption modestly influences the statistical significance of the internal determinants.

4.2.1. Neighbouring States Models

Of the three highly competitive policies, only corporate incentives for renewables shows a statistically significant parameter estimate, suggesting differentiation, rather than diffusion. Among the five low competition policies, only public benefits policies have a positive and statistically significant parameter estimate. These results question the applicability of the neighbouring states specification for policy diffusion research.

5.2.2 Walker Regions Models

All eight policies are strongly and positively significant for the Walker diffusion metric. Different Walker regions were also more likely to adopt different types of policies. RPS were adopted in all 8 of region 2 states and in 6 of 7 of region 4 states, while only being adopted in 4 of 17 of region 1 states, and in 4 of 14 of region 3 states. Public benefit funds have a similar pattern. In contrast, regions 1 and 3 were much more likely to adopt personal and corporate tax credits than regions 2 or 4. This finding suggests a preference for policy types by states that share a similar political culture.

4.3. Policy diffusion discussion

More than anything, our results demonstrate that across all types of policies, political culture – even as measured 57 years ago, matters. After controlling for the observable internal determinants - the most predictive characteristics of each state is that states' political culture, as measured by its Walker region. In all 8 policies tested, adoptions by Walker region cohorts is a statistically significant predictor of future policy adoption, even when Census region diffusion is included as a control variable (results not shown).

This suggests that states have a relatively fixed set of states that they learn from, regardless of the type of policy, and that reference groups have remained relatively fixed since 1850 (though Walker demonstrates some movement over time). Some of these states are neighbours and others are not. This suggests that instead of policies diffusing across neighbours, they diffuse in a similar pattern that they did pre 1965 (and spanning back to the 1800s), suggesting that globalization is not to credit / blame for this, but that state policy seems to be path dependent. States emulate other states because of political attributes that make some states more innovative than others. More innovative states move first, and then other states follow the innovators in their "Walker region" that they seek to emulate.

Moreover, these data (presented in the online appendices) allow us to examine whether certain states are more frequently first-movers for each Walker region. In region 1, Texas was the first mover in 2 of the 8 policies; in region 2, New York was a first mover in 6 of the 8 policies, and Massachusetts was a first mover in 2 of the 8 policies; in region 3, Maryland was the first mover in 3 of the 8 policies, and Oregon was the first mover in 2 of the 8 policies. In region 4, New York was the first mover in 6 of the 8 policies, and Wisconsin was the first mover in 2 of the policies. And in region 5, California was the first mover in 3 of the 8 policies. This analysis points to just a few states being particularly important in policy innovation – leading to the diffusion of energy policies in the U.S. states. While this analysis has only been conducted with 8 policies, it suggests that certain states are more likely to be policy innovators in the area of energy and climate.

4.4. Internal determinants versus diffusion

Table 3 illustrates the results for the diffusion variables across the eight policies without controlling for internal determinants, and shows how the exclusion of relevant independent variables can impact results. Comparing these results to the parameter estimates after controlling for internal determinants demonstrates the amount of variation absorbed by the diffusion models. For neighbouring states, much of the statistical significance of the neighbouring models is absorbed by adding the internal determinants variables and vastly changes the interpretation of the results. Without internal determinants controls, four policies are statistically significant (and are all positive). Once controls are added, two remain significant, corporate incentives for renewables changes valence and demonstrate differentiation, rather than emulation. In contrast, for the Walker model, adding internal controls does not decrease the significance of the estimated effects – all policies show policy learning across Walker regions with and without internal determinants controls. This result highlights the susceptibility of the neighbouring states model to specification error and excluded variable bias.

4.5. High Competition vs. Low Competition

We expected economic development (high competition) policies to diffuse across neighbouring states, while low competition policies would diffuse across Walker regions. There is little evidence to support this hypothesis. Amongst high competition policies, no policies appear to have diffused across state borders. And amongst the 5 policies expected *not* to diffuse across state borders, public benefit funds was the only policy to diffuse across state borders. Although we only test our theory on a limited number of policies, economic development policies do not appear to diffuse more readily across state borders. These results support findings by Holzinger, Knill and Sommerer (2008; 2011) that do not show diffusion due to regulatory competition in environmental policy and by Schmitt, Tosun, and Knill (forthcoming) that show a complicated relationship between regulatory pressures and policy adoption.

Amongst the low competition policies, Walker regions were more predictive for policy adoption. All 8 policies diffused across Walker regions. However, most of these policies also diffused across Census regions and sub-regions (see online appendices). In robustness checks where the Census region diffusion variables are included in the regression as well as Walker regions, Census regions become statistically insignificant and Walker regions remain significant.

5. Conclusions and new directions for research

This study provides implications for the study of policy diffusion and the specification of event history analysis models, as well as implications for the adoption and diffusion of energy programs. The neighbouring states model of policy diffusion seems to consistently underperform other methods of modelling policy learning. While supportive findings can be selectively chosen from the literature, these findings do not compare the neighbouring state hypothesis with other mechanisms of grouping states and may crucially exclude relevant explanatory variables. We find that Walker regions provide more explanatory power in all 8 policies than the neighbouring state model. Walker is a statistically significant (and one of the most correlated) predictors of policy adoption in all 8 policies and provides a unique contribution to our understanding of policy diffusion, separate from internal determinants. These Walker regions hold even after controlling for geographic, political, economic, and environmental characteristics of states, and when Census region adoption is included as a control variable. In contrast, internal determinants seem to absorb most of the variation explained by the neighbouring states approach. That the Walker regions remain an important determinant of policy diffusion speaks volumes about the durability of external sources of information that policy decision-makers draw from in the U.S.

Further, there are significant theoretical problems with the neighbouring state model. While intergovernmental competition is the most compelling story behind this model, many policies do not facilitate the type of competition that would drive neighbouring state diffusion. It is also unclear whether competition should drive states to differentiate themselves or to imitate each other. In these findings, states mimic each other for certain policies, but differentiate themselves for others. As a result, we do not believe that the neighbouring states model should continue to be employed unless there are clear reasons to believe that state competition across state lines is driving policy adoption. There are other mechanisms for policy diffusion, such as trade networks (Saikawa 2013), that are more theoretically justified than the neighbouring states model.

That states emulate a fixed set of states that they view as cohorts has enormous implications for policy that depart from much of existing literature. Given that the United States has been a chief advocate of abandoning international regime efforts to address climate change for a more bottom up approach, the extent to which these efforts have been implemented in the U.S. is of interest to the global policy community. The vast majority of literature suggests that states learn from each other or compete with each other. Because states appear to take cues from a fixed set of states, in an ideal policy world where policymakers could manipulate policy experiments (or where federal funding for policy experimentation is doled out to specific states), it would make sense to seed policy experiments to states in different Walker regions. As discussed above, certain states appear to be clear leaders in the Walker regions. New York is a leader amongst region 2 and region 4. Maryland, Massachusetts, Oregon, Wisconsin, Texas, and California also appear to be consistent policy innovators, likely because these (generally larger states) have larger budgets, capacity, and culture that promote policy innovation. This lesson provides insight for international policy diffusion as well. If certain states are consistent leaders and others are consistent laggards, it may be possible to seed policy experiments in states that are more open to policy experimentation. International institutions and networks can be used to push laggards to adopt successful policy experiments. These results are consistent with Howlett and Joshi-Koop (2011), who find that the training and expertise of policy analysts dictates whether a government is open to policy experimentation. If policy diffusion occurs through professional networks and institutions and professional policy analysts are also able to push policy experimentation, then professional networks appear to be a mechanism to both open government to policy experimentation and diffuse policy experiments.

Certain types of policy are more likely to be adopted in states with different political cultures. Walker regions 2 and 4 were near-universal adopters of RPS programs and Public Benefit funds, while these programs were very unpopular in regions 1 or 3. In contrast, tax benefits were relatively more popular in these regions than in regions 2 or 4. This suggests that policy-makers may win greater acceptance by choosing culturally appropriate policies for states.

The most consistent correlations across energy policies point towards political attributes of specific states including citizen interest groups and political liberalism. To increase the policy adoption of climate change policies, the results of the model emphasize the importance of citizen interest groups, paired with specific policy types that might make states more (or less) receptive to policy adoption. For participants in the state policy process, these results provide useful guidance regarding the possible acceptance of a particular policy, based on its characteristics.

Jordan and Huitema (this volume) suggest that future research focus on mechanisms of diffusion, and the characteristics of policies that lead them to diffuse. While this paper attempted to understand both the role of intergovernmental competition and the role of political culture (among other characteristics) on policy diffusion, future research can continue to address the causal drivers of intergovernmental competition, and whether we ought to expect states to imitate each other or to compete with each other. The selection of well-chosen policies can aid in understanding differences across policies and how policies diffuse. Recent research has made improvements specifying the economic relationships between political entities (e.g. (Saikawa 2013)); however, more complex spatial econometric methodology allows for more sophisticated approaches to understanding relationships between the states. Recent advances in statistical computing and methodology, such as spatial econometric techniques, ought to allow for an improvement in the identification of policy relationships across states. Specifications that allow for a combination of fixed effects as well as time-variant political-economic relationships between states hold significant promise for understanding the diffusion of policy (Neumayer and Plümper 2012). Finally, understanding how the success of policy experiments provides feedback to the development and subsequent improvement of policies holds promise to understand policy learning.

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Table 1. Policies by type

	Corporate Incentives / High Competition	**Individual Incentives / Low Competition**
Regulatory Renewables	Renewable Portfolio Standards	Access Laws or Net Metering
Financial Incentives Renewables	Business and Corporate Tax Credits	Personal Tax Credits
Regulatory Efficiency		Public Building Energy Standards; Public Benefits Funds
Financial Incentives Efficiency	Business and Corporate Tax Credits	Personal Tax Credits

Table 2. Internal Determinants Specification for all 8 policies: Logistic Regression Results

	RPS	Corp.Tax Eff.	Corp. Tax Renew	Pub Ben	Bldg Stds	Net Meter	Pers. Tax Eff	Pers. Tax Renew
Solar Density	0.624	0.492	-2.491	-0.308	5.555**	-6.844**	3.893	4.821
	(4.030)	(1.539)	(3.375)	(2.969)	(2.397)	(3.231)	(3.485)	(4.338)
Wind Potential	0.184	0.360	0.763*	1.093**	-0.325	0.665***	0.437*	0.249
	(0.281)	(0.365)	(0.395)	(0.484)	(0.401)	(0.221)	(0.239)	(0.295)
Solar * GSPPC	-15.17	8.138	42.45	-40.22	-156.9**	165.4*	-96.96	-95.92
	(101.5)	(72.59)	(146.8)	(80.72)	(71.61)	(88.95)	(96.48)	(100.6)
WindPot *	0.0147	-5.321	-14.77	-37.97**	4.636	-20.10***	-5.655	-7.991
	(6.636)	(5.519)	(11.32)	(15.86)	(9.885)	(5.331)	(5.585)	(6.857)
BiomassPC	-546.9**	-232.9	-446.2**	-397.4	-88.71	-272.9	-555.8	201.2
	(226.0)	(290.1)	(223.4)	(533.0)	(181.1)	(215.3)	(380.8)	(207.1)
HouseVote	17.10***	-11.69	-17.07	6.959	9.148	-6.106	1.411	-3.426
	(4.651)	(16.15)	(30.13)	(5.397)	(9.275)	(5.886)	(19.15)	(11.63)
CritIndex	4.617**	-2.870	-0.269	6.423***	0.706	0.551	4.198	3.759
	(2.328)	(3.062)	(2.851)	(2.489)	(2.677)	(1.242)	(5.093)	(3.061)
EnergyProdPC	-0.000630	-0.000176	0.000389	-0.000243	-0.00108	0.000234	0.000391	7.91e-05
	(0.00132)	(0.000202)	(0.000418	(0.000443)	(0.00119)	(0.000129	(0.000341)	(0.000354
ElectricPrice	0.261	-0.0269	-0.270	0.467***	0.133	0.0609	-0.677	-0.125
	(0.200)	(0.284)	(0.774)	(0.137)	(0.178)	(0.112)	(0.912)	(0.238)
ConsumptionP	-1.547	0.125	-2.995	6.467	2.419	4.352*	-5.165	3.843
	(6.142)	(3.427)	(17.12)	(5.141)	(2.009)	(2.229)	(15.46)	(3.862)
CO2Intensity	0.917	0.143	-1.991	-3.431	0.811	-1.368**	-2.612	-2.119**
	(2.420)	(0.715)	(2.023)	(2.530)	(1.274)	(0.589)	(2.837)	(1.074)
Liberalism	0.108***	0.0694*	0.0687	0.0760*	-0.00630	0.0287	0.0738	0.0605*
	(0.0355)	(0.0364)	(0.0830)	(0.0434)	(0.0284)	(0.0219)	(0.0701)	(0.0324)
SierraPC	-131.6	-250.7	60.51	-135.7	-68.28	176.0***	6.959	-6.039
	(247.5)	(359.1)	(162.8)	(320.1)	(224.4)	(38.12)	(196.0)	(90.91)
StateRevenueP	0.0298	0.427**	-0.196	1.723***	-0.0400	-0.0679	-0.361	0.339
	(0.257)	(0.191)	(0.234)	(0.624)	(0.210)	(0.187)	(0.294)	(0.264)
GSPPC	219.1	-144.4	-328.3	-15.12	730.6**	-582.9	110.6	304.5
	(442.2)	(301.8)	(659.3)	(335.6)	(299.5)	(368.4)	(481.6)	(425.9)
PopDens	0.00660	0.000343	-0.000457	0.00192	0.00365	-0.00932*	0.00289	0.000479
	(0.00522)	(0.00472)	(0.0114)	(0.00359)	(0.00580)	(0.00487)	(0.0118)	(0.00453)
LandSqKM	1.34e-	2.33e-06	4.51e-07	8.50e-06	1.07e-	-4.07e-06	3.77e-06	5.22e-07
	(3.18e-06)	(5.93e-06)	(4.37e-06)	(6.16e-06)	(3.10e-	(2.74e-	(5.21e-06)	(3.91e-
Restructure	0.317	0.570	-0.205	-0.364	-0.901	0.122	-1.513	0.432
	(0.874)	(0.599)	(1.343)	(0.859)	(0.812)	(0.571)	(1.321)	(0.693)
Time	0.320**	0.393*	0.603***	0.211	0.363**	0.183**	0.923*	0.339*
	(0.155)	(0.218)	(0.219)	(0.216)	(0.145)	(0.0748)	(0.528)	(0.192)
Constant	-32.84	-7.991	10.99	-18.56	-39.67***	21.42*	-16.37	-28.64
	(21.80)	(6.661)	(21.44)	(13.66)	(11.12)	(12.96)	(18.22)	(21.04)
Obs,	708	647	755	643	662	523	744	690
pR^2	0.501	0.232	0.228	0.436	0.337	0.265	0.335	0.207
Wald X^2	105.19	43.56	131.42	122.38	96.59	149.70	76.78	78.48

p-value: * < .1; ** < .05; *** < .01; Robust standard errors are in parentheses, clustered by state

Table 3. Diffusion variables; With and Without Controlling for Internal Determinants

	High-competition Policies			Low-competition Policies				
	RPS	Corporate Efficiency	Corporate Renewable	Public Benefit	Building Standards	Net Metering	Personal Tax Renewable	Personal Tax Efficiency
Without Controlling for Internal Determinants								
Neighbour	3.486***	1.258	-3.327	3.101***	3.805***	1.567***	0.938	0.142
	(0.703)	(0.913)	(3.111)	(0.918)	(0.674)	(0.459)	(0.898)	(1.238)
Walker	4.987***	7.243***	10.27***	4.010***	5.424***	4.656***	8.574***	14.60***
	(1.000)	(1.524)	(3.054)	(0.745)	(0.838)	(0.748)	(1.563)	(2.709)
With Controlling for Internal Determinants								
Neighbour	-0.482	-1.984	-10.70***	3.315**	-0.586	-2.359	-0.808	-3.001
	(1.391)	(1.530)	(4.121)	(1.408)	(1.136)	(1.581)	(1.998)	(2.507)
Walker	9.239***	13.42***	14.83*	9.024***	3.967**	9.767***	14.32***	24.85*
	(2.269)	(4.191)	(8.173)	(2.489)	(1.796)	(2.471)	(5.506)	(13.06)

p-value: * < .1; ** < .05; *** < .01; Robust standard errors in parentheses, clustered by state

Appendix A: Descriptive Statistics (2008)

Variable	Description of Variable	Source of Data	Obs	Mean	Std. Dev.	Min	Max
Solar Density	kwh/M2/day	NREL	50	4.2364	0.5374268	2.42	5.48
Wind Potential	Pct of US Electricity Potential	NREL (Elliot and Schwartz 1993)	48	3.466667	7.188239	0	36
Biomasspc	Thousand Tons / Year / Population	NREL (Milbrandt, 2005)	50	.0026699	.0044129	.0001292	.0267999
Voter Turnout	Voter total U.S. House election	Office of the Clerk, U.S. House	50	.357137	.0611709	.2258601	.4761996
Criteria Pollutant Index	∑Pct of population living in non-compliance (6 pollutants)	Matisoff (2008)	50	.0641208	.0905446	0	.4140529
Energy ProdPC	000 Btu / capita (coal + gas + oil)	EIA	50	704.2283	3157.463	0	22190.48
Electricity Price	Cents / kwh (total)	EIA	50	11.539	4.41611	6.99	32.5
ConsumptionPC	mmBTU / capita	EIA	49	.3792684	.1661513	.2053847	1.014019
CO2 Intensity	Metric tons (millions) of carbon dioxide / Gross state product (billion $)	EIA	50	.6090798	.442219	.1837141	2.138309
Liberalism	Index of Citizen Liberalism	(Berry et al, 1998)	50	61.33578	17.55346	25.23727	91.84828
SierraPC	Sierra club membership per capita	Sierra Club	50	.0021274	.0011687	.000434	.0054827
State Government RevenuesPC	$1,000/population	Census bureau	50	4.424165	1.88829	1.513686	13.08177
GSPPC	Gross domestic product by state	Bureau of Economic Analysis	50	.0460478	.0092474	.0325307	.0730176
Pop Density	Population / Area	U.S. Census	50	74.02424	99.16165	.4645265	450.9603
Area SQKM	Land area (state)	U.S. Census	50	183235.3	222705.3	2706	1481347
Restructuring	Active Electricity Restructuring (1 = yes)	EIA	50	.18	.3880879	0	1

Appendix B. Highly Competitive Energy Policies: Logistic Regression Results.

VARIABLES	RPS NN	RPS Walker	Corp Eff NN	Corp Eff Walker	Corp Renew NN	Corp Renew Walker
Diffusion Variable	-0.482	9.239***	-1.984	13.42***	-10.70***	14.83*
	(1.391)	(2.269)	(1.530)	(4.191)	(4.121)	(8.173)
Solar Density	1.087	-3.127	0.949	-1.826	-1.904	-4.577
	(4.491)	(5.521)	(1.797)	(2.157)	(4.952)	(3.909)
Wind Potential	0.202	0.309	0.394	0.290	1.096**	0.795
	(0.289)	(0.505)	(0.388)	(0.314)	(0.473)	(0.642)
Solar * GSPPC	-24.69	104.9	-6.001	76.29	17.90	114.0
	(110.7)	(123.9)	(82.55)	(79.54)	(141.4)	(125.5)
WindPot * GSPPC	-0.0202	0.790	-5.406	-3.274	-16.31	-18.41
	(6.623)	(10.54)	(5.516)	(4.732)	(13.51)	(23.08)
BiomassPC	-577.5**	-884.6**	-273.5	-227.0	-908.9**	-464.7
	(251.5)	(430.8)	(317.9)	(245.4)	(367.1)	(320.3)
HouseVote	17.30***	18.22**	-14.28	-8.973	-30.61	-15.11
	(4.648)	(7.323)	(17.32)	(16.34)	(25.22)	(21.43)
CritIndex	4.766*	2.114	-2.712	-0.864	1.358	-3.327
	(2.516)	(3.918)	(3.577)	(4.588)	(5.291)	(5.459)
EnergyProdPC	-0.000978	-0.000313	-0.000201	-0.000333	0.000441	0.000450
	(0.00200)	(0.000438)	(0.000208)	(0.000236)	(0.000375)	(0.000596)
ElectricPrice	0.249	-0.418**	-0.0797	0.00603	-0.259	-0.372
	(0.212)	(0.174)	(0.302)	(0.308)	(0.601)	(0.639)
ConsumptionPC	-1.802	-16.33	0.553	-2.116	-4.379	-4.670
	(5.958)	(10.53)	(3.344)	(2.971)	(13.94)	(16.05)
CO2Intensity	1.339	1.353	0.187	0.810	-2.487	-2.233
	(3.009)	(3.556)	(0.707)	(0.948)	(2.553)	(2.184)
Liberalism	0.113***	0.134***	0.0755**	0.0419	0.127	0.0926
	(0.0404)	(0.0449)	(0.0360)	(0.0332)	(0.111)	(0.0601)
SierraPC	-126.6	-237.1	-67.30	-294.9	191.1**	-621.7
	(261.6)	(341.2)	(430.9)	(394.2)	(83.33)	(915.0)
RevPC	0.0636	0.136	0.420**	0.458*	0.0219	-0.254
	(0.280)	(0.335)	(0.200)	(0.236)	(0.291)	(0.367)
GSPPC	261.3	-152.3	-92.98	-402.7	-287.3	-540.0
	(481.0)	(518.5)	(339.6)	(333.9)	(678.9)	(522.4)
PopDens	0.00722	0.00906	0.000776	0.00226	-0.00376	-0.00435
	(0.00552)	(0.00799)	(0.00468)	(0.00438)	(0.0106)	(0.0112)
LandSqKM	1.33e-05***	2.02e-	1.00e-06	-2.32e-06	-5.40e-06	4.00e-06
	(3.28e-06)	(7.49e-06)	(6.81e-06)	(9.14e-06)	(6.14e-06)	(7.92e-06)
Restruct	0.379	0.615	0.617	0.539	0.188	-0.769
	(0.813)	(1.327)	(0.619)	(0.651)	(1.708)	(0.847)
Time	0.342**	-0.0825	0.489*	-0.0208	0.847***	0.300
	(0.170)	(0.242)	(0.277)	(0.172)	(0.325)	(0.287)
Constant	-35.61	-12.07	-9.612	2.651	9.873	20.29
	(24.61)	(27.68)	(6.704)	(11.16)	(28.66)	(20.27)
Observations	708	663	647	598	755	704
pR^2	0.502	0.605	0.243	0.353	0.332	0.303
Wald X^2	104.46	92.39	48.81	46.07	162.64	675.78

p-value: * < .1; ** < .05; *** < .01; Robust standard errors are in parentheses, clustered by state

Appendix C. Less Competitive Energy Policies: Logistic Regression Results

VARIABLES	Pubben NN	Pubben Walker	Bldg Stds NN	Bldg Stds Walker	Netmeter NN	Netmeter Walker
Diffusion Variable	3.315**	9.024***	-0.586	3.967**	-2.359	9.767***
	(1.408)	(2.489)	(1.136)	(1.796)	(1.581)	(2.471)
Solar Density	-2.344	-1.531	5.803**	2.769	-5.990*	-9.747**
	(3.658)	(8.130)	(2.419)	(2.610)	(3.479)	(4.076)
Wind Potential	1.080**	2.248**	-0.350	0.0180	0.730***	0.999***
	(0.533)	(1.048)	(0.414)	(0.284)	(0.234)	(0.311)
Solar * GSPPC	1.007	14.10	-163.3**	-79.73	140.0	255.7**
	(86.54)	(178.4)	(75.03)	(89.31)	(94.23)	(113.7)
WindPot * GSPPC	-42.33*	-81.85*	4.870	-3.178	-22.22***	-25.22***
	(21.76)	(43.94)	(10.00)	(7.173)	(5.953)	(9.594)
BiomassPC	-211.8	-549.8	-85.34	3.594	-329.4	-675.6*
	(514.8)	(892.0)	(184.2)	(200.9)	(227.9)	(373.4)
HouseVote	5.847	-5.840	9.329	3.020	-4.792	-13.11
	(6.986)	(23.32)	(9.537)	(13.71)	(5.746)	(8.405)
CritIndex	6.929***	10.74**	0.500	0.179	0.427	-4.164*
	(2.480)	(4.184)	(2.661)	(2.923)	(1.373)	(2.184)
EnergyProdPC	-0.000123	0.000298	-0.00118	-0.000251	0.000218*	0.000148
	(0.000599)	(0.00129)	(0.00113)	(0.000320)	(0.000128)	(0.000248)
ElectricPrice	0.513***	-0.0372	0.161	-0.00262	0.0657	-0.114
	(0.147)	(0.194)	(0.190)	(0.250)	(0.121)	(0.134)
ConsumptionPC	8.554	8.364	2.457	1.825	3.927*	3.510
	(5.894)	(7.584)	(2.034)	(2.791)	(2.325)	(2.885)
CO2Intensity	-4.024	-8.724	0.956	-0.864	-1.257*	-2.369*
	(2.915)	(5.350)	(1.218)	(1.566)	(0.644)	(1.276)
Liberalism	0.0615	0.109**	-0.00648	-0.0162	0.0381	0.00300
	(0.0497)	(0.0479)	(0.0286)	(0.0288)	(0.0270)	(0.0268)
SierraPC	-213.1	-863.1	-53.87	-150.1	161.7***	203.5***
	(415.8)	(679.3)	(175.4)	(369.3)	(35.29)	(51.55)
RevPC	1.636**	2.600**	-0.0388	0.168	-0.0180	-0.0583
	(0.650)	(1.275)	(0.208)	(0.274)	(0.180)	(0.227)
GSPPC	-256.9	-327.5	768.7**	407.7	-464.8	-945.1**
	(420.1)	(935.0)	(318.3)	(381.7)	(390.5)	(449.9)
PopDens	0.00508	0.000708	0.00316	0.00379	-0.0107**	-0.0146***
	(0.00530)	(0.00991)	(0.00597)	(0.00525)	(0.00492)	(0.00490)
LandSqKM	1.35e-05	1.79e-05	1.12e-	8.64e-	-3.17e-06	-7.52e-06
	(9.30e-06)	(1.60e-05)	(3.33e-06)	(3.29e-06)	(2.61e-06)	(4.85e-06)
Restruct	-0.513	-0.284	-0.895	-0.909	0.124	0.0103
	(0.940)	(1.151)	(0.814)	(0.741)	(0.596)	(0.574)
Time	0.248	0.109	0.383**	0.114	0.304***	-0.298*
	(0.297)	(0.590)	(0.153)	(0.176)	(0.105)	(0.162)
Constant	-9.216	-7.249	-41.65***	-22.05*	16.10	41.65**
	(15.68)	(39.20)	(11.27)	(12.44)	(14.43)	(17.80)
Observations	643	592	662	624	523	475
pR^2	0.465	0.619	0.338	0.380	0.284	0.378
Wald X^2	132.63	52.50	93.62	151.30	125.57	80.83

p-value: * < .1; ** < .05; *** < .01; Robust standard errors in parentheses, clustered by state

Appendix D. Less-Competitive Policies, Personal Tax Incentives: Logistic Regression

VARIABLES	Pers Renew NN	Pers Renew Walker	Pers Tax Eff NN	Pers Tax Eff Walker
Diffusion Variable	-0.808	14.32***	-3.001	24.85*
	(1.998)	(5.506)	(2.507)	(13.06)
Solar Density	4.998	-4.502	4.523	-0.697
	(4.319)	(3.499)	(3.705)	(6.346)
Wind Potential	0.266	0.238	0.613*	0.386
	(0.286)	(0.303)	(0.315)	(0.453)
Solar * GSPPC	-102.2	135.2*	-128.7	-8.003
	(104.0)	(78.26)	(129.4)	(261.5)
WindPot * GSPPC	-7.963	-9.737	-9.138	2.525
	(7.083)	(6.951)	(6.809)	(11.72)
BiomassPC	181.1	303.9	-580.0*	-676.5**
	(212.0)	(216.4)	(338.5)	(291.2)
HouseVote	-4.339	-7.710	-3.280	-17.79
	(13.07)	(18.89)	(27.36)	(18.90)
CritIndex	3.705	1.209	4.750	-0.659
	(3.115)	(2.583)	(5.118)	(3.434)
EnergyProdPC	8.61e-05	7.26e-05	0.000410	0.000188
	(0.000366)	(0.000252)	(0.000363)	(0.000588)
ElectricPrice	-0.104	-0.199	-0.622	-0.569
	(0.264)	(0.241)	(1.096)	(0.876)
ConsumptionPC	3.280	-0.0170	-7.952	-6.187
	(4.490)	(4.904)	(17.43)	(24.35)
CO2Intensity	-2.118*	-1.985*	-1.926	-3.249**
	(1.096)	(1.132)	(2.979)	(1.638)
Liberalism	0.0584*	0.0297	0.0648	0.111**
	(0.0309)	(0.0317)	(0.0721)	(0.0549)
SierraPC	3.948	-195.7	39.49	-683.5
	(68.50)	(271.4)	(90.70)	(911.0)
RevPC	0.343	0.604	-0.288	0.251
	(0.275)	(0.446)	(0.395)	(0.707)
GSPPC	330.5	-618.4*	296.8	-227.6
	(442.2)	(350.9)	(678.6)	(987.5)
PopDens	0.000475	0.00312	0.00235	-0.00714
	(0.00458)	(0.00598)	(0.0172)	(0.0122)
LandSqKM	-1.08e-07	4.54e-06	3.10e-06	4.53e-06
	(4.46e-06)	(5.47e-06)	(5.07e-06)	(1.57e-05)
Restruct	0.459	0.740	-1.037	-1.976**
	(0.691)	(0.777)	(1.323)	(0.880)
Time	0.355**	-0.0106	0.956*	0.129
	(0.171)	(0.272)	(0.498)	(0.309)
Constant	-28.90	13.04	-19.34	10.59
	(20.74)	(17.69)	(19.26)	(18.98)
Observations	690	653	744	700
pR^2	0.209	0.363	0.349	0.566
Wald X^2	83.04	67.27	138.31	336.27

p-value: * < .1; ** < .05; *** < .01; Robust standard errors in parentheses, clustered by state

Appendix E – Selected Policy Summaries

Policy	Policy Description	Example State Legislation (for each policy a selection for a randomly selected state is provided)
Renewable Portfolio Standards	Requires utilities, usually serving a minimum population, to generate or purchase enough renewable energy to supply a percentage of their electric sales	Connecticut Requires each electric supplier and each electric distribution company wholesale supplier to obtain at least 23% of its retail load by using renewable energy by Jan 1, 2020. The RPS also requires each electric supplier and each electric distribution company wholesale supplier to obtain at least 4% of its retail load by using combined heat and power systems and energy efficiency by 2010
Business and corporate tax credits (renewable)	Financial incentives for eligible renewable and other technologies installed and placed into service	Hawaii The Hawaii Energy Tax Credits allow corporations to claim an income tax credit of 20% of the cost of equipment and installation of a wind system and 35% of the cost of equipment and installation of a solar thermal or photovoltaic (PV) system
Business and corporate tax credits (efficiency)	Financial incentives for certain energy-efficient equipment installed and placed into service	Georgia The following credit limits for various technologies: Lighting retrofit projects: $0.60 / square foot of building Energy-efficient products: $1.80 / square foot of building

Public benefit funds	Collects public funds, for example using a public goods surcharge on ratepayer electricity, to create public funds for renewable energy and energy efficiency projects	Oregon Requires energy utilities to collect a 3% public-purpose charge from their customers to support renewable energy and energy efficiency projects
Energy standard for public buildings	Promote energy conservation in state-owned buildings	Alabama State departments and agencies are encouraged and promoted to conserve energy in state-owned buildings. The initiative aims to reduce energy consumption by 10% in all conditioned, state-owned facilities by the end of Fiscal Year 2008, and 20% by Fiscal Year 2010 (as compared to 2005 levels). State departments and agencies are encouraged to employ the latest energy-conservation practices in the design, construction, renovation, operation, and maintenance of state facilities
Personal tax credits (renewable)	Incentives for residential consumers to install and implement renewable energy systems	Utah The individual income tax credit for residential systems is 25% of the reasonable installed system costs up to a maximum credit of $2,000 per residential unit. Eligible residential systems include active and passive solar thermal systems; solar electric systems; wind turbines; hydro energy; geothermal heat pumps direct-use geothermal; and biomass

Personal tax credits (efficiency)	Incentives for residential consumers to purchase and install energy-efficient products	Virginia The incentive is available for dishwashers, clothes washers, air conditioners, ceiling fans, compact fluorescent light bulbs, dehumidifiers, programmable thermostats or refrigerators that meet or exceed federal Energy Star standards. For taxable years beginning in 2007, individuals may claim a deduction of 20%, up to $500, on their state income tax return for sales tax paid to purchase certain energy-efficient products
Net metering	Incentives consumers to implement on-site renewable energy generation	Minnesota Each utility must compensate customers for customer net excess generation (NEG) at the average retail utility energy rate defined as the total annual class revenue from sales of electricity minus the annual revenue resulting from fixed charges, divided by the annual class kilowatt-hour sales
Energy standards for public buildings	Promotes the reduction of energy use in public buildings	Iowa In April 2005, Iowa governor issued an executive order directing state agencies to reduce electricity and natural gas use in buildings by an average of 15% by 2010, relative to their energy use in 2000

Source: Database of State Incentives for Renewables & Efficiency 2012 (www.dsireusa.org)

Appendix F: Adoption of Energy Policies by state

	RPS	Personal tax (Renew)	Personal Tax (Efficiency)	Public benefit fund	Building standards	Net meter	Corporate tax credit (Efficiency)	Corporate tax credit (Renewable)
Alabama					2006			
Alaska								
Arizona	2006	1994	2001		1998	2008	2006	
Arkansas					2005	2001		
California	2002			1996	2005	1995		
Colorado	2004				2005	2005		
Connecticut	1998			1998	2006	1998		
Delaware	2005			1999	2004	1999		
Florida					2007	2008	2006	
Georgia		2008				2001	2008	2008
Hawaii	2004				2006	2004		
Idaho		2005	1999		2008			
Illinois	2007			1997	2005	2007		
Indiana					2008	2004		
Iowa		2005			2005		2005	
Kansas								
Kentucky			2008		2008	2005		2008
Louisiana		2007			2007	2003	2007	
Maine	2006			1997	2003	1998		
Maryland	2004	2000	2001		1992	1997	2000	2001
Massachusetts	1997		1999	1997	2007	2008		
Michigan	2008		2008	2000	2008	2008		
Minnesota	2001				2001			
Mississippi								
Missouri	2008		2008		1993	2007	1997	
Montana	2005	2001	2004	1999		1999	2001	2004
Nebraska								
Nevada	2005					1997		
New Hampshire	2007			2002	2005	1998		
New Jersey	1999			1999	2002	1999		
New Mexico	2006	2006	2007	2005	2006	2008	2002	2007
New York	2004	1997	2009	1996	2001	1998	2001	2000
North Carolina	2008				2007	2005		
North Dakota		2001				1991	2001	
Ohio				1999	2007	1999		
Oklahoma			2005		2008		2002	
Oregon	2007	2007	2007	1999	1991	1999		
Pennsylvania	2004			1996	2004	2004		
Rhode Island	2004	2006		1996	2005	2006	2006	
South Carolina		2006					2006	

South Dakota							
Tennessee							
Texas	1999				1995		
Utah		2001			2006	2002	2001
Vermont	2005	2008		1999		1998	2008
Virginia					2007	1999	
Washington	2007				2005	1998	
West Virginia						2006	2001
Wisconsin	1998			1999	2006	1992	
Wyoming						2001	

Appendix G: Highly Competitive Policies Results (Census and Census Subregions)

VARIABLES	RPS Census	RPS SubReg	Corp Eff Census	Corp Eff Subreg	Corp Renew Census	Corp Renew Subregion
Diffusion Variable	9.728***	14.32***	13.53***	9.624***	28.27	45.56**
	(2.344)	(3.577)	(4.657)	(2.976)	(22.00)	(22.66)
Solar Density	-5.749	-11.41	0.651	1.323	-0.864	0.555
	(4.472)	(7.163)	(1.501)	(1.820)	(5.396)	(4.741)
Wind Potential	0.197	0.106	0.306	0.187	0.625	0.994**
	(0.312)	(0.254)	(0.370)	(0.337)	(0.402)	(0.470)
Solar * GSPPC	157.4	326.1*	-7.583	-17.89	-1.883	-42.06
	(107.7)	(182.5)	(72.80)	(80.99)	(164.2)	(120.1)
WindPot * GSPPC	-1.554	2.551	-2.229	-3.044	-11.38	-10.78
	(6.483)	(5.620)	(4.808)	(4.672)	(13.50)	(12.30)
BiomassPC	-457.7**	-379.9	-256.9	-150.3	-490.5**	-998.5***
	(192.8)	(276.8)	(325.7)	(262.6)	(204.0)	(338.0)
HouseVote	13.93***	11.36**	-12.02	3.407	-11.29	-7.344
	(5.098)	(4.415)	(16.63)	(23.26)	(18.78)	(11.10)
CritIndex	1.934	-2.318	-1.857	-1.312	-5.136	-13.77
	(3.180)	(5.711)	(3.247)	(2.936)	(5.136)	(9.138)
EnergyProdPC	-0.000501*	-0.000891	-0.000197	-0.000217	0.000320	0.000596
	(0.000269)	(0.000620)	(0.000205)	(0.000267)	(0.000429)	(0.000516)
ElectricPrice	-0.233	-0.328**	-0.0692	-0.0186	-0.388	-0.565
	(0.166)	(0.167)	(0.289)	(0.378)	(0.476)	(0.496)
ConsumptionPC	-9.096	-9.684	-0.363	-2.301	-5.572	-11.09
	(6.124)	(7.385)	(4.071)	(3.426)	(16.27)	(14.05)
CO2Intensity	1.772	1.806	-0.0269	1.333	-1.818	-4.654**
	(1.848)	(1.486)	(0.742)	(1.393)	(1.809)	(2.222)
Liberalism	0.144***	0.136***	0.0732*	0.0385	0.0631	0.0959
	(0.0411)	(0.0365)	(0.0396)	(0.0384)	(0.0530)	(0.0608)
SierraPC	-331.6	-313.3	-187.3	-214.8	-659.7	-926.0**
	(243.8)	(306.7)	(325.5)	(444.2)	(650.5)	(466.8)
RevPC	-0.267	-0.0490	0.580***	0.535**	-0.0349	0.478
	(0.302)	(0.313)	(0.223)	(0.241)	(0.366)	(0.556)
GSPPC	-353.5	-1,006	-105.3	-80.64	-107.7	-200.4
	(441.7)	(685.5)	(298.4)	(353.3)	(676.8)	(452.0)
PopDens	0.00834	0.00848*	0.00189	0.00615	-0.00418	-0.00423
	(0.00608)	(0.00474)	(0.00463)	(0.00725)	(0.00896)	(0.00501)
LandSqKM	1.98e-05***	1.95e-	1.42e-06	5.73e-06	3.76e-06	1.15e-05
	(5.82e-06)	(7.08e-06)	(6.64e-06)	(7.79e-06)	(5.79e-06)	(9.00e-06)
Restruct	-0.0756	-0.579	0.609	0.677	-0.300	-0.845
	(1.146)	(1.195)	(0.604)	(0.592)	(1.083)	(0.730)
Time	-0.133	-0.443	0.0191	0.182	0.204	0.312*
	(0.152)	(0.275)	(0.129)	(0.154)	(0.298)	(0.171)
Constant	-2.118	23.67	-7.451	-15.35	5.985	3.573
	(21.31)	(29.39)	(6.721)	(12.35)	(25.86)	(16.92)
Observations	708	708	647	647	755	755
pR^2	0.588	0.648	0.274	0.347	0.330	0.490
Wald X^2	192.09	242.85	37.47	36.19	356.32	161.60

p-value: * < .1; ** < .05; *** < .01; Robust standard errors in parentheses, clustered by state

Appendix H: Low Competition Policies – Logistic Regression Results

VARIABLES	Pubben Census	Pubben Subregion	Bldg Stds Census	Bldg Stds Subregion	Netmeter Census	Netmeter Subregion
Diffusion Variable	7.564***	8.194***	4.176*	7.967***	10.70***	9.353***
	(2.180)	(2.358)	(2.235)	(1.871)	(3.469)	(2.927)
Solar Density	-0.346	1.923	3.654	3.832	-7.800*	-8.219*
	(4.716)	(3.536)	(2.518)	(2.787)	(4.125)	(4.420)
Wind Potential	1.084*	1.016	-0.439	-0.544	0.833**	0.662
	(0.594)	(0.771)	(0.434)	(0.420)	(0.395)	(0.453)
Solar * GSPPC	-44.96	-53.95	-107.8	-98.17	182.1*	207.3*
	(96.96)	(83.70)	(73.01)	(63.44)	(108.2)	(118.5)
WindPot * GSPPC	-47.28*	-37.64**	6.995	8.106	-26.05**	-21.24*
	(27.27)	(18.18)	(10.79)	(10.01)	(10.34)	(11.83)
BiomassPC	-346.9	-90.82	-87.37	-3.132	-468.8	-434.1
	(838.5)	(743.7)	(219.6)	(143.0)	(301.5)	(299.0)
HouseVote	5.192	9.333	8.005	10.69**	-10.49	-6.318
	(6.628)	(6.448)	(7.309)	(4.812)	(6.993)	(6.797)
CritIndex	6.482***	7.594**	0.495	-2.567	-3.500	-2.640
	(2.313)	(3.834)	(2.686)	(2.889)	(2.292)	(2.163)
EnergyProdPC	-0.000142	-0.000174	-0.00109	-0.000692	0.000194	0.000257
	(0.00101)	(0.000934)	(0.00130)	(0.00135)	(0.000152)	(0.000166)
ElectricPrice	0.148	0.259	-0.0320	-0.144	-0.124	-0.103
	(0.289)	(0.167)	(0.242)	(0.312)	(0.163)	(0.139)
ConsumptionPC	4.360	3.888	2.276	-1.406	5.894**	2.233
	(4.997)	(12.20)	(2.029)	(2.511)	(3.003)	(2.491)
CO2Intensity	-3.165	-4.007	0.743	1.011	-1.580**	-0.899
	(2.980)	(3.713)	(1.376)	(1.665)	(0.748)	(0.577)
Liberalism	0.103***	0.122***	-0.0126	-0.0109	0.0248	-0.000235
	(0.0370)	(0.0386)	(0.0285)	(0.0385)	(0.0238)	(0.0257)
SierraPC	-857.9	-890.6**	-51.99	-92.74	244.5***	207.0***
	(725.4)	(434.4)	(168.9)	(364.3)	(62.48)	(50.50)
RevPC	1.931*	2.140*	0.0865	0.112	-0.0962	-0.0724
	(1.031)	(1.143)	(0.216)	(0.267)	(0.202)	(0.170)
GSPPC	28.80	87.34	531.3*	538.0**	-586.1	-688.6
	(506.6)	(401.3)	(306.4)	(272.7)	(442.0)	(475.8)
PopDens	-0.000317	-0.00228	0.00465	0.00514	-0.0158**	-0.0115**
	(0.00977)	(0.00982)	(0.00578)	(0.00548)	(0.00664)	(0.00557)
LandSqKM	1.70e-05	1.36e-05	1.12e-	1.18e-	-4.15e-06	-4.85e-06
	(1.59e-05)	(1.22e-05)	(3.08e-06)	(4.06e-06)	(3.52e-06)	(3.21e-06)
Restruct	-0.211	-0.177	-0.876	-0.466	0.194	0.234
	(0.943)	(1.119)	(0.784)	(0.844)	(0.645)	(0.676)
Time	0.0263	-0.100	0.125	-0.103	-0.315*	-0.306
	(0.440)	(0.516)	(0.166)	(0.155)	(0.168)	(0.204)
Constant	-16.73	-30.13	-28.55**	-28.28**	28.12*	30.30*
	(19.22)	(19.69)	(12.12)	(13.56)	(16.22)	(17.38)
Observations	643	643	662	662	523	523
pR^2	0.562	0.624	0.355	0.462	0.339	0.394
Wald X^2	182.24	138.78	111.67	183.47	79.60	74.78

p-value: * < .1; ** < .05; *** < .01; Robust standard errors in parentheses, clustered by state

Appendix I: Low Competition Policies – Logistic Regression Results

VARIABLES	Pers Renew Census	Pers Renew Subregion	Pers Tax Eff Census	Pers Tax Eff Subregion
Diffusion Variable	24.75**	24.43***	19.05***	27.29***
	(10.07)	(6.416)	(7.039)	(6.843)
Solar Density	5.526	8.534	4.863	8.145
	(5.783)	(9.222)	(4.062)	(5.540)
Wind Potential	0.181	0.544	0.231	0.475
	(0.370)	(0.451)	(0.279)	(0.512)
Solar * GSPPC	-109.8	-233.8	-120.9*	-240.9***
	(115.3)	(187.0)	(71.78)	(92.70)
WindPot * GSPPC	-2.125	-11.52*	-0.694	-7.634
	(5.322)	(6.912)	(6.215)	(8.690)
BiomassPC	206.0	121.3	-570.0	-765.1
	(286.7)	(359.2)	(395.2)	(818.6)
HouseVote	-3.014	-15.44	10.42	6.627
	(14.68)	(22.93)	(17.97)	(27.10)
CritIndex	3.018	1.184	1.346	-4.914
	(3.454)	(4.620)	(5.890)	(6.130)
EnergyProdPC	-0.000825	-0.00319	0.000362	-0.00152
	(0.00251)	(0.00285)	(0.000488)	(0.00667)
ElectricPrice	-0.178	-0.208	-0.760	-1.119
	(0.267)	(0.341)	(0.905)	(1.239)
ConsumptionPC	5.417	11.99	-3.577	-4.416
	(5.606)	(7.613)	(17.10)	(21.11)
CO2Intensity	-1.964	-1.539	-3.903	-3.931
	(1.672)	(2.810)	(2.707)	(5.823)
Liberalism	0.0550	0.0722	0.0985	0.173**
	(0.0349)	(0.0455)	(0.0682)	(0.0772)
SierraPC	-437.9	-1.041	-971.7*	-1,023
	(452.3)	(68.42)	(554.0)	(1,416)
RevPC	0.715*	0.789*	-0.249	-0.333
	(0.434)	(0.402)	(0.361)	(0.278)
GSPPC	319.0	792.8	157.2	683.5
	(453.7)	(773.6)	(301.3)	(463.6)
PopDens	0.00197	0.00368	-0.000255	-0.00198
	(0.00540)	(0.00597)	(0.0101)	(0.0181)
LandSqKM	-2.18e-06	6.21e-06	4.90e-06	7.37e-06
	(6.72e-06)	(7.08e-06)	(7.56e-06)	(1.02e-05)
Restruct	0.474	0.666	-2.402**	-3.479***
	(0.771)	(0.705)	(1.024)	(1.146)
Time	-0.164	0.0459	0.575	0.426
	(0.230)	(0.175)	(0.514)	(0.780)
Constant	-30.65	-46.09	-17.76	-30.10
	(27.99)	(44.40)	(21.44)	(30.20)
Observations	690	690	744	744
pR^2	0.331	0.442	0.408	0.503
Wald X^2	86.14	67.66	142.98	392.32

p-value: * < .1; ** < .05; *** < .01; Robust standard errors in parentheses, clustered by state

Appendix K: Correlations Between Internal Determinant Variables (Year=2008)

	Solar Density	Wind potential	Biomass per capita	House Vote	Crit Index	Energy Prod per capita	Electric Price	Consumption per capita	CO_2 Intensity	Liberalism	Sierra per capita	Revenue per capita	GSP per capita	Population Density	Land	Restructure
Solar Density	1															
Wind Potential	-0.02	1														
Biomass per capita	-0.12	0.78	1													
House Vote	-0.57	0.35	0.31	1												
Crit Index	-0.02	-0.23	-0.30	-0.14	1											
Energy Prod. Per capita	-0.00	0.29	-0.01	0.14	-0.11	1										
Electric Price	-0.06	-0.31	-0.31	-0.10	0.31	-0.12	1									
Consumption per capita	-0.24	0.52	0.34	0.07	-0.29	0.66	-0.26	1								
CO_2 Intensity	-0.04	0.45	0.37	0.03	-0.32	0.60	-0.40	0.74	1							
Liberalism	-0.45	-0.09	-0.01	0.35	0.20	-0.29	0.49	-0.36	-0.29	1						
Sierra per capita	-0.12	-0.14	-0.27	0.35	0.19	-0.03	0.37	-0.35	-0.41	0.53	1					
Revenue per capita	-0.44	0.24	0.09	0.14	-0.05	0.46	0.25	0.63	0.44	0.11	-0.00	1				
GSP per capita	-0.26	0.21	-0.07	0.07	0.28	0.44	0.38	0.34	-0.05	0.18	0.26	0.48	1			
Pop. Density	-0.19	-0.30	-0.30	-0.10	0.42	-0.15	0.48	-0.38	-0.38	0.45	0.09	0.02	0.31	1		
Land	-0.18	0.35	0.00	-0.00	0.02	0.17	-0.04	0.52	0.17	-0.24	0.04	0.44	0.32	-0.34	1	
Restructure	-0.06	0.25	0.24	0.03	0.29	-0.05	-0.05	-0.02	-0.05	0.21	0.20	-0.10	0.14	0.06	0.00	1