



institut du développement durable et des relations internationales – 6, rue du Général Clergerie – 75116 Paris – France – Tél. : 01 53 70 22 35 – iddri@iddri.org – www.iddri.org

idées
POUR LE DÉBAT

N° 06/2006 | CHANGEMENT CLIMATIQUE

Bringing the material back in: US responses to the global climate change regime

Dana R. Fisher (Department of sociology, Columbia University)

Dana R. Fisher a présenté cette communication lors de la conférence qu'elle a donnée le 21 mars 2006, dans le cadre du séminaire Développement durable et économie de l'environ-

nement co-organisé par l'Iddri et la chaire Développement durable EDF-Ecole poly-technique ; Ce texte n'engage que son auteur. En mettant ce document en ligne sur son site, l'Iddri a

pour objectif de diffuser des travaux qu'il juge intéressants pour alimenter le débat.

Tous droits réservés

**BRINGING THE MATERIAL BACK IN:
United States Responses to the Global Climate Change Regime***

Dana R. Fisher
Department of Sociology
Columbia University

Running Head: Bringing the Material Back In

Forthcoming: *Sociological Forum*

* Please direct all correspondence to:

Dana R. Fisher
Department of Sociology
Columbia University
324M Fayerweather Hall
1180 Amsterdam Avenue; Mail Code 2551
New York, New York 10027
Phone: 212-854-9623
drf2004@columbia.edu

The author would like to thank William R. Freudenburg, Lewis Friedland, Aaron Gullickson, Charles Tilly and the Contentious Politics Workshop at Columbia University for providing comments and suggestions on earlier drafts of this article. The author would also like to thank Nicole Kaufman for her research assistance and Doug Miller for providing assistance in creating Figure 1.

BRINGING THE MATERIAL BACK IN: Understanding the United States Position on Climate Change

Abstract

Since environmental sociology was born as a sub-discipline of sociology, its proponents have encouraged sociological research that incorporates environmental factors. After a quarter of a century, however, sociological research continues to overlook the role of environmental factors—even when the object of the research is to understand an environmental issue. This paper analyzes the role of environmental factors to understand the ways that natural resource interests have been translated into political outcome in the form of American responses to the potential regulation of greenhouse gases. Incorporating data about natural resource use and national decision-making both before and after the Bush Administration's decision to pull out of negotiations for the Kyoto Protocol, this paper concludes that comprehending fully political decisions about global climate change in the United States requires that we recognize the conjoint constitution between policy-making and the environmental factors that are affected by such policies. More broadly, this research supports the notion that, in order to understand social phenomena more fully, sociologists must recommit to bringing environmental factors into social research.

Key Words: Environmental Sociology, Policy-Making Processes, Natural Resource Dependence and Global Climate Change

Introduction

With the birth of environmental sociology in the 1970s, scholars working within this relatively new sub-discipline encouraged sociological research that incorporated environmental factors (see especially Burch 1971; Buttel 1986; Catton and Dunlap 1980; Dunlap and Catton 1979; Humphrey and Buttel 1982). One of the major topics of discussion in the newly formed American Sociological Association Section on Environmental Sociology¹ was the tacit understanding that sociological research should not include inquiry into natural environmental factors. So consistent was this concern that, when Buttel reviewed the “New Directions in Environmental Sociology” in 1987, he stated that the core of the theoretical work on environmental sociology had been “self consciously fashioned as a critique of ‘mainstream’ sociology” (p. 468). At the time, in fact, it was possible to find statements—including those in some of the top journals in sociology—that indicated a relatively clear disregard for the importance of ecological constraints on society (e.g. Choldin 1978; Greenwood 1984; Jeffery 1976; Michelson 1976; van den Beghe 1978; but see Duncan 1964; Field and Johnson 1986; Firey 1960; Hawley 1944). In the words of Manfred Stanley in his article in the *American Sociological Review* (1968: 855), for example, he summarizes the tendency of social scientists to focus on the “progressive substitution of sociocultural explanations for those stressing the determinative influence of physical nature.”

Sociologists working within the emerging subfield of environmental sociology, however, acknowledged the need to incorporate environmental variables into their research. As noted by Dunlap and Catton in their influential piece in the *Annual Review of Sociology*, “Environmental sociology involves recognition of the fact that physical environments can influence (and in turn

¹ This American Sociology Association section is now called the Section on Environment and Technology.

be influenced by) human societies and behavior. Thus, environmental sociologists depart from the traditional sociological insistence that social facts can be explained only by other *social* facts” (Dunlap and Catton 1979: 244 emphasis in original; see also Dunlap and Catton 1983; Dunlap 2002). The authors go on to recognize the “acceptance of ‘environmental’ variables as meaningful for sociological investigation,” considering it the hallmark of environmental sociological research (1979: 244; see also Dunlap 1986).

A quarter of a century later, it has become extremely rare to see sociological research that clearly overlooks the ways that society is affected by and affects the natural environment. In addition, it has become considerably less rare to find environmental articles in leading sociology journals (see e.g. Buttel 2000; Fisher and Freudenburg 2004, 2005; Foster 1999; Frank et al. 2000a, 2000b; Goldman and Schurman 2000; Molotch et al. 2000; York et al. 2003a; York and Rosa 2005). As this paper will argue, however, even with this growth, the role of environmental factors in social affairs continues to be underrated. In fact, as recently as 2002, Buttel stated: “It remains relatively uncommon within contemporary sociological circles to devote serious attention to the natural world and the social relations that shape and are shaped by the natural world” (201). The reasons behind this neglect are not likely to be the product of an overt bias or the enduring legacy of the Durkheimian dictum. Instead, as Guterbock recognizes in his study of the effects of snow on urban density patterns (1986), the task may simply be far more difficult than is commonly understood. In his own words, he encourages inclusion of environmental characteristics: “if we omit climate—and environmental factors generally—from our sociological models, we do so at the peril of seriously misunderstanding our social world” (1986: 382-3).

Building on this challenge to sociological research, Freudenburg et al. present the notion of the *conjoint constitution* between natural resources and society, suggesting that “the physical characteristics do matter, but they matter in a way that depends to a large degree on the practices, perspectives and technologies that are taken for granted in a given time and place. At the same time, the social definitions of the situation can depend...on the physical environment, both in its raw form and as modified by past human activity” (1995: 372). Applying this notion of the conjoint constitution to political decision-making, this paper examines the ways that the environmental factors of a nation-state affect its policies.

There are many cases of sociological research that illustrate this point. Perhaps the acid test, however, would be to consider what is widely understood as an explicitly environmental issue, and one that has already been analyzed by a number of scholars, including some of the leading environmental sociologists in the world. Fortuitously, there happens to be just such a case, involving the fact that the United States is one of the only nations in the world to reject the Kyoto Protocol,² the international treaty that regulates greenhouse gases.³ As I will discuss in detail in the pages that follow, social scientific inquiry has focused on a variety of *social* aspects of the United States to understand its climate change policy and its position on the Kyoto Protocol (e.g. Gelbspan 1997; Harris 1998, 2000; Leggett 1999; Lisowski 2002; Lutzenhiser 2001; McCright and Dunlap 2000, 2003; Sprinz and Weiss 2001; Victor 2001). Although these accounts explain specific aspects of the policy-making process, they overlook the significant role

² Although there are a number of developed, or Annex I, countries that have not ratified the Protocol, the United States is the *only* nation to reject the treaty publicly. During her closing statement at the climate change negotiations in 2001, Undersecretary of State for Global Affairs Paula Dobriansky, who became the head of the U.S. delegation in May 2001, publicly stated that the United States thinks that the Kyoto Protocol “is not sound policy” (Dobriansky 2001).

³ The term “greenhouse gases” refers to carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

that the country's natural resource endowment plays in affecting climate change policy. In other words, there has been surprisingly little attention paid to the conjoint constitution between policy-making in the United States and the specific environmental characteristics of the country and its energy infrastructure.

This article, accordingly, explains the responses to the potential regulation of greenhouse gases in the United States by looking at America's natural resource endowment and how it affects decision-making. On the pages that follow, I briefly review the accounts put forth by sociologists to understand decision-making around global climate change in the United States. I then review the work of scholars who have looked at the role of natural resource interests, paying particular attention to the notion of the conjoint constitution and how it can be applied to this particular case. Following that review, I present data on the relationship between America's natural resource endowment and domestic climate change policy-making both before and after the Bush Administration's decision. In this section, I show how dependence on a particular natural resource was translated into domestic policy. Finally, I discuss the implications of these findings on the ways that sociologists conduct research, suggesting that there is a need to recommit to incorporating environmental factors into sociological analyses so that we may understand these phenomena more fully.

Sociological Perspectives on a Specific Society-Environment Relationship

As has been previously stated, environmental sociologists have been calling for the meaningful inclusion of environmental factors in sociological research since the sub-discipline was born in the 1970s. Even with this call to incorporate environmental factors into sociological research,

however, sociological research continues to focus primarily on social factors. In particular, as a general level of consensus emerged among atmospheric scientists who see a linkage between anthropogenic emissions of greenhouse gases and an increase in the earth's propensity to retain the sun's heat (see for example IPCC 2001; National Research Council 1992, 2001), sociological research has increasingly concerned itself with understanding aspects of this environmental issue. However, much of the sociological research on global climate change continues to focus on the role of social phenomena independent from environmental factors.

Understanding Climate Change Policy in the United States

One particularly relevant case in point is the sociological research that explores the relationship between greenhouse gas emissions and the social characteristics of nation-states (e.g. Dietz and Rosa 1997; Roberts and Grimes 1997; York et al. 2003b; see also Fisher and Freudenburg 2004; Roberts 2001). Generally, this work tends to focus on the relationship between emissions and affluence, as well as other social characteristics, analyzing how they are related to national emissions. Although the purpose of this research is to understand the variance in emission levels of different countries, it has a relatively clear policy component. York, Rosa and Dietz, for example, find that population is "a key driving force of [greenhouse gas] emissions" (2003b: 43). In discussing the implications of their findings, the authors caution the reader, stating that one cannot "be entirely sanguine about institutional [or political] change" (p. 44). Similarly, in his study of global inequality and climate change, Roberts links the inequality of greenhouse gas emissions to global politics surrounding the Kyoto Protocol (2001). Although these scholars are studying an explicitly environmental issue, most of the research overlooks the potential role of environmental factors.

This omission is even more obvious in the small but growing research on the politics of climate change in the United States (e.g. Harris 1998, 2000; Lutzenheiser 2001; McCright and Dunlap 2000, 2003; Rudel 2001; Sprinz and Weiss 2001; Victor 2001; but see Fisher 2004; see also Gelbspan 1997; Leggett 1999 for more popular accounts). In his attempt to explain the U.S. withdrawal from the Kyoto Protocol, for example, Lisowski applies Putnam's logic of the two-level game between international and national politics (Putnam 1988; see also Evans et al. 1993). In the study, Lisowski finds that U.S. President George W. Bush took advantage of politics inside the United States to "legitimize his hawkish approach" internationally (2002: 101). Lutzenheiser also focuses on policy to explain the U.S. position on climate change. Analyzing the different proposals for potential climate change policy in the United States, the author finds that, as of summer 2001, there was "no U.S. climate policy and little debate about one" (2001: 512). Although his conclusion suggests that there is a need to look at the distribution of consumption and pollution, the author looks specifically at political and economic factors to explain what he calls the *non-policy* in the United States.

Perhaps the most surprising of these sociological studies of American climate change policy is presented by McCright and Dunlap (2000, 2003). Although Dunlap is one of the leading sociologists to criticize what he calls the "extremely 'unecological' traditions and perspectives in modern social science" (1980: 5; see also 1986, 2002; Dunlap and Catton 1979, 1983), he and his colleague focus on explicitly social factors to explain American climate change policy. The authors study the role of the conservative movement and the ways that this movement was able to challenge the science of the issue in the United States (2000, 2003; see also Boehmer-Christiansen 1994). In their more recent investigation, they conclude that: "the

conservative movement and especially the conservative think tanks appear to have successfully affected our nation's policy-making, this time with international implications" (2003: 370).

Although the aspects of the debate put forth by these existing sociological studies of American climate change policy are important, they focus on specific features of the debate in isolation, without considering the role that environmental factors may be playing in national decision-making processes. As I will argue in the section that follow, because the most well-known greenhouse gas—carbon dioxide—is emitted as a product of all fossil fuel combustion, debates surrounding the regulation of greenhouse gases in the U.S. are inherently related to the natural resource endowment of this country and the specific resources that fuel its energy infrastructure.

Exploring the Relationship between Natural Resource Endowments and Decision-Making

Even though the research on global climate change does not explicitly incorporate environmental factors, a relatively unrelated literature provides a potential point of departure for exploring the effects that natural resource endowments have on society (e.g. Bunker 1985, 1992, 1996; Drucker 1985; Elo and Beale 1985; Flora 1990; Freudenburg 1992; Freudenburg and Gramling 1994; Humphrey et al. 1993; Martinez-Alier 1995; Peluso et al. 1994; Smith 1994; Weber 1995). In fact, outside of discussions of climate change policy a number of scholars have studied the role that natural resource interests—or those social actors that have an economic and/or political investment in natural resources—have played in national decision-making in the United States (e.g. Heinz et al. 1993; Nash 1968; Sherrill 1983; Vietor 1980). In particular, these scholars focus on the natural resources that are used as sources of energy with the goal of understanding how the political interests associated with these particular resources affect energy policy more

broadly (e.g. Chubb 1983; Goodwin 1981; Laumann and Knoke 1987). Laumann and Knoke highlight the challenges to regulating natural resources that fuel the energy infrastructure.

Energy policy is “entangled with questions of regional development, environmental quality, and national security” (Laumann and Knoke 1987: 44; see also Vietor 1980).

To understand these challenges, it is important to explore the role that land-use plays in decision-making. In his work on the city as a growth machine, Molotch presents what he calls a “political economy of place” (1976). Although the focus of his study is urban areas and unemployment, the author provides a useful framework for understanding the relationship between natural resource endowments and decision-making. In particular, Molotch outlines the ways that the “government becomes the arena in which land-use interest groups compete for public money and attempt to mold those decisions which will determine the land-use outcomes” (312). Through this process, the author explains how government decisions affect the cost and access to raw materials in a variety of ways. At the same time, Molotch argues that land areas—be they communities or nations—should be seen as a “mosaic of competing land interests capable of strategic coalition and action” (311; for an example of this type of action, see Hansen 1991).

But what determines the relationship between *particular* land interests and the ways that they affect political decision-making? To understand the relationship between natural resource interests and the politics of climate change, we must return to the broader literature on the society-environment relationship to reconsider the role of environmental factors. This relationship is, perhaps, best presented in the notion of the *conjoint constitution*, which, as has been previously noted, highlights the need to incorporate environmental factors into sociological research. Its central component is the recognition that there is a “mutual contingency” between

the physical and social worlds. In the words of Freudenburg: “What have commonly been taken to be ‘physical facts’ are likely in many cases to have been shaped strongly by social construction processes, while at the same time, even what appear to be ‘strictly social’ phenomena are likely to have been shaped in important if often overlooked ways by the fact that social actions often respond to stimuli and constraints from the biophysical world” (2002: 233: see also Freudenburg et al. 1995).

Within their work on the conjoint constitution, Freudenburg et al. look at the degree to which the environment and society are interrelated by analyzing the meanings and uses of the area along the Michigan-Wisconsin border that is known as *Iron Mountain* (1995). Because of its environmental characteristics, this mountain has served multiple social purposes over time: as hunting grounds and living space to the Menominee tribe before European settlers arrived; as a source of timber for the early English-speaking residents; as a source of iron ore during the period of railroad expansion in the U.S.; and then, when technology developed that made a different type of iron ore more attractive and strip mining the preferred means of iron extraction, the mountain became a site for regional tourism. The authors conclude that it is not merely social construction, but the “interplay of the social and the physical” that leads society to take for granted our “socially agreed-upon definitions” (1995: 388). In other words, certain characteristics of the natural resources themselves contribute to the influence they wield in the policy-making arena. Combining the notion of the conjoint constitution between society and the natural environment with the ways that land-use interests in the growth machine affect decision-making, this paper explains how America’s natural resource endowment, in terms of its dependence on oil and coal, affects national policy-making.

By looking at national efforts to regulate global climate change in the United States since 1997, I unpack the relationship between the natural resource endowment of the United States, as represented by certain energy interests that fuel the country's economy, to understand how geographically diffuse and labor intensive natural resource interests have been translated into policy outcome. The rest of this paper is broken down into three sections. First, I trace natural resource extraction and consumption throughout the United States paying particular attention to how this reliance on indigenous natural resources affects political decision-making. Second, I present data on the ways that natural resource dependence has influenced national decision-making around the issue of global climate change in the United States, focusing on three points in history: United States Senate Resolution 98, which passed unanimously in July 1997; the Senate vote on the Climate Stewardship Act of 2003, which took place after the Bush Administration decided to reject the Kyoto Protocol; and the more recent sub-national policies in nine American states to implement emission targets. Finally, I discuss how the inclusion of environmental factors significantly adds to our understanding of this important political issue, suggesting that future sociological research must consider these factors in a meaningful way.

Data and Methods

This paper incorporates three very different types of data: secondary quantitative data on the energy infrastructure in the United States, data that were collected through interviews with people involved in the climate change debate in the United States, and data on political parties and the voting behavior of elected representatives. The quantitative data for this paper were collected from multiple sources as cited within the text. The qualitative data for this paper were collected during three research trips to Washington, DC. The first two trips took place in April

and August 2000, during the last year of the Clinton Administration. The last trip took place in May 2001, during the first year of the Bush Administration. In addition, I met with a number of representatives from the U.S. at the Conference of the Parties-6 (COP-6) climate change negotiations in the Hague in 2000, and at the Conference of the Parties-6bis (COP-6bis) climate change negotiations in Bonn in 2001. In total, I met with over fifty people engaged in the issue of climate change in the United States, formally interviewing twenty-eight of them who were key players involved in determining the policy decisions regarding global warming in the United States. Building off of the work of Lofland and Lofland (1995), the interviews were open-ended and semi-structured. Interviewees included scientists, government officials, and representatives of industry and social movement organizations. They represent a snowball sample of those who contributed to political decisions regarding the regulation of greenhouse gases in the United States. Some of the people whom I interviewed agreed to meet under the assumption that they would not be directly attributed. In the cases where I reference those conversations, I cite the person's general affiliation.

Natural Resource Dependence and the American Energy Infrastructure

As a first step in understanding the connection between natural resource endowment and political decision-making in the United States, we begin by looking the specific characteristics of the energy infrastructure in the United States. David Gardiner, the Deputy Chairman of the White House Climate Change Task Force during the Clinton Administration, introduced the overall relationship between the energy infrastructure and climate change regulation when he spoke about the difficulty of climate change policy-making in the United States:

I think, in the end, there's a large group of economic interests who are happy with the way things are today and would be perfectly happy if the

world did not change. And in the end, if we're going to deal with climate change, we must change the way in which we produce and use energy, and there are powerful economic interests who...prefer the status quo and oppose change...Underneath it all, what's really going on here is the debate about that set of politics, and we believe we have to change: We believe that the future is in clean energy and not dirty energy (interview with author, Gardiner 2000).

Such a shift from dirty to clean energy, however, would have a significant effect on the energy infrastructure of the United States. One aspect of that infrastructure is its sheer size: the U.S. is the largest energy producer, consumer and net importer in the world (Energy Information Administration 2002), but another aspect of the energy infrastructure is its specific character. In the words of William L. Fang, Deputy General Counsel of the Edison Electric Institute, which represents the companies that produce 70 percent of all electricity in the U.S.⁴, "In the U.S., you've got plentiful forms that can be cheaply transported, and that's why renewables haven't come in very much in our industry or anywhere else. So I think those help account for some of the...policy responses to those kinds of situations" (interview with author, Fang 2000). Table I, which presents overall energy production and consumption, shows the distribution of indigenous energy supply and energy consumption in the United States in 2000. It is important to note the specific fuel sources being produced in this country: the U.S. produces high levels of coal and natural gas and, to a lesser extent, crude oil.

TABLE I ABOUT HERE

As can also be seen in Table I, 38.8% of U.S. energy consumption is oil. Indigenous American oil, in combination with the open spaces within the United States, have contributed to the U.S. becoming the most automobile-dependent country in the world. Dependence on motor vehicle travel, in fact, has been found to be one of the best predictors of carbon dioxide

⁴ www.eei.org/resources/eei/ (Accessed October 2, 2003)

emissions in the developed world (Fisher and Freudenburg 2004, 2005). Although U.S. dependence on oil plays a significant role in explaining carbon dioxide emissions, it is my contention that understanding policy outcomes regarding climate change involves focusing on land use in the form of natural resource extraction.

Although the U.S. consumes significant amounts of oil and natural gas, it produces just about 55% of those fuels. In contrast, the U.S. produces more coal than it consumes. This point is particularly significant given the variation in the carbon dioxide emissions from the consumption of the different types of fossil fuels. “Coal releases more CO₂ per unit of generated energy than does oil, and oil more than natural gas”(International Energy Agency 2000a: 20). As the *New York Times* reported in July 2001, more specifically, “American coal-powered plants pump 2.3 billion tons of CO₂ into the air each year—twice as much as the amount emitted by cars” (Goodell 2001: 6). Hugh Pitcher, Staff Scientist of the Global Climate Change Group at the Pacific Northwest National Laboratory, discusses the implications of this difference, “You could roughly meet the Kyoto [Protocol] targets for the United States if you shut down every coal-fired electricity generating plant and replaced it with a combined cycle gas turbine” (interview with author, Pitcher 2000). This statement highlights the fact that it is not just *overall* energy consumption and production that is important to understanding the American responses to the issue of global warming, but also important are the natural resource interests that will be most affected by the regulation of carbon dioxide emissions.

As Pitcher’s observation suggests, more important than the overall levels of energy consumption may be the fact that 22.8% of the energy consumed in the United States is fueled by coal (Energy Information Administration 2002). Perhaps even more important than the overall

consumption of coal is the fact that the U.S. has the largest coal reserves in the world. The significance of this point is stressed by Kert Davies, the Science Policy Director of one of the leading environmental groups working on climate change, Ozone Action, which was absorbed by Greenpeace in 2001, “Who will get hit [by the regulation of greenhouse gases in the United States] is coal, not so much oil...if you’re a power plant or a power company, you’re in deep trouble, because they’re the ones who really have to move” (interview with author, Davies 2000). As has been previously stated, in contrast to oil, natural gas and nuclear power, the U.S. produces *more* coal that it consumes. Therefore, any regulation of carbon dioxide will not only affect electricity companies, it will also affect the companies that extract the coal and the workers who do the mining. Both Davies and Pitcher speak of electricity production when they speak about coal consumption in America. Table II provides a list of the fuel share in electricity generation in the United States. As can be seen in the table, 52.3 percent of all U.S. electricity is generated from coal.

TABLE II ABOUT HERE

Given the high level of carbon emissions from coal, why does the U.S. continue to consume so much? In the view of William Fang, Deputy General Counsel of the Edison Electric Institute, the abundance of indigenous coal makes a shift difficult. If the country were to switch to another fuel source: “Tremendous amounts of natural gas would be needed, and the price, supply, the delivery of gas, those are all huge questions” (interview with author, Fang 2000). Fang, a lobbyist for the electricity industry, claims that an energy transition in the U.S. away from coal would be very expensive, if it were possible at all. In addition to the cost of such a transition is the effect it would have on the regions of the United States that extract coal. Not only does the U.S. produce high levels of coal as a whole, but coal extraction is geographically

diffuse across the United States. In contrast to the U.S. oil reserves, which are “concentrated overwhelmingly (over 80%) in four states -- Texas (24%, including the state's reserves in the Gulf of Mexico), Alaska (22%), Louisiana (20%, including the state's reserves in the Gulf of Mexico), and California (19%, including the state's Federal Offshore reserves)” (Energy Information Administration 2003), coal has been mined around the country for decades (e.g. Vietor 1980). In 2000, coal extraction took place in twenty-six of the fifty states: thirteen states are major coal-producing states, extracting more than 25 million short tons of coal a year; and thirteen states are lesser coal-producing states, extracting less than 25 million short tons in 2000 (United States Energy Information Administration 2000b). These states comprise what Leggett has called the “problematic heartland of coal” in the U.S. (1999: 249). Figure 1 presents a map of coal-producing states in the United States.

FIGURE 1 ABOUT HERE

In addition to their differences in geographical distribution, oil and coal extraction involve very different levels of labor intensity. Oil extraction has become increasingly mechanized and does not require a significant labor force.⁵ In contrast, coal mining has been one of the most labor-intensive of the extractive industries (for a social history of coal usage, see Freese 2003). Although there are significant differences in the degree of labor intensity due to the type of coal being mined,⁶ the United Mine Workers—the national union for all American miners—continues to be very strong and plays a significant role in the national policy arena. In 2004, the union ranked as one of the 30 largest labor unions in the United States.⁷

⁵ See www.texas-ec.org/tcp/101oil.html for a full summary of the history of oil extraction in America (Accessed March 24, 2004).

⁶ See www.eia.doe.gov/oiaf/archive/aeo98/coal_pr.html for a full discussion (Accessed March 24, 2004).

⁷ www.infoplease.com/ipa/0/1/0/4/6/3/A0104634.html (Accessed 1 April 2004).

Because coal extraction is so labor intensive, the political influence of coal mining is further heightened by what Freudenburg and Gramling call the “social multiplier effect” wherein “social interaction patterns can exert powerful influences on individuals’ attitudes” (2004: 205; see also 1994). In other words, even though coal mining only employed an estimated 2.1% of the labor force in West Virginia in 2004,⁸ because far more people in the state have friends, family and neighbors who work in the industry, the influence of this particular natural resource is significantly larger than the number of people actually working in the mines. As a result of the labor intensity of coal mining and its social multiplier effect, public opinion tends to support the industry in areas where coal extraction takes place (for a full discussion of how public opinion affects public policy, see Burstein 1998; Burstein and Linton 2002; see also O’Connor et al. 2002). In short, these different characteristics of America’s natural resource endowment are very significant and affect the ways that political interests associated with these resources get translated into policy outcomes. As will be discussed in more detail in the following sections, the geographical distribution of coal resources, along with the labor intensity of its extraction, has an effect on the proclivities of states’ elected officials, as well as that of President Bush, who comes from the only state in the nation that extracts significant amounts of coal *and* oil.

Natural Resource Dependence and Domestic Policy-Making

The importance of coal as an energy source and as an economic good, when seen from the perspective of a coal-producing state, is stressed by the legislative assistant and counsel to

⁸ These numbers are based on estimations provided by the US Energy Information Administration (www.eia.doe.gov/cneaf/coal/page/acr/table18.html [accessed April 25, 2006]) and the US Census Bureau (factfinder.census.gov/servlet/QTTable?_bm=n&_lang=en&q_r_name=DEC_2000_SF3_U_DP3&ds_name=DEC_2000_SF3_U&geo_id=04000US54 [Accessed on April 25, 2006]).

Senator Michael Enzi, a Republican Senator from Wyoming—a state that happened to be responsible for 31% of U.S. coal extraction in 2000. “We also have...strong concerns and interests in coal...Part of the things that the Kyoto Protocol would do would be to take out our ability to produce and utilize that coal. That would be the end of the state economy...Those elements fund a lot of the state, and we actually have seen many big benefits that have come from that” (interview with author, Scholes 2000). Not surprisingly, Senator Enzi was one of a number of Senators from coal states who proposed legislation to limit climate change regulations in the United States.

More broadly, with coal being extracted from twenty-six of the United States, fifty-two of the one-hundred U.S. Senators come from states in which coal production contributes to the state economy and coal extraction employs many people in the labor force. In addition, even more states run their electricity plants off of the cheap and indigenous U.S. coal supply. In other words, although the Deputy Director of the White House Climate Change Task Force during the Clinton Administration was indeed correct when he stated that the U.S. “must change the way in which we produce and use energy” in order to address the issue of global warming (interview with author, Gardiner 2000), the lack of support for a change in the U.S. energy infrastructure is widespread. A transformation of the U.S. away from coal as the main source of electricity for the economy would not only affect the owners of a few wealthy companies; it would also affect those working to extract the resource, as well as more than half of the electricity consumers in the United States. In addition, given the vast quantities of coal that are shipped to power plants on American railways (Vietor 1980: 4), an energy transition in the U.S. would likely affect the transportation sector as well. In other words, the specifics of the energy infrastructure in the

United States, particularly given the geographical distribution and labor intensity of U.S. coal extraction, has a significant effect on national policy outcomes. This natural resource dependence in the U.S. is very important and, I contend, contributes significantly to political debates that have shaped the lack of a national climate change policy in the United States.

Throughout its eight-year-term, the Clinton Administration actively negotiated for the Kyoto Protocol and supported strong climate change policy-making in the United States. Consistent with the claims of scholars who study the relationship between political interests and political outcomes (e.g. Laumann and Knoke 1987), the Clinton Administration, which was very sensitive to environmental interests, supported climate change regulation in the United States. The Congress, in contrast, which includes representatives from the twenty-six coal-extracting states mentioned above and was the focus of significant pressure from natural resource interests, had a very different position than that of the Administration.

The Byrd-Hagel Resolution

Perhaps the most well known national policy regarding climate change in the United States is Senate Resolution 98, or what has come to be known as the Byrd-Hagel Resolution. On 25 July 1997, over four months prior to the climate change negotiations in Kyoto, Japan—where the Kyoto Protocol would be drafted—the U.S. Senate unanimously voted to pass the Byrd-Hagel Resolution. In sum, the Resolution stated that “the United States should not be a signatory to any protocol...at negotiations in December 1997, or thereafter” (U.S. Senate, 1997a: Report Number 105-54). This Resolution made clear the Senate’s position against legally binding emission reduction targets, before the Administration sent its negotiating team to Kyoto in December.

The lead sponsors of the Resolution were freshman Republican Senator Chuck Hagel from Nebraska and Democratic Senator Robert Byrd from West Virginia. As pointed out by a senior staff member of the Senate Energy and Natural Resources Committee, Hagel was hand-picked to stop the regulation of greenhouse gases by the Global Climate Coalition, an industry-sponsored non-profit organization that lobbied on behalf of automobile and energy interests. In the staff member's own words, "The Republicans were looking for somebody to take the lead on climate change and the campaign against [the] Kyoto [Protocol]...I was at his very first fundraiser when they announced he was their lead guy on climate change" (interview with author, Senior Staff, 2001).

Senator Byrd, in contrast, was one of the most senior Democrats in the Senate. Even though he expressed some confidence in the importance of the issue of climate change (e.g. U.S. Senate 1997b: S8118), the Senator hailed from the coal extracting state of West Virginia. IN 2000, for example, West Virginia was responsible for 14% of all U.S. coal-production (United States Energy Information Administration 2000b). Some accounts, in fact, report that Byrd, himself, recruited most of the support for the Resolution. In the words of Rafe Pomerance, one of the U.S. negotiators from the State Department at the time, "Byrd went and lined everybody up ...[he] walked around with the Resolution [asking Senators to] sign his Resolution" (interview with author, Pomerance 2000). Senators representing states with energy interests as well as Democrats in the Senate were both observed signing on to the Resolution due to Byrd's personal involvement with it.

On July 25, 1997, the Resolution passed unanimously in the Senate with a vote of 95-0. Perhaps the most reasonable interpretation of its success is that different members of the Senate supported it for altogether different reasons. It is very probable that some Senators supported it

because Byrd—a Senior Democrat in the Senate—asked for their assistance. Others, however, strongly believed in the message within the Resolution—that a treaty that was based on the pre-existing international agreements about the rules of the climate change treaty under negotiation would be harmful to their political interests. Although, in many cases, Congressional Resolutions are non-binding, frequently nothing but “acts of friendship or rewards or whatever” (interview with author, Pomerance 2001), Senate Resolution 98 may not be such a benign policy recommendation.

In fact, the Byrd-Hagel Resolution still stands today as a reminder that the U.S. Senate did not support the rules for the Kyoto Protocol that was to be drafted in Japan later that year. In fact, United States President George W. Bush’s decision to change his Administration’s position on the regulation of carbon dioxide was announced in a letter he wrote to one of the original sponsors of Senate Resolution 98: Senator Hagel—the Senator who was reportedly hand picked by the Global Climate Coalition to stop the regulation of greenhouse gases. Even though the Resolution still represents the political interests of many of the Senators who signed it, many agree that, were there to have been another vote on the Resolution in 2001, it would not have been unanimous. In the words of the staff member of a leading Senator on global climate change, the Resolution “could never be done again” (interview with author, Legislative Assistant 2001). Whether or not the Resolution itself maintained the same level of support that it had in 1997, consensus in the Senate has continued to follow the opinions put forth by industrial lobbyists, such as Edward Yawn, the Director of Government Relations of the Edison Electric Institute, the association of U.S. shareholder-owned electric companies,⁹ “[Senate Resolution 98]

⁹ Adapted from <http://www.eei.org/resources/eei/>

is a key indicator of where the Senate is on the [Kyoto] Protocol” and on policies regarding global climate change (interview with author, Yawn 2000).

The Climate Stewardship Act of 2003

Although issues surrounding the passage of the Byrd-Hagel Resolution suggest that there is a connection between natural resource dependence in the United States and legislative political outcomes, the fact that the bill passed unanimously—even with the explanations given above—does not provide ample evidence for this claim. More than two years after the Bush Administration pulled out of the negotiations for the Kyoto Protocol, however, debates about the regulation of greenhouse gases re-emerged in the Senate and, within this debate, the role that natural resource dependence plays in domestic policy outcomes can be seen more clearly.

When Senators McCain and Lieberman pushed for a vote on their proposed “Climate Stewardship Act” in summer 2003, debates about the issue of climate change erupted on Capitol Hill once again. Even though the Act did not address the Kyoto Protocol directly, on July 28th, Senator Inhofe—a Republican Senator from Oklahoma, a coal-producing state, and the chairman of the Senate Environment and Public Works Committee—gave a two-hour speech on the floor of the Senate regarding the science of climate change and the political viability of the ratification of the Kyoto Protocol. In his own words:

95 Senators—both Democrats and Republicans—who, according to Byrd-Hagel, presumably oppose ratification if the [Kyoto] treaty came up on the Senate floor... You have Senators who are of the liberal persuasion—fine people but certainly [of] a different philosophy than mine... who are really sincerely talking in favor of this Kyoto Treaty, but they cast their vote against it. They said: We don’t want to ratify this treaty, and we are not going to ratify this treaty (U.S. Senate 2003a: S10015-6).

When Senators McCain and Lieberman tried to re-open discussion in the Senate about the domestic regulation of greenhouse gases through the Climate Stewardship Act, the high-ranking chairman invoked the unanimous vote on the Byrd-Hagel Resolution, redirecting the debate to the topic of the Kyoto Protocol, stating that discussions were a waste of time.

Even with such opposition, a revised version of the Climate Stewardship Act was voted upon in the Senate in October 2003. The Union of Concerned Scientists summarized the bill: “The current version of the CSA [Climate Stewardship Act] calls for a reduction in emissions of heat-trapping gases to 2000 levels by the year 2010. The bill creates a market-based system of tradable allowances to achieve this reduction...The CSA would also set up a program of scientific research on abrupt climate change (for the full text of the Act, see U.S. Senate 2003b).¹⁰ The bill was defeated in a vote on October 30, 2003. In contrast to the unanimous vote on the Byrd-Hagel Resolution in 1997, however, the vote on the Climate Stewardship Act was much closer: the measure was defeated by twelve votes. Looking at the relationship between the fifty-five Senators who voted against the Act and resource dependence throughout the United States provides more data to support the overall hypothesis of this paper: understanding American climate change policy requires a recognition of the role that the natural resource dependence plays in domestic policy-making.

Natural resource dependence was operationalized by each state’s extraction of coal and oil: states that did not extract either resource were coded with a 0, those states that extracted less than 25 million short tons of coal in 2000 were identified as lesser coal-producing states and were coded with a 1, those states that extracted more than 25 million short tons of coal in 2000 were identified as major coal-producing states and were coded with a 2 (Energy Information

¹⁰ www.ucsusa.org/global_environment/global_warming/page.cfm?pageID=1237 (Accessed 1 April 2004).

Administration 2000b).¹¹ In addition, the four states that extracted the majority of the oil in the U.S. in 2003 were coded with a 1 (Energy Information Administration 2003). Total natural resource extraction for each state was calculated by summing their levels of coal and oil extraction. The values of each state ranged from 0 to 3, with only one state—Texas—scoring a 3 because it extracts significant levels of both coal and oil. Fourteen states scored a 2 because they are either major coal-producing states or minor coal-producing states that *also* extract oil, twelve states scored a 1 for extracting less than 25 million short tons of coal a year *or* extracting oil, and twenty-three states scored a 0 for extracting neither coal nor oil.

Next, these levels of natural resource dependence were compared to the Senators who opposed the Climate Stewardship Act.¹² The relationship between natural resource extraction and opposition to the Act is very significant ($r = .645$) suggesting that Senators from resource dependent states were significantly more likely to vote against the bill than those from non-extracting states. Moreover, coal-dependent states, as reported by the United States Energy Information Administration, were just as strongly associated with those Senators who voted against the Climate Stewardship Act ($r = .657$). In other words, Senators from states that extract coal—which is a geographically diffuse and labor-intensive process—were significantly more likely to oppose the Act.

¹¹ By adopting this coding scheme, I consider the extraction of oil and coal to be threshold variables. For the twenty-six states that extract coal, I utilize the distinction made by the United States Energy Information Administration to determine the boundary between lesser coal-producing states and major coal-producing states (United States Energy Information Administration 2000b).

¹² Because the Climate Stewardship Act aimed to regulate greenhouse gases, I look here at whether Senators from resource dependent states voted *against* it. It is important to note that only 98 of the 100 U.S. Senators voted on the Climate Stewardship Act. Two Senators—Senator Nelson (D) from Nebraska and Senator Edwards (D) from North Carolina—abstained from the vote.

The relationship between coal dependent states and opposition to the Climate Stewardship Act becomes even clearer by looking at a cross tabulation of the relationship between the levels of coal dependence, as measured by coal extraction, and opposition to the Act. Table III presents the cross tabulation. None of the fourteen senators that supported the Act came from states with significant coal dependence; these states did not extract more than 25 million short tons of coal in 2000. Conversely, in states where there was any level of coal extraction taking place, at least one senator opposed the Act. Using a Pearson chi-square test of opposition to the bill, I test the null hypothesis that the voting for the bill was the same for states irrespective of their coal endowment. The results are statistically significant, and the null hypothesis is rejected ($\chi^2 = 27.87$, d.f. = 2, $p < .000$). In short, these findings present a very clear relationship between coal dependence and opposition to domestic climate change regulation.

TABLE III ABOUT HERE

It is also worth noting that there is a strong relationship between Republican representation in the Senate and opposition to the bill ($\chi^2 = 31.946$, d.f. = 4, $p < .000$). In order to test how coal dependence and the party affiliation of the Senators affects the votes against this bill, Table IV presents the results of two logistic regressions of votes of individual Senators against the Climate Stewardship Act. Model 1 confirms that coal extraction significantly affects the voting behavior of Senators. In Model 2, which includes coal extraction as well as party affiliation, both of the variables are very significant predictors of the outcome of the vote. In other words, far from the relationship between coal extraction and the vote on the Climate Stewardship Act being made spurious with the inclusion of the party affiliation of the Senators, coal extraction continues to play a very significant role in the vote on this national climate policy.

TABLE IV ABOUT HERE

In sum, these results provide additional support for the claim that political outcomes are the product of the interaction between the society and the natural environment. In other words, state dependence on coal extraction, along with the political party affiliation of the elected official contributes to his/her voting behavior on policies related to global climate change. These findings are consistent Freudenburg and Gramling's work on the "social multiplier effect" of oil extraction (1994, 2004). With coal extraction being significantly more labor intensive than oil extraction, it is likely that states that extract high levels of coal would have a significant social multiplier effect. Such an effect translates into the voting behavior of individuals, as well as the political positions of the people whom the citizens elect to represent them.

The social multiplier effect, along with the labor intensity of coal extraction, also contributes to the effectiveness of the lobbying tactics of the union representing coal miners in the United States: the United Mine Workers. Because of the potential implications of climate change legislation on coal mining in the United States, the union has actively lobbied against bills that aim to regulate carbon dioxide emissions. In 1999, the president of the union, Cecil Roberts, gave testimony before the United States Senate Committee on Energy and Natural Resources stating that reducing carbon dioxide emissions in the United States would cost "over a million lost American jobs and over \$100 billion per year in lost economic output" (Roberts 1999). Potential mining job losses were also referenced by Senator Inhofe in his statement on the floor of the Senate during the debate over the Climate Stewardship Act on October 30, 2003 (U.S. Senate 2003b: S13597).

With the continued lack of success for bills to regulate greenhouse gas emissions at the national level and the Bush Administration's continued emphasis on increasing natural resource extraction in the United States,¹³ some states have begun to regulate their perceived contribution to climate change at the sub-national level. As of March 2006, twenty-eight states had implemented what have been called "comprehensive plans" to address climate change. These different plans, however, have been called a "patchwork quilt" of policies by the Pew Center on Global Climate Change because of the high variation of commitment and enforcement included in each plan (Pew Center on Global Climate Change 2006: 1).

Although these plans run the gamut, nine of the twenty-eight states had implemented state-wide emission targets to reduce greenhouse gas emissions by March 2006: California, New Mexico, New Jersey, Maine, Massachusetts, Connecticut, New York, Washington, and Oregon. In order to assess the relationship between coal dependence and such sub-national policies, I focus on those few states that have implemented emissions targets. Looking at a cross tabulation of the coal dependence of states and those that have implemented climate action plans with emission targets, the role of this natural resource becomes even clearer. Table V presents the cross tabulation. Here, none of states that are major coal extractors and produce more than 25 million short tons a year have implemented a climate action plan that includes actual emission targets and only two of the states that are minor coal extracting states have implemented such a policy. In fact, seven of the nine states that have implemented these policies extract no coal.

TABLE V ABOUT HERE

¹³ Although President Bush stated his commitment to addressing what he called America's oil *addiction* by increasing energy efficiency and investing in alternative energy technology during his 2006 State of the Union address (Bush 2006), national funding for such programs has been significantly reduced during the Bush Administration's tenure in the White House (e.g. Lavelle 2006).

Although there are only nine cases of such state-level policies to date, analysis of this small number of cases also points to the enduring role that coal extraction plays in climate change policy in the United States, even at the sub-national level. Using a Pearson chi-square test of states with climate action plans that include emission targets, I tested the null hypothesis that implementing such plans was the same for states irrespective of their coal endowment. The results are not quite statistically significant ($\chi^2 = 3.997$, d.f. = 2, $p < .136$). In contrast to the vote on the Climate Stewardship Act in 2003, however, there is no relationship between political party affiliation and those states that have implemented climate action plans with emission targets ($\chi^2 = 0.595$, d.f. = 1, $p < .441$).¹⁴

Discussion and Conclusion

Although the analysis of the limited number of states that have implemented emission reduction targets should be interpreted with caution, the overall results support the notion that natural resource dependence in the form of coal extraction affects political decision-making in the United States. In short, the results of the analysis of the Byrd-Hagel Resolution, the Climate Stewardship Act of 2003, and the more recent state-level policies to regulate greenhouse gas emissions prove that including aspects of the natural resource endowment contributes significantly to our understanding of American climate change policy. In other words, this research provides support for the notion that natural resource interests are translated into political outcome through the growth machine (Molotch 1976). Resource dependence in the United States plays a significant role in domestic decision-making, particularly with regard to issues such as

¹⁴ In this analysis, I include the party affiliation of each state's governor, as it is the executive of each state who is responsible for implementing such climate action plans.

global climate change, where regulation will have an affect natural resource extraction and use. Presenting data that span ten years of domestic policy and two very different Administrations, I have shown that it is the resource dependence of the nation-state and not partisan politics that determines domestic decision-making with regard to global climate change.¹⁵ In fact, when including political party along with coal extraction in the analysis of the Climate Stewardship Act of 2003, dependence on coal played continues to play a significant role in explaining the variation in the vote. And, for the more recent state-level policies, political party plays no role in explaining which states have implemented greenhouse gas emission targets.

Although other social scientific research has focused on very important aspects of this issue in the United States, I contend that the lack of a national climate change policy in the United States is the product of the conjoint constitution between the natural resources that fuel the country's energy infrastructure and domestic policy-making. In other words, the issue of global warming has become what Lutzenhiser (2001) calls a "non-policy" *because* natural resource dependence has affected national policy-making. Like the multiple social uses of Iron Mountain explained by Frendenburg et al. (1995), it is the social uses of coal that give it economic and political value. If, for example, alternative fuel technology were perfected and coal were no longer seen as the cheapest indigenous energy source in the United States, it is likely that the strong relationship between coal and decision-making would no longer hold. Additionally, if clean coal technology was workable and coal could be consumed without emitting any greenhouse gases, the voting behavior of Senators from coal-dependent states would likely change. Until such technological innovation occurs, however, we must recognize

¹⁵ It is also important to note that having a president who comes from the most natural resource-dependent state in the entire country certainly makes this type of relationship more visible.

the importance of the role that environmental factors and their social uses play in social processes. As Freudenburg et al. point out: “While it is possible to separate the physical from the social in terms of analytical convenience, it is important to recognize that the social is inherent in what is usually seen as the physical, just as the physical is often integral to what is perceived as the social” (Freudenburg et al. 1995: 386).

In 2002, Dunlap looked back on the formation of environmental sociology as a sociological sub-discipline. He “realized that mainstream sociology had developed a set of traditions and taken-for-granted assumptions that led our discipline to ignore the biophysical environment....In my mind, a ‘real’ environmental sociology would involve examination of environmental variables (especially as causes or effects) in relation to social variables” (2002: 330-331). Even with appeals by many of the leading environmental sociologists in the world, however, sociologists who study the politics of environmental issues—including Dunlap himself—have overlooked the role that environmental factors play in social processes. By considering the conjoint constitution between natural resources and political decision-making in this paper, we are able to understand better both America’s position on climate change policies and, more generally, American society.

Thus, future research must continue to incorporate environmental factors in sociological studies. More specifically, research should explore the relationship between natural resource dependence and domestic policy-making, focusing particularly on the effects that geographically diffuse and labor-intensive interests have on political outcomes. These findings suggest that countries with similar energy endowments and resource dependencies—no matter what their ideological position on the issue of global warming—will adopt similar policies. Australia, the

other very coal-dependent state that would be regulated by the Kyoto Protocol,¹⁶ for example, did not to ratify the Protocol. Research is needed to see if there is a similar relationship between Australia's natural resource endowment and its national climate change policy.

In addition, the findings of this paper suggest that future research should focus explicitly on the complex relationship between political representation and natural resource dependence. Although it is clear that geographically diffuse and labor-intensive resource dependence can affect the voting behavior of elected officials, further research must explore the natural resource growth machine and how it translates into political representation. By moving forward in these directions, sociologists will be able to answer important questions about the political implications of the relationship between society and the natural environment.

¹⁶ The Protocol only includes legally binding carbon dioxide emission reductions for developed—or Annex I—countries only.

References:**Boehmer-Christiansen, Sonja**

- 1994 "Global Climate Protection Policy: the limits of scientific advice." *Global Environmental Change* 4:140-159.

Bunker, Stephen G

- 1985 *Underdeveloping the Amazon*. Urbana: University of Illinois Press.
- 1992 "Natural Resource Extraction and Power Differentials in a Global Economy." In Ortiz, S. and S. Lees (eds.) *Understanding Economic Process*: Pp. 61-84. Lanham: University Press of America.
- 1996 "Raw Material and the Global Economy: Oversights and Distortions in Industrial Ecology." *Society and Natural Resources* 9:419-429.

Burch, William R

- 1971 *Daydreams and nightmares; a sociological essay on the American environment*. New York,: Harper & Row.

Burstein, Paul

- 1998 "Bringing the public back in: Should sociologists consider the impact of public opinion on public policy?" *Social Forces* 77:27-62.

Burstein, Paul and April Linton

- 2002 "The impact of political parties, interest groups, and social movement organizations on public policy: Some recent evidence and theoretical concerns." *Social Forces* 81:381-408.

Bush, George W

- 2006 State of the Union Address By the President. January 31, 2006. Available at www.whitehouse.gov/stateoftheunion/2006/index.html (Accessed April 20, 2006).

Buttel, Frederick H.

- 1986 "Sociology and the Environment: the winding road toward human ecology." *International Social Science Journal* 109:337-356.
- 1987 "New Directions in Environmental Sociology." *Annual Review of Sociology* 13:465-488.
- 2000 "World Society, the Nation-State, and Environmental Protection." *American Sociological Review* Vol. 65, No. 1:117-121.
- 2002 "Environmental sociology and the sociology of natural resources: Institutional histories and intellectual legacies." *Society & Natural Resources* 15:205-211.

Catton, William R. Jr. and Riley E. Dunlap

- 1980 "A New Ecological Paradigm for Post-Exhuberant Sociology." *American Behavioral Scientist* 24:15-47.

Choldin, H. M.

1978 "Social Life and the Physical Environment." in D. Street (ed.) Handbook of Contemporary Urban Life: Pp. 352-84. San Francisco: Jossey-Bass.

Chubb, John E.

1983 Interest groups and the bureaucracy : the politics of energy. Stanford, Calif.: Stanford University Press.

Dietz, Thomas and Eugene A. Rosa

1997 "Effects of Population and Affluence on CO2 Emissions." Proceedings of the National Academy of Science 94:175-9.

Dobriansky, Paula J.

2001 "Closing Statement to the Seventh Session of the Conference of Parties (COP-7)." Marrakech, Morocco. Available on: www.state.gov/g/oes/rls/rm/6050.htm (Accessed 18 February 2006).

Drucker, Peter F.

1986 "The Changed World Economy." Foreign Affairs 64:768-791.

Duncan, Otis Dudley

1964 "Social Organization and the Ecosystem." In R. E. L. Faris (ed.) Handbook of Modern Sociology: Pp. 36-82. Chicago: Rand McNally.

Dunlap, Riley E.

1980 "Paradigmatic Change in Social Science: from human exemptions to an ecological paradigm." American Behavioral Scientist 24:5-14.

1986 "Environment, Ecology, and Agriculture Revisited: Ancestor Worship and the Dangers of Disciplinary Myopia." The Rural Sociologist 6, Number 4:304-314.

2002 "Paradigms, Theories, and Environmental Sociology." In R. Dunlap, F. H. Buttel, P. Dickens, and A. Gijswijt (eds.) Sociological Theory and the Environment: Classical Foundations, Contemporary Insights: Pp. 329-350. Lanham: Rowman & Littlefield Publishers, Inc.

Dunlap, Riley E. and William R. Catton

1979 "Environmental Sociology." Annual Review of Sociology 5:243-273.

1983 "What Environmental Sociologists Have in Common (whether concerned with 'built' or 'natural' environments)." Sociological Inquiry 53:113-35.

Elo, Irma T. and Calvin L. Beale

1985 Natural Resources and Rural Poverty: An Overview. Washington DC: Resources for the Future.

Energy Information Administration (EIA)

- 2000 "Coal Production and Number of Mines by State and Mine Type, 2000." Washington, DC: Energy Information Administration. Available at: www.eia.doe.gov/cneaf/coal/cia/html/tb103p01p1.html (Accessed 1 April 2004).
- 2002 Annual Energy Review 2002. Available at: www.eia.doe.gov/emeu/aer/overview.html (Accessed 1 April 2004).
- 2003 "United States of America-Energy Report." Washington, DC: Energy Information Administration. Available at: www.eia.doe.gov/emeu/cabs/usa.html#oil (Accessed 1 April 2004).

Evans, Peter B., Harold Karan Jacobson, and Robert D. Putnam

- 1993 Double-edged diplomacy : international bargaining and domestic politics. Berkeley: University of California Press.

Field, Donald R. and Darryll R. Johnson

- 1986 "Rural Communities and Natural Resources: A Classical Interest." *The Rural Sociologist* 6, Number 2:187-96.

Firey, Walter

- 1960 *Man, Mind and Land: a theory of resource use*. Westport, CT: Greenwood Press, Publishers.

Fisher, Dana R

- 2001 "Resource dependency and rural poverty: Rural areas in the United States and Japan." *Rural Sociology* 66:181-202.
- 2004 *National Governance and the Global Climate Change Regime*. Latham, MD: Rowman & Littlefield Publishers.

Fisher, Dana R. and William R. Freudenburg

- 2004 "Postindustrialization and environmental quality: An empirical analysis of the environmental state." *Social Forces* 83:157-188.
- 2005 "Rejoinder: Ecological Efficiency, Disproportionality, and Methodological Precision: On the Importance of Linking Methods to Theory." *Social Forces On-Line Rejoinders*. Available at: <https://socialforces.unc.edu/epub/rejoinders> (Accessed 17 April 2006).

Flora, Corneilia

- 1990 "Rural Peoples in a Global Economy." *Rural Sociology* 55:157-177.

Foster, John Bellamy

- 1999 "Marx's Theory of Metabolic Rift: Classical Foundations for Environmental Sociology." *American Journal of Sociology* 105, Issue 2:366-405.

Frank, David John, Ann Hironaka and Evan Schofer

- 2000a "The Nation-State and the Natural Environment over the Twentieth Century." *American Sociological Review* Vol. 65 No. 1:96-117.

2000b. "Environmentalism as a Global Institution: Reply to Buttel." *American Sociological Review* Vol. 65, No. 1:122-127.

Freese, Barbara

2003 *Coal : a human history*. Cambridge, MA: Perseus Pub.

Freudenburg, William R

1992 "Addictive Economies: Extractive Industries and Vulnerable Localities in a Changing World Economy." *Rural Sociology* 57:305-332.

Freudenburg, William R., Scott Frickel, and Robert Gramling

1995 "Beyond the Nature Society Divide - Learning to Think About a Mountain." *Sociological Forum* 10:361-392.

Freudenburg, William R. and Robert Gramling

1994 *Oil in troubled waters : perception, politics, and the battle over offshore drilling*. Albany: State University of New York Press.

2004 "Public Reaction to Offshore Oil." In Cutler J. Cleaveland (ed.). *Encyclopedia of Energy*: 195-206. Amsterdam, Boston: Elsevier.

Gelbspan, Ross

1997 *The Heat Is On*. Reading, Massachusetts: Addison-Wesley Publishing Company, Inc.

Goldman, M. and R. A. Schurman

2000 "Closing the "great divide": New social theory on society and nature." *Annual Review of Sociology* 26:563-584.

Goodell, Jeff

2001 "How Coal Got its Glow Back." *Conference News Daily*, reprinted from the *New York Times*. July 23:6-9.

Goodwin, Craufurd D. W

1980 *Energy policy in perspective : today's problems, yesterday's solutions*. Washington, D.C.: Brookings Institution.

Greenwood, D. J.

1984 *The taming of evolution : the persistence of nonevolutionary views in the study of humans*. Ithaca: Cornell University Press.

Guterbock, T. M.

1990 "The Effect of Snow on Urban Density Patterns in the United-States." *Environment and Behavior* 22:358-386.

Hansen, John Mark

1991 *Gaining access : Congress and the farm lobby, 1919-1981*. Chicago: University of Chicago Press.

Harris, Paul G

- 1998 "Understanding America's Climate Change Policy: Realpolitik, Pluralism, and Ethical Norms." OCEES Research Paper Number 15. Oxford: Mansfield College.
- 2000 Climate Change and American Foreign Policy. New York: St. Martin's Press.

Hawley, Amos H.

- 1944 "Ecology and Human Ecology." *Social Forces* 22:398-405.

Heinz, John P, Edward O. Laumann, Robert L. Nelson and Robert H. Salisbury

- 1993 The hollow core : private interests in national policy making. Cambridge, Mass.: Harvard University Press.

Humphrey, Craig R., G. Berardi, M. S. Carroll, S. Fairfax, L. Fortmann, C. Geisler, T. G. Johnson, J. Kusel, R. G. Lee, S. Macinko, N. L. Peluso, M. D. Schulman, and P. C. West

- 1993 "Theories in the Study of Natural-Resource-Dependent Communities and Persistent Rural Poverty." In the Rural Sociological Society's Taskforce on Persistent Rural Poverty (eds.) *Persistent Poverty in Rural America*: Pp. 136-172. Boulder, CO: Westview.

Humphrey, Craig R. and Frederick H. Buttel.

- 1982 Environment, energy, and society. Belmont, Calif.: Wadsworth Pub. Co.

International Energy Agency (IEA)

- 2000a CO2 Emissions from Fuel Combustion 1971-1998. Paris: OECD.
- 2000b Energy Statistics of OECD Countries (1997-1998). Paris: OECD.

Intergovernmental Panel on Climate Change (IPCC)

- 2001 *The Third Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.

Jeffery, C. R.

- 1976 "Criminal Behavior and Physical-Environment - Perspective." *American Behavioral Scientist* 20:149-174.

Laumann, Edward O. and David Knoke

- 1987 The Organizational State: social change in national policy domains. Madison, Wisconsin: University of Wisconsin Press.

Lavelle, Marianne

- 2006 "A Lack of Energy: A Bush visit doesn't change the fact that spending on alternative fuels is down." *U.S. News and World Report*, March 6.

Leggett, Jeremy

- 1999 The Carbon War. London: Allen Lane The Penguin Press.

Lisowski, Michael

2002 "Playing the Two-Level Game: US President Bush's Decision to Repudiate the Kyoto Protocol." *Environmental Politics* 11, Number 4:101-119.

Lofland, John and Lyn H. Lofland

1995 *Analyzing social settings : a guide to qualitative observation and analysis*. Belmont, Calif.: Wadsworth Publishing Company.

Lutzenhiser, Loren

2001 "The Contours of U.S. Climate Non-Policy." *Society and Natural Resources* 14, Number 6:511-524.

McCright, Aaron M. and Riley E. Dunlap

2000 "Challenging Global Warming as a Social Problem: An Analysis of the Conservative Movement's Counter-Claims." *Social Problems* 47:499-522.

2003 "Defeating Kyoto: The conservative movement's impact on U.S. climate change policy." *Social Problems* 50:348-373.

Martinez-Alier, J.

1995 "Political Ecology, Distributional Conflicts, and Economic Incommensurability." *New Left Review* 211.

Michelson, W. H.

1976 *Man and His Urban Environment*. Reading, MA: Addison-Wesley.

Molotch, Harvey

1976 "The City as a Growth Machine: Toward a Political Economy of Place." *American Journal of Sociology* 82: 309-332.

Molotch, Harvey, William Freudenburg, and K. E. Paulsen

2000 "History repeats itself, but how? City character, urban tradition, and the accomplishment of place." *American Sociological Review* 65:791-823.

Nash, Gerald D.

1968 *United States oil policy, 1890-1964; business and government in twentieth century America*. [Pittsburgh, Pa.]: University of Pittsburgh Press.

National Research Council, Committee on the Human Dimensions of Global Change

1992 *Global Environmental Change: Understanding the Human Dimensions*. Washington DC: National Academy Press.

2001 Prepublication Copy. *Climate Change Science: An Analysis of Some Key Questions*. Washington DC: National Academy Press.

O'Connor, R. E., R. J. Bord, B. Yarnal, and N. Wiefek

2002 "Who wants to reduce greenhouse gas emissions?" *Social Science Quarterly* 83:1-17.

Peluso, Nancy Lee, Craig R. Humphrey and Louise P. Fortmann

- 1994 "The Rock, the Beach and the Tidal Pool: People and Poverty in Natural Resource-Dependent Areas." *Society and Natural Resources* 7:23-38.

Pew Center on Global Climate Change

- 2006 "Learning from State Action on Climate Change." Pew Center on Global Climate Change, Washington, DC. Available at www.pewclimate.org/docUploads/UpdatePewStatesBriefMarch2006%2Epdf (Accessed April 22, 2006).

Putnam, Robert D.

- 1988 "Diplomacy and Domestic Politics: The Logic of Two-Level Games." *International Organization* 42:427-60.

Roberts, Cecil E.

- 1999 "Statement of Cecil E. Roberts, President of the United Mine Workers of America before the United States Senate Committee on Energy and Natural Resources on the Economic Impacts of the Kyoto Protocol." March 25, 1999. www.umwa.org/legaction/globalwarming/statement.shtml (Accessed 1 April 2004).

Roberts, J. Timmons, and Peter E. Grimes

- 1997 "Carbon Intensity and Economic Development 1962-91." *World Development*. 25 (2): 191-198.
- 2001 "Global Inequality and Climate Change." *Society and Natural Resources* 14:500-510.

Rudel, Tom K

- 2001 "Introduction to controlling climate change: Sociological perspectives." *Society & Natural Resources* 14:489-489.

Sherrill, Robert

- 1983 *The oil follies of 1970-1980 : how the petroleum industry stole the show (and much more besides)*. Garden City, N.Y.: Anchor Press/Doubleday.

Smith, David A.

- 1994 "Uneven Development and the Environment: Toward a World-System Perspective." *Humboldt Journal of Social Relations*. Volume 20: 1.

Sprinz, Detlef F. and Martin Weiss

- 2001 "Domestic Politics and Global Climate Policy." In U. Luterbacher and D. F. Sprinz (eds.) *International Relations and Global Climate Change*: Pp. 67-94. Cambridge, MA: MIT Press.

Stanley, Manfred

- 1968 "Nature, Culture and Scarcity - Foreword to a Theoretical Synthesis." *American Sociological Review* 33:855-870.

U.S. Senate.

- 1997a "Senate Resolution 98." Congressional Record. 12 June 1997: Report Number 105-54.
- 1997b "Proceedings and Debates of the 105th Congress." Congressional Record. 25 July: S8118.
- 2003a "Science of Climate Change." Congressional Record. S10012-23. July 28, 2003.
- 2003b "The Climate Stewardship Act of 2003." Congressional Record. 30 October 2003: S13572-13600.

van den Berghe, Pierre L

- 1978 "Bridging the Paradigms." Society 15 September/October:42-49.

Victor, David

2001. The Collapse of the Kyoto Protocol and the Struggles to Slow Global Warming. Princeton, NJ: Princeton University Press.

Viotor, Richard H. K.

- 1980 Environmental politics and the coal coalition. College Station: Texas A&M University Press.

Weber, Bruce

- 1995 "Extractive Industries and Rural-Urban Economic Interdependence." In Emery N. Castle (ed.) The Changing American Countryside: Rural People and Places: Pp.155-179. Kansas: University Press of Kansas.

York, Richard and Eugene A. Rosa

- 2005 "Societal Processes and Carbon Dioxide (CO₂) Emissions: Comment on "Post Industrialization and Environmental Quality: An Empirical Analysis of the Environmental State." Social Forces On-Line Rejoinders. Available at: <https://socialforces.unc.edu/epub/rejoinders> (Accessed 17 April 2006).

York, Richard, Eugene A. Rosa, and Thomas Dietz

- 2003a "A Rift in Modernity? Assessing the Anthropogenic Sources of Global Climate Change with the STIRPAT Model." International Journal of Sociology and Social Policy 23:31-51.
- 2003b "Footprints on the earth: The environmental consequences of modernity." American Sociological Review 68:279-300.

Table I: Total Energy Production/Consumption by Source in the United States 2000
(Quadrillion British Thermal Units)

	United States
Coal	
Production	22.623
Consumption	22.580
% of Overall Energy Consumption	22.8 %
Oil	
Production	12.358
Consumption	38.404
% of Overall Energy Consumption	38.8 %
Natural Gas	
Production	22.233
Consumption	23.953
% of Overall Energy Consumption	24.2 %
Nuclear Power	
Production	7.862
Consumption	7.862
% of Overall Energy Consumption	7.9 %
Renewable Energy	
Production	6.158
Consumption	6.158
% of Overall Energy Consumption	6.2 %
Percentage Indigenous Sources	72 %

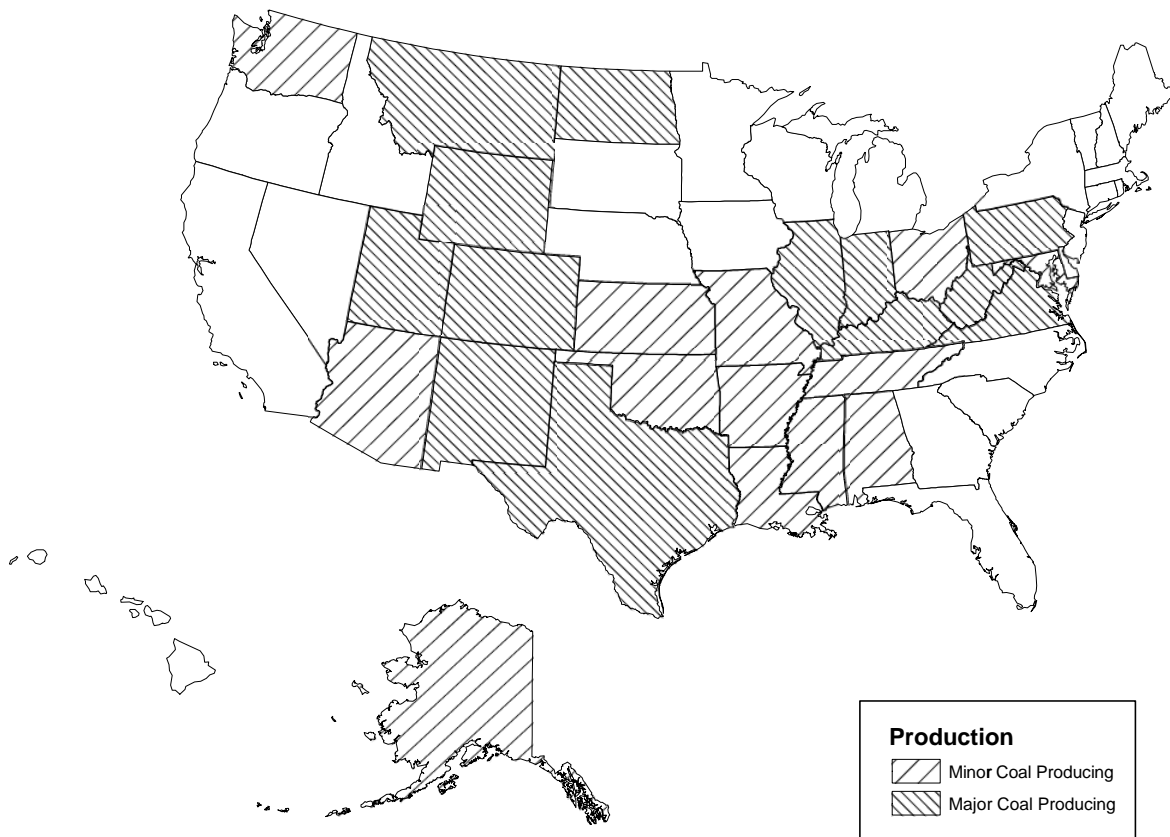
Source: Energy Information Administration 2002.

Table II: Fuel Share in Electricity Generation in the United States, 1998

Country	Coal	Oil	Gas	Nuclear	Hydroelectric	Other
United States	52.3%	3.8%	14.6%	18.6%	8.4%	2.2%

Source: International Energy Agency 2000b

Figure 1: Coal-Production in the United States by State (2000)



Adapted from: www.eia.doe.gov/cneaf/coal/statepro/imagemap/usaimagemap.htm

Table III: Coal Dependence/ Opposition to the Climate Stewardship Act of 2003
Crosstabulation (N= 50)

Opposition to the Climate Stewardship Act per state	Coal Dependence			Total
	No Coal	Minor Coal (<25 million short tons)	Major Coal (≥25 million short tons)	
0 Senators	13	1	0	14
1 Senator	9 *	1	3	13
2 Senators	2	11	10	23
Total	24	13	13	50

* Two of the nine states in this category had one senator that abstained from the vote on the Climate Stewardship Act.

Table IV: Logistic Regression Coefficients Predicting Votes Against the Climate Stewardship Act of 2003, Coefficient (S.E.), N= 100

Independent Variable	Model 1	Model 2
Coal Extraction	2.421 ** (.501)	2.221 ** (.557)
Republicans in the Senate	---	3.158 ** (.680)
Constant	-.819 ** (.310)	-2.156 ** (.519)
-2 log-likelihood	91.245	62.692

* Significant at the .05 level

** Significant at the .01 level

Table V: Coal Dependence/ Climate Action Plans with Emissions Targets Crosstabulation, March 2006 (N= 50)

States with Climate Action Plans with Emissions Targets	Coal Dependence			Total
	No Coal	Minor Coal (<25 million short tons)	Major Coal (\geq 25 million short tons)	
Yes	7	2	0	9
No	18	14	9	41
Total	25	16	9	50