

ABSTRACT

Title of dissertation: RHETORICAL ANALYSIS OF ARGUMENTS MADE
 IN THE CLIMATE CHANGE DEBATE:
 ARGUMENT FAMILIES AND SOCIAL NETWORK
 LINKS AS POTENTIAL BASES FOR AGREEMENT

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The issue of climate change brings together some of the most important sociological issues of the age, including global governance, the role of industrialization and capitalism in degrading the environment, the relationship between humans and non-human nature, and the inequality of nations. However, it is an open question whether societies and countries of the world can come to agreement about the meaning of climate change and actions (or no action) that should be taken to address it. To avoid privileging one or another of the issue's aspects, this study used a discursive and rhetorical approach to include all the arguments made in the debate on an equal footing. First, 100 documents that make arguments about climate change were analyzed to characterize the arguments made and to distinguish four rhetorical elements: the personal and organizational sources of authority for the rhetor, the type(s) of evidence used for the claims made, the worldview(s) expressed, and the actions proposed. This analysis provided the basis for categorizing the documents into "families," coherent arguments made about the climate change issue; and performing a social network analysis to discern linkages formed by the argument families and rhetorical elements that might be the basis for coming to agreement about climate change issues. The study found coherence within families as

well as multiple links across families, indicating that rhetors in the climate change debate form a dense network of ties that could be used to build agreement.

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DEBATE:
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AS POTENTIAL BASES FOR AGREEMENT

by

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To Richard Harvey Brown

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CHAPTER 1: INTRODUCTION

At first blush, global climate change does not seem to be worthy of much sociological interest. It looks to be concerned mostly with the physical world, not the social. Most people neither know nor care about the science involved: the tropopause, gas concentrations in parts per million by volume, watts per meter squared of radiative forcing, atmospheric lifetimes and the carbon cycle, etc. Much of the scientific analysis of climate change has been from the stance of the physical scientists: emissions of greenhouse-related gases from human activities, the physico-chemical reactions that produce the greenhouse effect and its enhancements, the impacts on crops and water supply, and so on. Most of these “hard” scientists agree that there are many uncertainties and that significant climate change will happen very slowly, over a century or more.

The stance of these physical scientists parallels that of scientists studying other Earth processes, like plate tectonics and earthquakes, solar storms and electricity outages, and geologic processes and volcanic eruptions. In each case, the large-scale processes are studied as intrinsically interesting and as relevant to human life. In the case of climate change, the Earth’s climate system is a wonderfully complex and nonlinear system – but it also determines the level of well-being of humans and societies.

Thus, the issue of climate change, seen from the perspective of human dependencies, opens up to become a very human, very social issue.

It is the claim of this study that climate change merits sociological attention because it brings together some of the most important societal issues of the age. Important societal issues are entwined in the debates associated with global climate change. It has become, among other things, a political issue; a manifestation of the problems associated with modernization, capitalism, and globalization; and a particularly good site in which to study the interrelationships and contradictions among scientific and other forms of knowledge. And these large-scale issues meet each other in the climate change debate. The climate change debate raises questions about whether global consensus or cooperation about the environment (or anything else) is possible, how the issues raised by Marx and his intellectual descendents apply to the environmental byproducts of modernity and capitalism, and what counts as knowledge within the world system. In terms of Ulrich Beck's (1992, 1999) "risk society," for example, climate change may be the limit case, the ultimate risk – something that you can't see or touch and that may not make you sick, but may make life on this planet uninhabitable for human beings. How can that societal challenge be met by diverse people in diverse places and by people working together?

The political, economic, scientific, and social aspects of the debate have brought climate change onto the global stage. In the 1980s, climate change emerged as an issue worth attention on the international agenda.¹ Over the past two decades climate change has been described by scientists, environmentalists, and politicians as a threat unprecedented in human experience. Many reasons and combinations of reasons

¹ Also leading to interesting theories about how items get on the international agenda.

have been advanced for this claim, especially the potential rapidity of temperature rise, the irreversibility of change once the forces are set in motion, the geographical scale of the threat, the complexity and nonlinearity of the natural systems involved, the ubiquity and strength of human commitment to combustion technologies, and the political challenges of global cooperation that climate change seems to demand. This flurry of attention resulted in the adoption of the United Nations Framework Convention on Climate Change (UNFCCC), agreed to at the 1992 “Earth Summit” in Rio de Janeiro.

However, climate change has also been described as a threat so slight, with costs so high that it is not worth addressing. Several prominent scientists, including William Nordstrom at Harvard University and Jesse Ausubel at Rockefeller University in New York, characterize climate change as likely “good for you” in bringing more salubrious weather to at least the mid-latitudes. These and “climate skeptic” or “contrarian” statements provide a basis for opposing swift political action. And certainly the U.S. George W. Bush administration epitomizes the it’s-too-expensive politicized viewpoint – coupled with slurs about “junk science” and a generally isolationist attitude toward global agreements.

Research attention has in recent years begun to focus on the political processes involved in framing climate change as a social-environmental “problem,” creating evidence of it, and developing the processes involved in attempting to develop solutions at the global level. After the initial agreement (the Framework Convention on Climate Change came into force in 1994; there are now 186 nations that are parties to the convention), progress has been slow at best and the Framework Convention is

apparently at an impasse. The number of policy proposals is legion, but even the modest goals of the Kyoto Protocol (generally less than 10% reductions in industrialized countries' greenhouse gas emissions) seemingly cannot be implemented.

The explicitly political issues have been taken up by scientists in schools of public policy and international relations, with an emphasis on neorealist theories and game-theoretical approaches, and by political institutionalists. The focus then narrows to the question of whether or not global politics can forge meaningful agreements or simply reproduce the historical power struggles of nation-states. Climate change seen from this viewpoint becomes just another issue on the global agenda, with the expected outcomes of continued dominance, strategic moves and alliances, and international negotiations.

However, this narrow political focus neglects important dimensions of the climate change issue. A strict calculation of nations' rational maximization and Prisoner's Dilemma games will not provide a satisfactory explanation of the agreements reached at Rio de Janeiro in 1992. At the Rio Earth Summit, nations agreed to

Stabilize atmospheric greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system, within a timeframe to allow ecosystems to adapt naturally, protect food production, and allow sustainable economic development (United Nations 1993).

Moreover, industrialized countries accepted responsibility for the increased atmospheric concentrations of greenhouse gases and for funding mitigation measures.

These provisions are seemingly against the economic and political interests of industrialized countries; they represent a long-term commitment to a global good.

Politics may have brought the climate change issue to the fore but cannot contain it. Political discourse is only one dimension of the debate. Until the 1990s less attention was paid to sociocultural dimensions of climate change and particularly to the discursive and rhetorical aspects, which in many respects underlie the political structures and manipulations. Indeed, major shifts in international relations and international policy usually are accompanied or preceded by such shifts in discourses. Even in the so-called human dimensions programs the focus has been on growth of population and consumption and the scale of the energy system (and other emissions-producing activities), without consideration of the social and cultural belief systems on which practices of fertility and consumption (including energy consumption) are built.

At issue seem to be several elements that must be addressed separately and in interaction. First, this is a problem constructed by scientists, almost totally outside the sensory experience of nonscientists and little understood by them. Second, the spatial and time scales of the problem are hard for people to comprehend; thus, this seeming lack of urgency or immediacy weakens motivation to do something. Third, there are winners and losers in climate change, so there is bound to be contention over the terms and conditions of policy. This raises issues of equity and rights, as well as responsibility to pay any mitigation or adaptation costs; these issues must be addressed in a political context. Fourth, this is an attempt at global governance, which must be accomplished by agreement and mutual verification, perhaps involving some higher authority than the nations involved.

Interactions in the Debate

The debate provides a space in which all kinds of discourses can be heard. But, because different constituencies are concerned in the different strands of the debate, the assumptions and terms of the debate about what – if anything – to do to address the prospect of global climate change are themselves topics of debate and dissension. Although it might be conjectured that because people and groups join a debate they attempt to mutually define terms and assumptions, and to “play by the same rules,” even the most cursory inspection demonstrates that this is not so. In fact, they argue first, and perhaps persistently, about what the terms of the debate are, as negotiators during the Vietnam War argued about the shape of the negotiating table. They argue about what the questions are, what (and whose) evidence counts, and the values and worldview that provide a frame for the debate. The following texts exemplify several threads of scientific discourse on global environmental change. Looking at the differences among them helps to explain why scientific consensus (outside the atmospheric science research community) has not been achieved. The first is a report issued by the U.S. Environmental Protection Agency. The second is an ecofeminist essay. The third is a postmodern analysis. The fourth is a narrative by a field ecologist.

Figures 3-14 and 3-15 illustrate the dynamics of thermal expansion and global temperatures for selected simulations. Between 2060 and 2090, three of the simulations include a sudden decrease in deepwater formation, which results in a global cooling of about 1.5 degrees C over a ten-year period. For the next

century, the rates of warming are mostly between 0 and 0.3 degrees C per decade, but 5 to 10 percent of the simulations warm more than 0.5 degrees C during at least one decade (Titus and Narayanan 1995).

The recovery of the feminine principle allows a transcendence and transformation of these patriarchal foundations of maldevelopment. It allows a redefinition of growth and productivity as categories linked to the production, not the destruction, of life (Shiva 1989)

Baudrillard also suggests that the means of information in today's global transnational economy unhinge ordinary metaphorical relations, because the operative semiotic principles of this informational order are those of simulation rather than pre-industrial counterfeit or industrial mechanical reproduction. Abstractions can no longer be seen as "the maps," "the doubles," "the mirrors" or "the concepts" of any terrain metaphorically regarded as "the real." On the contrary, all abstract frames of the real begin to function as simulations (Luke 1995:96).

Yet as I stood at the edge of the field, I had a strong intuition of disaster. I thought of all the richness of the mature forest, in all its seasons: its dark, humid smell on summer mornings, its complex procession of wildflowers throughout the spring, its bronzed and rubied canopies in October. I thought of the blue-coated nuthatches, the carpenter ants, the hog-nose snake, the shelf

fungi, the warblers and vireos and hawks—none of these to return, though they might one day be replaced by distant relations. The net result of management seemed to be that a complex world had been replaced with a barren field; what didn't seem to get figured into the management plan was almost everything that had once been there (Armstrong 1993:13).

These writers are all scientists, speaking from different standpoints, using different arguments, evidence—and different syntax, diction, and imagery. Personal emotion clashes with cool rationalism, delight in particulars with aggregate overviews, observer with participant. The visual presentation of each text differs as well, indicating differences in orientation and in the bases of evidence for the writers' claims. The first report, issued by the Environmental Protection Agency, presents tables and graphs. For the ecofeminist text, occasional mythical drawings illustrate the philosophy. The sociology article is pure text. The Armstrong article from the journal *Orion* is interspersed with full-page, color photos.

The voices of nonscientists are even more varied. Some see the issue as almost a conspiracy on the part of scientists. Others see it as a political issue; those who are left of center often favor taking measures to address climate change, whereas those who are right-leaning believe in getting on with business as usual and not worrying about climate change. Others feel that we are harming the environment in many ways and should address all the harms, including climate change. Still others frame the issue as a signal that people must reduce consumption of industrial products, waste and pollution. Some advocate reconceptualizing our relationship with nonhuman nature,

according rights to other living beings and even Earth as an entity, and respecting the other inhabitants rather than thinking of them as resources for our use.

Thus, there are several perspectives from which to view climate change as a sociological topic. The political perspective can be explored in the new social movement literature. Along with labor, civil rights, democratic activists, and feminism, environmental social movements have been analyzed principally in terms of political action: how are people mobilized to make common cause and how do they take advantage of political opportunity structures to achieve environment-oriented goals? Part of the answer to these questions has been taken up by cultural analysts of social movements, who have variously sought to examine how social identities are construed within social movements and how narratives, slogans, etc., help to further movement causes. Another part of the answer lies in the area of environmental sociology. Here the issue becomes a cultural one – the relationship between humans and non-human nature, which raises discussions about the modern age's separation of subject and object, so-called Man and so-called Nature. A third area of sociology that bears on issues raised by climate change is the sociology of science, which investigates questions about how we know what we know, the authority of scientific knowledge in society, the politics of the formation of knowledge, and the evaluation of scientific and other kinds of knowledge in decision-making.

Social Science in the Debate

So far I have argued that climate change is a sociological problem and that studying the debate space of the discourse can encompass its wider sociological

dimensions. However, social scientists have not studied climate change in this way. As partially discussed earlier in this chapter, they have tended to take their framings and questions from physical scientists. When social scientists have not followed physical science framings, they have stayed at the very margins of the debate space. Following is a brief description of the historical contributions of social science to the climate change issue.

The predominant approach to climate change science and the science/policy nexus is what Rayner and Malone (1998; see also Malone and Rayner 2001) and others have called descriptive. A descriptive approach takes its cue from the physical sciences and the experimental method. In Dilthey's terms, such an approach seeks to describe the world, not understand it. Scientists who use a descriptive approach prefer to count, weigh, and measure, using the language of equations and mass balances. They see themselves as objective observers of a reality "out there," much as an astronaut can view the Earth as a whole, from a distance. Therefore the descriptive approach lends itself to aggregation at the global level, to analyses of Gross Domestic Products, and to calculations of what the total cost of climate change mitigation measures would be. Its outputs tend to be datasets, charts and graphs, and carefully constructed reports that end with Findings and Discussions.

Corresponding to this approach is a view of the science/policy relationship encapsulated in the phrase "speaking truth to power." According to this view, scientists disinterestedly seek truth and inform policymakers of the truths they have "discovered." Policymakers then consider their options for effective governance in light of these truths. The two types – scientists and policymakers – have carefully

demarcated roles and relationships. Scientists, in this view, supply the facts, policymakers the values and the practical know-how to get something done.

This careful distinction is reflected in the international science organization whose charter it is to assess the science of climate change. The Intergovernmental Panel on Climate Change (IPCC), which met for the first time in Geneva in November 1988, was designed to insulate climate change science from broader international development issues. The IPCC has reflected a continuing tension between the modern scientific and technical conception of climate change, and the increasingly messy ethical and political considerations.

Three working groups were formed: (1) science, (2) impacts, and (3) response strategies. These working groups have persisted through three assessment reports. From their subject areas, Working Group 1 should consist of physical and chemical scientists (and, because of the reliance on models, computer scientists), Working Group 2 of earth systems scientists with participation from economists, and Working Group 3 of social scientists of all stripes. In fact, the participation of social scientists in the entire process of the First Assessment Report was summarized as “lamentable” (Redclift 1992:34). Working Group 1, looking at atmospheric chemistry, climatology, and ecology, achieved a remarkable level of consensus and is widely recognized as representing the highest quality international scientific collaboration. The other two reports proved highly controversial where they touched on issues such as local and aggregated projected damages of climate change, because they raised issues of economic and social inequality, forms of governance, and human rights.

The social science that predominated in the First, Second, and Third Assessment Reports (IPCC 1990, 1995, 2001) was economics. Economists were asked to address very specific questions. Calculation of emissions from human activities, and damage functions and mitigation costs, calculated at the global level, helped to avoid the issue of differentiated impacts. And the results of energy and economic models could be debated by policymakers eager to appear to be doing something.

In all these mainstream scientific efforts, descriptive science was the predominant approach. However, much relevant research outside the mainstream has been conducted using an interpretive approach (Rayner and Malone, “Challenge” 1998). Interpretive research focuses on the meaning of activities and language – on “the nature of experience, the structure of perceptions, the recognition of interests, and the development of frameworks for collective action” (Rayner and Malone, “Challenge,” 1998:42) – that is, the fundamentally social character of the human mind and how it operates. In climate change research, interpretive studies have addressed the framing of the problem as well as issues of stakeholder involvement, sociocultural values, the nature and production of knowledge, and policy implementation (research and development investments, technology selection and diffusion, and so on). Cultural anthropologists and sociologists have examined the claims and worldviews of government, science, and indigenous people in environmental disputes. In contrast to macro-level theory about international relations, political scientists have studied the ways in which individual actors form networks and epistemic communities. Whole literatures focus on behavioral changes in energy and technology use, as well as how technologies come to be adopted. Social scientists investigate how real-world public

policy and industry decisions are made, as opposed to idealized models of rational actors, and analogues demonstrate societal responses to climate changes in the past.

But these kinds of studies have not penetrated very deeply into mainstream climate change science. Perhaps this is because of the strong original framing of the problem as a “hard” science problem and an unwillingness to face up to the implications of results from political, economic, and cultural research.

Thus, at least two broad-brush histories can be articulated about the role of the social sciences in global climate change research. One such history might start, not with social science, but with Jean-Baptist Fourier’s 1822 suggestion that “air traps heat, as if under a pane of glass” and keeps Earth warm, and Arrhenius’ identification of the so-called greenhouse effect late in the nineteenth century; continue with the research into the physico-chemical processes by which carbon dioxide and other gases play a role in regulating the Earth’s climate; then turn to investigations into the economic-energy activities that result in greenhouse gas emissions; then (finally) arrive at the recognition of so-called “human dimensions” as an important aspect of climate change research. Another history might begin with George Perkins Marsh’s work *Man and Nature* (1864, reprint 1973), which was subtitled “or Physical Geography as Modified by Human Action,” follow that thought through the concept of the “nōosphere” (a biosphere organized by human activity), then highlight early contributions of social scientists to research in the field of climate and society that focused mainly on direct human accommodation to the hazards of natural climatic extremes and indirect economic effects of climate. Gradually, however (this version of history continues), mainstream science organizations such as the International

Geosphere-Biosphere Program (IGBP), despite paying lip service to the importance of social science research, marginalized such research in add-on organizations (here we are back to “human dimensions” programs) or discounted research studies as too localized.

Two developments have brought more social scientists into climate change research and debate in recent years. The first is a recognition that proposals for meaningful mitigation are stalled. The most obvious example is the Kyoto Protocol, which commits countries to modest emissions reductions and has been in limbo since it was formulated in 1997. The second development is a resultant emphasis on adaptation strategies, coupled with a willingness to engage in more socially oriented research. Adaptation to climate change is inextricably bound up with governance and economic development issues that are already being examined in sustainable development, natural hazards and disasters, food security and other research areas.

Rosa and Dietz (1998) summarize the evolution of sociological research into climate change issues. Under the heading of neo-realism, they place research that “borrows directly from the science of ecology, adds sociological insights and produces empirical results” (Rosa and Dietz 1998:443), and world-systems analyses of the environment’s role in economic stagnation and inequality. A second broad category is idealist-based social constructivism, which includes studies that focus on uncertainties in knowledge claims and on the social and political forces shaping scientific and public recognition of climate change as a problem. Rosa and Dietz (1998:446) conclude by calling the late 1990s “the incipient stage of our sociological understanding of [global climate change].”

This Project: Analyzing Arguments in the Debate

This research project is explicitly sociological, focusing on the social issue of how people in this debate might come to (or toward) agreement. The arguments made – the rhetoric and framings employed – reveal much about the dimensions of the issue (global level, century scale, cross-cultural scope) and the collateral issues invoked.

I will take a cultural-rhetorical approach, drawing insights from three subdisciplines of sociological theory and from globalization theory as developed by sociologists and other social scientists. Using this approach, I view the issue of climate change at the broad intersection of new social movement theory, environmental sociology, the sociology of science, and globalization theories. At this intersection, we can formulate the problem in the following way: In the various voices of the climate change debate, is there any common ground on which to build agreement among scientists, policymakers, so-called environmentalists, industrialists, and members of civil society about actions that could be taken to address climate change? The topic of climate change thus falls within the larger sociological and rhetorical questions about how people come to mutually understand an issue and come to agreement about it, and ultimately about how society changes; climate change adds scale and science dimensions to this issue.

Overview of this Project

This project will demonstrate the bases, *within the rhetorical contexts and arguments*, for potential agreements about climate change, both its causes and

remedies. That is, the arguments themselves will be the focus of my analysis. I will treat situational variables such as class, status, and power as they exist relevant to the discourse. The remainder of this section outlines the research study.

The next chapter discusses the possible contributions of existing research within the subdisciplines of social movement theory, sociology of science, and environmental sociology to the research question that I have formulated. Principal areas of study in each subdiscipline relate to the climate change debate, but do not directly address the rhetorical issues; the limitations of the subdisciplines preclude my situating this study within any one of them.

Having done the preliminary work of sorting through existing sociological research in areas that look to be relevant, I then map out the methods of the current study in Chapter 3. The first of these methods is an exploration of globalization theory, which has been built by social scientists in every discipline from economics to anthropology. The second and third methods involve empirical studies of arguments in 100 texts related to climate change. The second method is a structured analysis of the rhetorical elements of each argument, which facilitates a classification of arguments into “families.” The third method involves coding the rhetorical elements and performing a social network analysis to help reveal the bases in the arguments themselves for coming to agreement. The final chapter summarizes the findings and draws conclusions about prospects for coming to – or closer to – agreement.

Theories of globalization, discussed in Chapter 4, cover both structures and processes, and provide parallels and foundations for thinking about climate change. In each topic area, there are strong and disparate voices debating causes and solutions. In

each debate area, the differences among traditional, modern, and postmodern arguments are important, as are economic and political issues such as inequalities within the world system. One major difference between the two debates is the prominence of scientific evidence and arguments in the climate change debate; science is much less important in globalization theory.

However, the parallels between globalization and climate change theories, although they help to elucidate the issues, do little to increase understanding of how debates at the global level might move *toward agreement* of the various voices in the debate. Politics, economics, culture, and science obviously are dimensions of the debate, but, in order to assess prospects for agreement, all dimensions and arguments need to be examined side by side.

Thus, the next step is to look at the arguments themselves as they exist in documents of various kinds from various sources; this is the work of Chapter 5. From 100 documents that make arguments about climate change and propose responses, I abstracted the rhetorical elements of each argument:

- the authority of the rhetor, as given by profession and organizational affiliation
- the type of evidence used to back up claims made in the argument
- the worldview expressed in the argument
- the specific proposals for action.

The arguments themselves provide the basis for classifying documents into argument “families,” coherent clusters of arguments that share a basic understanding of the climate change issue, its causes, and its cures (if needed). The argument families map out the whole debate space that has climate change as its topic: scientific, political,

economic, modernist, Marxist, and cultural claims of various types. The debate can be seen whole instead of from any particular vantage point.

Chapter 6 builds on the same rhetorical analysis to illuminate the social network links among rhetors within and among argument “families” in the climate change debate. Rhetors can be linked by any similarity in rhetorical elements. For example, if rhetors use data and computer models as evidence, this is a link among them. Those who propose emissions-trading schemes are linked by that proposal. Rhetors who think the world is on the brink of climate collapse share that link. The social network analysis reveals a dense network of links that may prove to be bases for coming to agreement.

But are familial relationships and social network ties actually bases for agreement? If so, how may relationships and ties be used to move the debaters closer to agreement? These are the questions taken up in the last chapter.

CHAPTER 2: SOCIOLOGY AND CLIMATE CHANGE

Sociology is a latecomer to the debates on climate change – as, indeed, are all the social sciences. Questions about climate change and research into those questions have been framed by the physical sciences, from the original theorizing by Arrhenius (1908) through the measurements of carbon dioxide taken at the Mauna Loa Observatory beginning in 1958 to the development of complex general circulation models (GCMs) of the climate system. The first contributions from social scientists came from economists, in describing and analyzing human activities that release greenhouse gases to the atmosphere (beginning in the 1980s); and political science, in following and interpreting negotiations having to do with issues such as acid rain and the ozone layer. Anthropologists such as Mary Douglas, Steve Rayner, and Michael Thompson have taken up such general environment-related issues as environmental risks and human-nature relationships as part of social solidarities. Sociologists of knowledge/science such as Bryan Wynne and Scott Lash have also contributed to environmental issues, taking up such questions as whose knowledge counts in addressing problems. But explicit sociological contributions to climate change have been infrequent.

The three major sociological literatures to be assessed as possibly useful for this project are social movement studies, environmental sociology, and the sociology of science. Each of these literatures speaks directly to at least some of the issues that I am addressing, although not necessarily directly in terms of the climate change debate. And many overlaps exist. Within both social movement theory and environmental

sociology are studies of environmental social movements. Within international relations and environmental sociology is research on the international politics of the environment; climate change, as an international problem with highly contested issues of cause and remedy, is particularly relevant to the international sphere.² Within the sociology of science and environmental sociology are examinations of how scientific knowledge becomes established and is used in defining environmental problems and playing a role in formulating candidate solutions. Science, as the “discoverer” of the “problem,” lays claim to be the hegemonic discourse in defining it and in formulating solutions; however, science-based findings often take a back seat in political negotiations.

When the environment is a topic in sociological research, often the environment is “part of” other, more central foci. The environmental movement is just one example (and generally not the best example) of new social movements. The environment as a concern is one aspect of globalization, although economic globalization and economic-cultural domination are still the central concerns. Environment is part of the discourse about the larger problems and dangers of modernity and industrialization. And it is a feature of anthropological/ethnographic studies that describe indigenous societies.

This “part of” treatment fails to account for the spectrum of relevant issues, and for the relationship of scientific, policy, and indigenous knowledges and

² But acid rain and ozone depletion are also relevant to the international sphere and have generated more urgency and attention.

discourses. Inverting the lens to place climate change discourse at the center allows these dimensions to come into focus and serves as a filter to determine the value of contributions from these sub-fields.

Social Movement Studies

The social movement literature provides a political and institutional vantage point from which to view the climate change issue. Recent social movement theory, even with its inclusion of cultural and institutional considerations, does not account for the role of argument and debate in social and political change. Arguments (even symbolic, as in the stories that build collective identity) are interpreted in terms of political power and advantage. The underlying metaphor is war, winning and losing – not coming to agreement. Social movement theory prefers protests and uprisings to discussion and debates.

Social movements are by definition purposeful, organized groups outside the mainstream of the political system. They try to change (or resist change) in some major aspect of society. They may favor evolution of the state or revolution. Thus, they construct alternatives to the state's politics and culture. Doing this involves recharacterizing state knowledge, using state knowledge in different ways, and/or adding to or deleting knowledge that the state has. For example, the women's suffrage movement sought to recharacterize the state's knowledge about its citizenship category to include women as voters. Social movements are thus both political and cultural.

Early social movement theory tended to treat social movements as collective action born of increasing grievances against the state. In this view, deprivation and relative deprivation gave rise to social movements. However, more recent theoretical and empirical analyses about social movements have generally used the approaches of historical or cultural institutionalism. In the 1970s, following the rise of social activism in the 1960s, the resource mobilization paradigm was introduced and elaborated. Drawing on rational choice theory, the resource mobilization approach conceptualized social movements as collective political action, dependent upon political and economic assets, such as strategies of influence, organizational ability, tactics, sponsorship, number and type of participants, use of violence, and so on. Much of the theory of social movements relies on arguments about mobilizing and political opportunity structures (McAdam, Tarrow and Tilly 1997; McAdam, McCarthy and Zald 1996; Morris and Mueller 1992). Zald (1992:332-333) summarizes the assumptions of resource mobilization research:

First, behavior entails costs; therefore grievances or deprivation do not automatically or easily translate into social movement activity, especially high-risk social movement activity. The weighing of benefits, no matter how primitive, implies choice and rationality at some level. Mobilization out of the routines of social and family life, out of work and leisure, is a problematic. Second, mobilization of resources may occur from within the aggrieved groups but also from many other sources. Third, resources are mobilized and organized; thus organizing activity is critical. Fourth, the costs of participating may be raised or lowered by state and societal supports or repression. And

fifth, just as mobilization is a large problematic, so too are movement outcomes. There is no direct or one-to-one correspondence between amount of mobilization and movement success.

These issues are tied to state development and transformation through the concept of political opportunity structures. Since state development and transformation are the major topics for historical comparative sociology, social movement theorists also often contribute to theories of state dynamics. For example, Charles Tilly works in both the areas of nation state analysis and social movements (see, e.g., Tilly 1992 and McAdam, Tarrow and Tilly 2001).

Although resource mobilization and political opportunity structures were still the dominant focus of social movement theory in the 1980s, there were also criticisms that this theoretical approach limited the analytic focus to political movements that pursue middle-class goals and that the theory assumed a kind of generic social movement, eliding the analysis of particular circumstances and goals associated with one type over another (Mueller 1992: 17-18). The area experienced a “cultural turn,” bringing in the themes of frames (including master frames and collective action frames); identity and collective identity; social location rather than atomistic, rational individualism; shared group logic; and a focus on informal rather than organizational activities (McAdam, McCarthy, and Zald 1996; Johnston and Klandermans 1995). Dieter Rucht (1996:186) broadened the definition of a social movement to include a network of groups and organizations prepared to mobilize for protest actions to promote (or resist) social change *and* individuals who attend protest activities or contribute resources.

Environmental social movements related to climate change have not received much attention from resource mobilization theorists. Indeed, most of the studies done from this perspective are concerned with the overthrow of the state or gaining political rights (e.g., of women and minorities). From the resource mobilization perspective, environmental social movements are a puzzle – hardly rooted in *social* grievances in the same way that social movements of oppressed people are. However, McAdam, McCarthy and Zald (1996), predicting a synthesis of research in political opportunities, resource mobilization structures, and cultural framings, include protest activities, grassroots reformist groups, public interest lobbies, and revolutionary forces in their definition of social movements. Institutionalists have recently both widened the scope of this research to “contentious politics” and introduced mechanisms such as attribution of threat and opportunity, brokerage, category formation, certification, diffusion, and object shift to gain more explanatory power in their analyses (McAdam, Tarrow and Tilly 2001); these mechanisms also mark a shift to a more culturally based analysis (although the focus remains political).

The cultural turn provides more analysis relevant to climate change social movements. Mediating between opportunities and action are culturally defined “framing processes.” The interplay of culturally based expectations may be a fruitful way to look at global and national environmental movements. Skretny (1996:231-232) challenges the view that social movements can be explained as rising interest groups who extend inroads into public policy, using their own organization and resources to influence those of the state. His study of civil rights groups demonstrates that such groups *as interest groups* played only minor roles. Instead, he describes successful

political groups as understanding, acting within, and pushing the boundaries of legitimate actions within established institutions rather than simply embodiments of material interests. He discusses Frank Dobbin (1994), who demonstrated in a cross-national study of industrial policy development that what economic groups fight for varies by national context and historical context.

Social movement struggles can be seen as efforts to control or define knowledge. From a historical institutionalist perspective, the kinds of knowledge that a social movement would focus on for the purpose of re-forming the state include statistics relevant to taxation, citizenship, and conscription. This kind of knowledge is important because it can be the basis for state control of people and resources for its own gain, and/or it can be the basis for inclusion in the benefits of citizenship. From a culturalist perspective, the kinds of knowledge that a social movement would focus on are those related to framings, cultural categories, and identity. In some cases, this would be the same information targeted by historical institutionalists, but the motives would be different. Information will be seen as political in the historical viewpoint, i.e., used in the struggle of the group to gain power. For the cultural analyst, this information is important because it represents a reading of what the world, the state, and people are like.

What is the potential for social movement studies or a social movement approach to contribute to this study of arguments made in the climate change debate?

Even new social movement theorists have not focused on climate change; it is far more common to find studies of the women's movement, environmental organizations that focus on immediate harms, political social movements, and civil

rights. This neglect of climate change may be because it is difficult to characterize climate change social movement organizations in the same ways that more explicitly contentious and political movements are – and there are relatively fewer organizations devoted to climate change. Also, the emphasis on the development of the nation-state and on rights-based or democratic social movements implies that environmental social movements, which tend to be either very local (against specific harms) or transnational, are not in the line of vision of many social movement theorists.

Moreover, for the subject of this study, another problematic arises. Almost by definition social movement theory is seeking to understand difference and opposition. In contrast, I am examining bases for agreement within a contentious debate space. Therefore, the tools of social movement analysis are likely to be of little help.

Finally, social movement theorists are committed to power relations as the primary explanatory factor in their descriptions of resource mobilization and political opportunity. Studies become largely tactical rather than substantive analyses. Even many of the “framing” and so-called cultural studies seek to explain how culture is or becomes power. This ideological commitment means that social movement theory is inadequate to explore how various opposed arguments in any debate can hold the bases for agreement among parties of varying strengths. So-called realist or rational choice theorists maintain that power relations will trump any other considerations, but in fact weaker-looking parties have gained decisive triumphs over their opponents, both on the battlefield and at the negotiating table. Analyses of framing and reframing capture more of the issues that I wish to explore, but often these analyses are merely describing a shift of power, without examining the bases for the shift. The concepts of

framing are likely to be embedded in analyses that tend to discount or overwhelm the specifically “problematizing” dynamic of framing, linking it explicitly to differentiated nations in context with particular capacities to act collectively.

Sociology of Science

To the extent that the issue of climate change is a scientific issue, it belongs to the sociology of science. Examining the nature of knowledge about climate change and the privileged role of scientific knowledge are essential to my study, but not sufficient to understand how arguments gain or lose attention and work with or against each other in various communities: scientific, policy, and public sphere.

The basic tenet/assumption of this subdisciplinary area is that all knowledge, including scientific knowledge, is socially constructed. Scientists do not “discover” the laws of Nature that exist independently of people, somewhere “out there.” Rather, scientists construct knowledge through agreed-on scientific processes, test results by agreed-to standards, and mutually accept or reject hypotheses and theories based on examination of results and their own discussions of the meaning of results. (This view has been characterized in the “Science Wars” as pure relativism, but of course it is no more pure relativism than the alternative position is pure positivism.) I will apply this constructivist viewpoint to the study of climate change and extend it by examining how different knowledges, both scientific and nonscientific, are needed to develop a social agreement about the nature and risk of global environmental changes.

Much of the work done within the sociology of science consists of what Latour terms following scientists around to see what they do when they’re doing well as

scientists. Weber's (1968:8) work on social action, and the identified image of the subject matter, "the way actors define their social situations and the effect of those definitions on ensuing action and interaction," fit the sociology of science paradigm as it is realized in these ethnographic studies. However, my study will be at a more macro level, looking at science writ large and other forms of knowledge as well the global societal structures. Taking a different tack, I want to study the intersections of their constructed knowledge and other constructions of knowledge.

"Truth" is often the criterion for evaluating science. Part of this evaluation is whether or not scientific theories are judged to be true—that is, derived from accurate and complete data, the product of an organized and transparent (ideally, replicable) process, and consistent with those data and other conditions in the world. Another part of determining the truth or falsity of a scientific argument is the acceptance of that argument by other scientists who are qualified to judge.

Physical and social scientists alike long held the view that science has a special claim to "truth," derived from proof, empirical evidence, and survival of informed criticism. The early scientists (including physicists and sociologists) looked for theories that were lawlike propositions, such as the Law of Gravity or the Law of Three Stages. Newtonian physics was used as a standard for axiomatic theory that was the goal of all science. But axiomatic theory and even formal theory, what Turner (1994:42) calls "watered-down axiomatic theory," involving the careful statement (words and some formalisms) of *testable* hypotheses are, as such "beyond the capacity of virtually all sciences." That is, Turner believes that intuition and insight are the true sources of theory, which *may* be susceptible to being formalized. Taking a more

moderate position, Boudon (1986[1984]:208) asserts that “the only *scientific* theories of social change are *partial* and *local* ones”; more general theories are more metaphysical than scientific.

A social constructionist point of view sets one standard for both physical and social science, but this definition acknowledges the contingent and value-laden nature of *all* knowledge in both the natural and social sciences. Thus, to take just a few examples, Latour (1987), looking at what scientists actually do, describes how the “black boxes” of scientific knowledge are constructed; Garfinkel (1967) demonstrates how “discoveries” emerge in scientific conversations; Gross (1990) shows the importance of social interactions in science; and Ravetz (1995) analyzes the ethics and interests that emerge in and are parts of scientific processes. Richard Harvey Brown (1998) analyzes science as narration, replacing the positivistic metaphor of the world as organism or machine (a metaphor borrowed from the natural sciences) with the metaphor of discourse (a more apt metaphor for the social sciences).

The interactions and relationships among scientific and other forms of knowledge will be important to this study. Scientific knowledge may become the basis for thoroughgoing social change, while at the same time being dependent upon narrative, nonscientific knowledge. Latour (1988), in his study of the “Pasteurization” of France, shows how scientific theories become accepted and actualized in nonscientific settings such as farms. Using mostly historical analysis, he shows how “order at all points,” i.e., a consensus among science and “lay” knowledges and perspectives, was achieved to improve the health of the milk-drinking public. Lyotard (1984), using partition and classification as well as logical analysis, explains the

differences between scientific and narrative language games and how they are related, science being ultimately dependent on narrative for its legitimacy. Habermas (1984, 1987), using a critical theoretical method, identifies three types of knowledge (positive, hermeneutic, and critical) and how these different types are used in communicative actions oriented toward coming to an understanding. Brown (1998) demonstrates the similarities among scientific, civic, and social movement narratives, and the use of narrative in democratizing science.

Beck (1992) directly addresses the issue of the use of science-you-can't-see to provide evidence of environmental problems – and, as well, to provide solutions. Miller and Edwards (2001) in general, and Norton and Suppe (2001) for the specific case of climate models discuss why scientists – and, presumably, the rest of us – should believe what they and we cannot directly observe about the atmosphere. Scientists have developed a global concept of climate; this clashes with people's concerns about their local weather and climate. Scientific knowledge about the global climate system is based upon highly sophisticated data collection networks, data manipulations, and theoretical chemical and physical relationships and dynamics in the atmosphere; knowledge so derived may not have salience for nonscientists, although it may be, as Norton and Suppe say, “good science.”

Sheila Jasanoff and Brian Wynne et al. (1998) provide a constructivist account of climate change science that draws on comparative analysis of how scientific consensus is formed. They review the cases of stratospheric ozone, the Green Revolution, the International Biological Program, the International Geosphere-Biosphere Program, and environmental computer-based models for “instructive

parallels” to the case of climate change. They find that the scientific consensus on climate change is weakly grounded, often clashing instead of articulating with local knowledge in many places.

Although sociology of science approaches help to explain the nature of the knowledge issues in the climate change debate, these are not the whole story of the debate. The origins and claims of climate science, to be sure, are still elements in the debate. The scientific efforts to measure changes in the atmosphere, describe and quantify physical and chemical processes, and model the climate system accurately enough to forecast changes – all these efforts beget large uncertainties. But the scientific efforts and uncertainties are only part of the debate, which is social in a larger sense. The debate includes important economic, political and cultural issues that cannot be reduced to questions of what the “facts” are and whose knowledge counts.

Moreover, by its very nature sociology of science privileges scientific discourse. The focus is on how scientists build knowledge, communicate among themselves, and affect the larger society. However, the climate change debate is not just a matter of scientists building knowledge in a contentious process. (In fact, a remarkable consensus has been achieved among scientists, although skeptics remain.) Neither is the debate satisfactorily characterized as a problem of communicating important knowledge from scientists to nonscientists, including policymakers and the general public. The space of the debate includes knowledge claims, but also claims of very different sorts: beliefs, logic, tradition, economics, politics, etc.

The chief insight that I will use from this area of inquiry is that scientific discourse exhibits close parallels to other forms of discourse. Thus, scientific

arguments can be placed on an equal footing with political, economic, and “worldview” arguments. That is, each type of argument makes one or several good claims to legitimacy. All of these arguments make attempts to become the hegemonic discourse; the special claims of science often lose out to other types of claims.

Environmental Sociology

The term “environmental sociology” can be seen to include sociological studies that take environmental topics as their case studies of their real subjects or, more narrowly, studies that focus on the environment as the central topic. In the first category there are, for instance, environmental economics and research into the political debates about the environment. In the second category are explorations of the different ways humans relate to the environment; radical varieties include deep ecology and ecofeminism. Although these are important framing or worldview issues in the climate change debate, two considerations make these lines of inquiry less than fruitful for the current study. First, environmental sociology tends to take a one-size-fits-all approach; that is, all environmental issues are manifestations of the same issue and are treated as equivalent. Second, environmental studies tend to assume that there are black and white choices: either to continue exploitation and pollution until eventual destruction or to initiate wholesale and transformative changes in attitudes and practices. The discursive approach of this study assumes, in contrast, that agreements may be built on any middle ground as well as at the extremes.

On the global stage, many scholars who focus on environment-relevant issues seek to extend the powerful tools of modernity to solve problems of pollution,

degradation, loss of biodiversity, potential climate change, and so on. There is a whole literature about how to “price” the environment and its functions in providing clean air and water, food, habitat, and recreation (see Yohe and Cantor 1998 for a review).

Another literature tackles the issues involved in developing new technologies that will be less polluting and less resource-intensive (IPCC WG3 2001 assesses this literature).

A small subset of the literature on consumption deals with energy consumption (e.g., Shove and Lutzenhiser 1998).

This study, which analyzes climate change discourses, is explicitly focused on an environmental problem, but will make no attempt to do boundary work in defining environmental sociology. I hold with Lutzenhiser (2002:7) that what distinguishes environmental sociology is a shared view of and focus on

human institutions and systems, human cooperation and conflict, human actions and technologies ... as part and parcel of natural systems – systems from which they draw resources; systems that they shape, manage, dominate, pollute, overexploit, and sometimes destroy. In this view, a society without its environment is unimaginable, and sociological imagination that overlooks the centrality of the natural environment for society is delusionary – and perhaps dangerously so.

Within this viewpoint, (largely American) empirical studies of people’s attitudes toward the environment have been conducted and (largely European) theoretical research has explored the roles of modernity, industrialization, science, social solidarity, and forms of knowledge and perception. The viewpoint is essential to my study – but the dialogue among those who share it and those who focus on other dimensions of the debate is the real focus of my work.

Environmental sociology has become a sub-discipline in sociology over the past three decades, achieving formal recognition from the major disciplinary associations in the 1970s. As part of the effort to create a sub-discipline, sociologists have been concerned to define its concerns, find its foundations, and establish the research and theoretical analyses that constitute and continue it.

A major area of focus in both defining the concerns and finding the foundations has been analyzing, deconstructing and reconstructing the relationship between people and the rest of nature. In other words, environmental sociology has focused on the issue of how the environment can be included in the premier *social* science.

Sociology was founded in contradistinction to the physical sciences in general and to biological determinism in particular. Yet it retained the basic concepts, metaphors, and theories born in the physical sciences. Darwin's research spawned evolutionary theory; Spencer, probably more popular at the time, applied evolutionary theory to society, with the additional assumption that social evolution means progress. Newton posited a world that ran like a machine, by immutable and universal "laws." Comte, and many other sociologists after him, sought the mechanistic immutable and universal laws that govern society. This effort is carried on by those who develop formal theory. Even ecology, originally a biological term, has been appropriated for sociological use. The word metabolism, used by biologists and also by Marx, has been analyzed as a bridging term between humans and their environment (see especially Dickens 1992, 1997) – and, lately, as a term for input-output analysis of industries in the term "industrial metabolism" (Opschoor 1997).

However, even in the act of using physical science theories, sociologists have carefully drawn a modernist boundary between humans and their environment (the so-called man/nature dichotomy). “In one move, the opposition between nature and culture (or society) made room for social sciences as autonomous disciplines distinct from the natural sciences, and undercut what were widely seen as the unacceptable moral and political implication of biological determinism” (Benton and Redclift 1994:3). Environmental sociology, as perhaps its principal task, seeks to put people and nature back into relation with each other – or, rather, into a different relation than master-servant or subject-object.

This viewpoint is nothing new, of course. The Romantics of the eighteenth and nineteenth centuries understood both the rift between “Man” and “Nature,” and its implications, both for the Man-Nature relationship and for human nature itself. Moreover, traditional societies outside the Enlightenment priesthood wove interdependence with nature into their structures and processes. In some places this prior understanding is being defended, rediscovered, or reconstructed.

Catton and Dunlap (1978a, 1978b) have labeled this the move from a human exemptionalist paradigm (HEP) to the new environmental paradigm (NEP). That is, the discipline of sociology and virtually all of its practitioners prior to the advent of environmental sociology have treated human beings as though they were exempt from the laws and constraints of nature. Environmental sociology’s task is not “bringing the environment back in” – because it was never there. The environment needs to be incorporated, integrated, set in relation to society; this effort means nothing less than a new paradigm for the discipline.

Indeed, many environmental sociologists feel that the sub-discipline should aim at transforming the sociological stance and viewpoints, and the concepts of society and societal change (Buttel 1997). This revolutionary change will include new units of analysis and new methodologies – the nation-state will change dramatically or be superseded by another form of social organization or anarchy, for example. The nature-culture dualism can be eliminated, replaced by an integrated vision of humans and nature coevolving or co-creating each other (like structure and agency co-create in Giddens' structuration theory; see also Redclift and Woodgate 1994). Or, in "deep green" philosophy (Tobias 1985), modern sociopolitical structures such as the nation-state, which are based on human domination of nature, will be superseded by a biocentric world, where people live in the consciousness that they are simply one species among many in the world. Bookchin, who vigorously disagreed with the deep green theorists, also proposed a kind of anarchy as the environmental alternative to the modern state (see also Murphy 1994).

However, many other sociologists have attempted instead to emphasize or recover the environmental threads to be discovered in the writings of sociology's founding fathers (none of the mothers). These reconstitutions provide theoretical rationales for considering humans and the environment together (see, e.g., Dunlap et al. 2002). Most often, Marx and Engels are the relevant figures. Foster (1997) has analyzed the contributions of Marx to the theoretical underpinnings of environmental sociology. Dickens (1992, 1997), although acknowledging that reading Marx and Engels as environmentalists would be wrong, culls statements from their early writings to demonstrate that they considered the environment to be "man's inorganic

body” and that “by thus acting on the external world, changing it, [man] at the same time changes his own nature” (quoted in Dickens 1992:48). Man’s relationship with nature was considered to be the crux of man’s natural happiness (species-being) and the very relationship distorted by capitalism’s various alienations.

A contrasting view of Marx is provided by Norgaard (1997:160), who characterizes Marx’s ideas as “based on Newtonian mechanical systems dynamized by the unfolding processes of Hegel’s dialectical method” – in other words, distinctly *not* a Darwinian worldview. The “evolution” in Norgaard’s “coevolutionary environmental sociology” comes from the Spencerian tradition.

A somewhat different way of establishing Marxist roots is to continue the critique of capitalism, its major sociological contribution, by establishing the pollutants and waste generated by capitalist production as both an inherent property of the system and a factor (or the main factor) in its coming downfall. The second contradiction of capitalism is “to create the further barriers to capital accumulation, in effect ruining the very condition it needs in order to expand” (Dickens 2002). The fusion of “red” and “green” makes a powerful story.

World systems theory, although more “red” than “green” (Roberts and Grimes 2002), has been adapted or enriched by environmental sociologists to explain a country’s environmental performance via its place in the world system and to predict the effects of environmental policies. Roberts and Grimes identify five contributions that world systems theory makes to environmental sociology: (1) identifies important trends such as commodification, proletarianization, globalization, expanding states, and growing corporate power; (2) provides insights on the cycles of crisis and

restructuring in global capitalism; (3) focuses on the key actors: states, capital, and labor (or civil society); (4) examines exploitation, such as that found in “free” trade between unequals; and (5) attempts to find the causes of conflicts, such as land tenure. On the weakness side, Roberts and Grimes cite tendencies to overemphasize economics and oversimplify the diversity of nations; and to pay not enough attention to culture, individual agency, and gender.

Also in the Marxist tradition, Wallerstein (1999) points out that capitalism works precisely because many of the resources exploited are free, such as land, sunshine and rain, trees, and minerals. There are three possible alternatives: (1) businesses can be required to pay all costs, with a resulting profits squeeze; (2) governments can pay, getting the wherewithal from business taxes or taxes on everybody else, resulting in a profits squeeze or tax revolts; or (3) societies can choose to do nothing, resulting in various eco-catastrophes. He theorizes that efforts to “price” the environment will fail because capitalism cannot succeed (i.e., make profits and continually grow) without vast quantities of free inputs from nature. However, he does not predict that his third option, eco-catastrophes, will occur; instead, “we are in the process of exit from this system [historical capitalism]” (Wallerstein 1999:10).

Schnaiberg’s (1980) phrase the “treadmill of production” is a Marxist-grounded critique of capitalism from an environmental sociological viewpoint. Capitalism’s need for continual growth means that the cycle of growth and degradation as new demands lead to exceedance of the carrying capacity of the earth. Buttel (1997:46) characterizes the treadmill of production as “more a theory of the role

of the state than it is a theory of economic institutions per se.” That is, state support is what enables the treadmill of production to continue and to become transnational.

Although Marxian theory is most often thought of as providing foundations for environmental sociology, Weberian concepts are also used as a ground. Murphy (1994) titles his book *Rationality and Nature: a Sociological Inquiry into a Changing Relationship*. The intensification of rationality that Weber described, says Murphy, helps to explain both the ability of people to remold a “plastic” nature, and their need to control themselves and nature in thoroughly rationalized institutions that promote sustainable development. Intensified rationality is opposed by “rerationalization,” which “subordinates ecological goals to the anarchist goal of eliminating social hierarchies, and in the case of Enlightenment feminism, particularly the hierarchy of men over women,” and “derationalization,” which advances “an anti-anthropocentric view arguing for the intrinsic value of nature as a whole” (Murphy 1994:101-102).

Weber further provides a more complete explanation of environmental problems resulting from capitalism, says Murphy. While Marxism describes the cycle of accumulation of capital and production of goods, Weber describes the accounting and prediction capabilities of the capitalist system. Following Weber, the failure to account for the waste produced along with consumer goods means that the rationality of the system is deficient, leading to system blinders about environmental problems, resulting irrationalities, and a parasitic relationship between people and nature. A solution may be found in rejecting the “iron cage” metaphor and embracing the idea that the use of the environment as a sink for waste can be “thrown aside, like a light

cloak” (Murphy 1994:226) if humans use their reason to master themselves as well as mastering nature.

Related to the issue of the relationship between people and the environment is one of the major questions within sociology – realism vs. idealism, or positivism vs. social constructionism. Is the environment/nature under discussion an independent reality that can be objectively assessed as “degraded,” for instance? Buttel (1997), for example, says that “environmental sociology is in some sense a materialist critique of mainstream sociology” – that is, that social theory needs to account for real, physical resources and constraints in the environment. Sklair (1994:205), in describing her global sociology, says it is “self-consciously materialist (and thus anti-state centrist).”

Hannigan (1995) makes the argument for social constructionism of nature from a historical perspective and for all of sociology. Social constructionism, he says, challenged structural functionalism, which “assumed the existence of social problems (crime, divorce, mental illness) which were the products of readily identifiable, distinctive and visible objective conditions” (Hannigan 1995:32). He quotes Coleman and Creasy: “If thousands of people did not know they were being poisoned by radiation leaking from a nuclear power plant, wouldn’t radiation pollution still be a social problem?” (quoted in Hannigan 1995:39). Hannigan goes on to assert that environmental sociology has been largely responsible for the impetus toward a social constructionist perspective on the environment.

Closely entwined with this issue is the whole question of dualisms. Are dichotomies such as subject/object, man/nature, nature/culture (and, for that matter, man/woman, birth/death, time/infinity) our “natural,” “inborn” way of analyzing the

world, or modernist creations that have been powerful in areas like technology and medicine but that are ultimately not only unhelpful in attempts to understand and improve society but also simply and demonstrably wrong?

To return to specifically environmental issues, is humanity part of nature, a special part of nature, or separate from and superior to nature? What does each stance mean for attempts to study, understand, describe, and control both humans and nature?

If society is part of nature, people cannot control it, since a part cannot control the whole – but this, although logical, is contrary to people’s historical and current experience. But perhaps the dichotomies raise the wrong question. Pálsson (in press:5), discussing “Nature and Society in the Age of Postmodernism,” asserts that “Any distinction between inside and outside (and, by extension, between nature and society) seems beside the point. It seems reasonable to assume the humans are simultaneously part of nature and society and that modern policy on the environment should be based on *that* premise, and not on the idea that humanity, or some part of it, is suspended above nature.”

However, as she and others (e.g., Rosenau 1992) have pointed out, thoroughgoing postmodernism is sterile with regard to political (and other) choices. If we have no basis – or an infinite number of equally valid bases, which amounts to no basis – by which we can know what is happening to the environment and what to do about it, there is no way forward, only unfounded options, equally unfounded pessimism, and the domination of the strong.

Cronon does not attempt a philosophical resolution of these questions. He accepts the human ability both to change and to manufacture nature. He also affirms

(Cronon 1995:55), “And yet the rock remains, as do the trees and the birds, the wind and the sky. They are first and foremost themselves, despite the many meanings we discover in them.” Human artifice, the natural objectives and processes, and human-assigned meanings are all real.

Eder (1996) takes up this issue but refuses to engage the question as formulated, instead discussing “nature” and “culture” as evolving in parallel but not necessarily in sync. Since the nineteenth century, “nature has come to be understood as a system of transformations, into which actions are integrated as physical events” (Eder 1996:45). When natural cycles (seasons, life and death, etc.) become separated from theories about nature, the task becomes threefold: a reconstruction of cognitive learning processes (everyday, professional, and theoretical knowledge), an examination of the moral learning processes, and an analysis of the connection between them.

The different relationships between people and the rest of nature have been historicized by environmental sociologists and other analysts. Generally, three “waves” are distinguished: conservationism, activism, and negotiation.

The first wave was a concern for conservation of natural spaces. This began in the nineteenth century. European foundations include the Romantic poets and philosophers who reacted to the Enlightenment project of domesticating nature by valorizing the wild spaces and relatively untrammelled scenes of nature as nourishing to the soul. American sources include Ralph Waldo Emerson, Henry Thoreau, and George Perkins Marsh. When Theodore Roosevelt, as President of the United States, began setting aside wilderness areas as national parks, he became the first

“environmental president.” Subsequent analysts have characterized the beginnings of the U.S. national park system as an elitist movement to preserve the open and scenic spaces for the enjoyment of well-heeled outdoorsmen, hunters, and fishermen. Organizations such as the Izaak Walton League, the Sierra Club, the Wilderness Society, and the Audubon Society, along with leaders like John Muir and Aldo Leopold, are associated with the conservation movement in the United States. Yearley (1991) analyzes the British historical cases of the Royal Society for Nature Conservation, formed by elites whose goal was scientific study of protected sites, and the Royal Society for the Protection of Birds, which began with the specific aim of stopping the slaughter of birds for fashion feathers.

The second wave of environmentalism, beginning with the 1962 publication of Rachel Carson’s *Silent Spring* (Gore 1992, MacDonald 2003) or with Earth Day in 1970 (Shabecoff 1993), was characterized by activists working to reduce or eliminate the pollutions of the nuclear age and industrialism. It is this activism that most closely resembles other so-called new social movements. Although a number of deadly incidents had been blamed on the effects of fossil fuel use – for example, the “killer fogs” in London (1948, 1952), a devastating oil spill in Santa Barbara (1969), and smog in Los Angeles and other cities – the requirements of economic progress had taken precedence over the need to curtail pollution until this time. Indeed, chemical companies attacked Carson personally as hysterical and extremist, and auto companies vigorously resisted a 1959 Los Angeles requirement for a blow-by valve to recycle crankcase emissions.

But Carson's book, other evidence that people could see and their strong reactions to it, and some political leadership in the unlikely form of U.S. President Richard Nixon, helped to bring environmental concerns to the fore. Banning the pesticide DDT and nuclear weapons, cleaning up the air and water, strictly controlling the use of toxic materials, limiting lumbering, halting the needless killing of animals such as whales, and holding industries accountable for polluting the environment were goals of activist organizations and individuals beginning in the 1960s. Tactics ranged from media campaigns to lawsuits to hugging trees, lying in front of bulldozers, and interfering with whaling vessels. Beginning in the 1960s, the Natural Resources Defense Council, the Environmental Defense Fund (1966), EarthFirst!, the League of Conservation Voters, Greenpeace and many others – local, national, and international – lobbied, demonstrated, sued firms and governments, and generally pushed hard to stop harmful practices and preserve environmental resources and places. “The ‘green’ organizations gradually built highly professional staffs of lawyers, lobbyists, scientists, economists, organizers, fund raisers, publicists, and political operatives to influence government decisions” (Shabecoff 1993:123).

The 1970s saw a plethora of environmental laws passed in the United States: the National Environmental Protection Act; the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); and laws to regulate water pollution, coastal zone management, safe drinking water, toxic substances, resources conservation management, and clean air. President Nixon created the Council on Environmental Quality and the Environmental Protection Agency. The focus was on command-and-control legislation, and the results of this approach often fell short of expectations.

Furthermore, land use was not addressed; land-use planning “is in its infancy at the local level, is rare on a regional scale, and remains politically anathema on the national level ... The land continues to disappear” (Shabecoff 1993:167). In Britain and Europe, Green political parties formed, traditional political parties were anxious to be seen as “green,” and industrial firms set about developing at least the appearance of environmental concern (Yearley 1991). In so-called Third World countries, environmentalism became part of the struggle against the culture- and nature-destroying aspects of industrialization.

The activist wave was succeeded by a so-called Third Wave, in which environmentalists attempt to work with the political process and with corporations to set up laws, regulations, and agreements that will be environment-friendly. According to Shabecoff (1993:257) for the case of the United States, the new group was in many ways more pragmatic and professional, more inclined to cooperate with existing political and economic forces to achieve its goals. The newcomers also recognized that more complex problems, such as global warming and well-organized opposition by powerful industry groups who no longer dismissed them as long-haired tree huggers, must be met with improved tools. The national organizations learned how to use and exchange mailing lists, conduct door-to-door canvassing efforts, and plan skillful advertising campaigns.

Many conservation and activist organizations became Third-Wavers, devising schemes for market-based policies and negotiating directly with industry.

Environmental organizations have become more numerous and more like their

opponents in style and tactics, although protests, direct action, and “witnessing” are still in evidence.

Environmental Sociology and Global Climate Change

Several sociologists and anthropologists have focused their attention on climate change as a research topic. In general, sociological studies in the area of the environment have examined the societal aspects of specific problems in specific places, for example, Wynne’s (1989) study of the struggle between scientific evidence and local knowledge in the radiological contamination of English sheep farms after Chernobyl. However, the definition of climate change as both a “new” and a “global” problem invites attention from scholars interested in a postmodern world order and in global governance. Of the conjunction between environmentalism and the network society, Castells (1997:122) says, “there is a direct correspondence between the themes put forward by the environmental movement and the fundamental dimensions of the new social structure, the network society, emerging from the 1970s onward.” Of climate change in particular, Clark Miller and Paul Edwards (2001:3) sum up this view: “Climate change, we argue, can no longer be viewed as simply another in a laundry list of environmental issues; rather, it has become a key site in the global transformation of world order.” And, as Yearley (1991) points out, once advertisements assume that consumers have knowledge of climate change and other global environmental issues, environmentalism has entered the mainstream.

Human Choice and Climate Change (Rayner and Malone 1998), a four-volume assessment of the social science relevant to climate change, includes major

contributions by sociologists. Jasanoff and Wynne (1998)³ describe how scientific findings emerged in a political context and how attempts to build a global climate science have only been partly successful. MacKellar et al. (1998) examine the relationship between population and climate change as an interplay among numbers of people, how they live, and what they consume. Shove et al. (1998) probe the institutional and infrastructural arrangements that are important determinants of energy use. Rip and Kemp (1998) assess Schumpertian and other views of technological change processes, which, if understood, could contribute to mitigation of and adaptation to climate change.

One line of research has been survey work connected with public awareness and knowledge of, and concern for climate change (and other environmental) issues (see Thompson and Rayner 1998 for a summary). Not all of this work is done by sociologists nor in the name of environmental sociology; but for convenience the survey work is discussed here. Consistent results from survey research include findings that concern for the environment is generally high, that people think more ought to be done to protect the environment – and that there is a great lack of knowledge about environmental problems generally and about climate change specifically. People confuse climate change with stratospheric ozone depletion and ascribe the “greenhouse effect” to causes as various as the NASA space program, automobile use, and electricity generated by nuclear power.

³ Strictly speaking, a legal scholar and a sociologist, respectively.

People's beliefs, as measured by surveys, are categorized differently by different researchers. Many use a knowledge-based approach, assuming that people will worry about things if they understand why those things are problematic. Correlations between demographic characteristics and environmental attitudes are used to theorize about the effects of age, gender, class, etc. on various concerns (e.g., Van Liere and Dunlap 1980). Others see concerns arising from ethical frameworks. Inglehart (1977, 1990), for instance, posits the concept of postmaterialistic values, including environmental concerns. Kempton (1991), Morgan et al. (1992) and Bostrom et al. (1994) use a "mental models" approach, i.e., that people will only use new information if they can fit it into preexisting ideas about how the world is. Thompson and Rayner (1998) use cultural theory to explain varying attitudes toward the environment; this study is discussed in greater detail below.

One way to characterize the approach of this study is as a search for commonalities among labeled phenomena. This is a mainstream sociological method, of course, as is applying a method that has been useful in some situations to others. One interesting example within environmental sociology is that of Barcena et al. (1997), who compare the features of ecologism and nationalism⁴ to explore the potential for "confluence" between the two. Thus, their attempt parallels my attempt to find bases for agreement; if efforts to address climate change could be joined to a

⁴ Nationalism is defined as "a movement directed towards and from political power" (Barcena et al. 1997:313), thus excluding cultural ethnic movements.

politically powerful force such as nationalism, the prospects for climate-friendly policy would look much brighter.

Once Barcena et al. account for nationalism's concern with a specific territory against the possibility that ecologism could adhere to a universalistic or at least global discourse as well as trying to defend specific spaces, they find a number of features through which ecologism and nationalism could make common cause. Their specific examples focus on what they call ethnoecology, the incorporation or alliance of ecological concerns with those of ethnic groups or nationalities. Thus, in Estonia the nationalistic movement blames the "Russians" for the poor state of the environment and posits a better environment under a national government.

Ethnoecology is one of six discourses that define the relationship of ecologism to nationalism (Barcena et al. 1997:310). The other five include (1) econationalism, as when the ecology movement in Euskadi (the Basque Country) campaigned against a nuclear power station by associating support for it with an affirmation of Spanish rule; (2) old peripheral nationalism, denouncing ecological colonialism while perhaps conserving national spaces (Brazil, Malaysia, Thailand, India, Pakistan, China); (3) hegemonic nationalism, in which the rich nations promote shallow ecologism that runs a poor second to growth; (4) hegemonic globalism, "in which the global pseudo-ecologist pose barely hides the ruthless voracity of all modernizing vanguards" (Barcena et al. 1997:312), and (5) ecoglobalism, in which transnational organizations such as Greenpeace work towards a "deep green" ecologism.

Middle spaces emerge among these six discourses as well. For example, the claim of American Indian Tribes to traditional hunting and fishing grounds, and to

sacred spaces could be classified as ethnoecology or old peripheral nationalism. In the first case, Native Americans blame American nations for environmental change and degradation as those of European stock settled in the Americas and conquered the native peoples. In the second case, since a number of Tribes have sovereign nation status (within limitations), the American nations can be thought of as attempting to continue the process of colonizing Native Americans by appropriating, degrading, or destroying their natural resources.

Thompson and Rayner (1998) use cultural theory, based in paradigmatic work by Mary Douglas, to classify three constructed diagnoses of the causes of climate change: that population, consumption, or failure to price natural resources is the problem that causes anthropogenic climate change. The policy prescriptions follow: reduce population growth, cut consumption, and properly value natural resources. These three diagnoses and prescriptions are aligned with hierarchical, egalitarian, and market institutions. Jaeger et al. (1993) have found that cultural explanations explain people's commitment to action on climate change much better than either knowledge-based explanations (i.e., how accurate people's knowledge is) or sociodemographic explanations.

Environmental sociology, although more directly concerned with issues raised in the climate change debate, provides only limited assistance to the focus of the current study. The analyses of the HEP versus NEP, the Rational versus the Romantic, and real versus constructed Nature distinguish two types of worldviews discernable in the arguments, but not elements that might bridge the gulf between them. The survey literature, too, seems to focus on differences, often with a "knowledge deficiency"

model, the dubious assumption that if only scientists can really communicate information about the problem of potential climate change, people will respond in ways the experts will think appropriate. I am of course interested in identifying differences but more interested in finding bases for agreement, bases that do not require one set or another of the debaters to give up deeply held beliefs about the relationship of humans and the rest of nature.

Similarly, the Marxian and Weberian analyses of environmental problems have diagnostic power and provide good alternative descriptions of what's-happening-now. However, understanding a problem does not necessarily lead straightforwardly to a solution or set of solutions. Investments in the current economic systems, beliefs and other cultural "glues," and political arrangements generally support the current situation (though often in dynamic tension), not past simpler conditions or visions of far different futures based on new commitments. The focus of this study, in contrast, is the arguments currently made and the bases within the arguments (if any) for coming to agreement.

Studies such as Barcena et al., and Thompson and Rayner yield insights about such issues as the role of scientific knowledge in the climate change debate and the congruence between environmentalism and other social commitments. These and other individual studies will inform the work of this study. But the limits of these three subdisciplines preclude situating the study within any of them.

CHAPTER 3: METHODOLOGY

In Chapter 1 I argued that considering climate change as a social issues requires a research approach that includes all the issues bound up in it – and, therefore, all the voices in the debate. In Chapter 2 I argued that three seemingly relevant subdisciplines of sociology contribute only partially to analysis of the climate change debate. In this chapter I lay out the research methodology used in this study.

To address the question of whether or not the potential exists for coming to agreement about climate change, I use both theoretical and empirical methods. I first review and extend theories about how people come to agreement, especially on issues of little immediate importance and at a global level. The general debate on globalization provides a framework that I also use to theorize about various dimensions of the climate change debate. Next, I analyze actual arguments in the climate change debate, examining the arguments made and their rhetorical features to discern potential bases for coming to agreement or at least moving closer to agreement. I thus evaluate empirical evidence from documents that belong to the debate. Separating and characterizing the elements of actual arguments helps in the theoretical sorting out process and may reveal patterns that indicate how agreements might be built across arguments. Finally, I perform a social network analysis to examine the links among rhetors, links formed by elements held in common. The presence (or absence) of links indicates the degree of potential for coming to agreement.

Theoretical Analysis of the Climate Change Debate and its Arguments

Theory provides an account of the world that makes sense of what we can see and measure. It “embraces a set of interrelated definitions and relationships that organizes our concepts of and understanding of the empirical world in a systematic way” (*Oxford Dictionary of Sociology*). If we use this basic definition, theory is what makes science intelligible and useful. Newton’s observations of empirical data must be theorized before they become scientific “discoveries”; without Durkheim’s theories, all we have are statistical tables. Thus, science can be defined by the mutual dependence of theory, method, and empirical activity. Merton (1957), in a pair of chapters, demonstrates that theory and research are codependent; theory must always be tested, and empirical results will alter existing theories and suggest new ones to be tested.

Theorizing allows researchers to step back and gain perspective on the climate change debate. The climate change debate is interesting to theorists at least in part because often it does not seem to be about climate change at all (Rayner and Malone 1998). Rather, climate change provides the ostensible subject for a wide range of debates about industrialization, development and inequality; what the “right” relationship is between human and nonhuman nature; the legitimacy of Western (or Northern) science; global governance and nation-state actors; and globalization. These topical areas provide context for the debate and theoretical approaches and frameworks with which to analyze the climate change arguments – at least to the extent that climate change is interpreted as another manifestation of a continuing issue.

Industrialization, Development, and Inequality

Who is to “blame” for anthropogenic climate change? The story has been told and retold of industrialized nations growing prosperous by exploiting the natural resources of colonies and poor nations while at the same time spoiling the environment and initiating an enhanced greenhouse effect that will differentially and adversely affect poor nations. When mechanisms are proposed to compensate poor nations, existing unequal arrangements inevitably become part of the subject. The development literature that deals with North-South inequality is therefore relevant to the debate; some allege that the climate change debate *is* a development debate and that power is the real topic. Many environmental sociologists would agree.

The Relationship between Humans and Nature

Are people the stewards of nature or just another species, with no more inherent rights than any other? Is the Earth our Mother or a wealth of resources? Are those resources finite or essentially unbounded, i.e., do people have to be careful to engage in “sustainability” or not? These are sociocultural questions, to which possible answers have been formulated by sociological and cultural theorists in various parts of the world. Catton and Dunlap (1980) argued for a “new environmental paradigm” in which human exemptionalism would be discarded in favor of a view of humans as part of nature and the natural world. C.S. Holling, an early ecologist, defined four views of nature (Holling 1986): (1) nature is benign and can recover from almost anything people can do; (2) nature is benign, but within limits—there are thresholds that, when

crossed, may trigger catastrophes; (3) nature is ephemeral, easily degraded and destroyed; and (4) nature is essentially unknowable and unpredictable. These views of nature were mapped onto Mary Douglas' Cultural Theory (Thompson et al. 1990), thus characterizing the social and political tendencies of those who hold each view of nature. These are Northern constructs, of course; Southern (Buddhist and Hindi, for example) analyses are quite different.

The Legitimacy of Northern/Western Science

Ulrich Beck notes that the global risks of contemporary society (of which climate change is certainly one) were defined and scoped by scientists from industrialized nations, using the tools and methodology that are credited with a principal role in the economic development of those nations. Furthermore, these same scientists are busily engaged in providing technological solutions to the problems they have defined. Obviously, a great deal of faith in the legitimacy of science is necessary to establish the "truth" about what is happening in the atmosphere and to attribute changes to human interventions. How did a scientific consensus come about (if it did), and what other kinds of knowledge may play roles in extending this consensus to the lifeworlds of ordinary people in both the North and South? It may be that the climate change debate is all about whether or not the hegemony of Western/Northern science can be extended to the whole world.

Global Governance and Nation-State Actors

Global governance and agreements about common resources, such as the oceans and atmosphere, is a central issue in the climate change debate. The claims of a global good and global citizenship resonate powerfully with those who wish to get on with the process of reducing greenhouse gas emissions. Nation-states, however, must both decide to sign on to and implement the terms of, say, the Framework Convention on Climate Change (or any of a dozen other environment-related conventions and treaties). So the struggle for national preeminence within the global system is certainly an issue, if not “the” issue in the climate change debate. Transnational social movement organizations attempt to mediate this struggle through holding up noble principles and resorting to political action (forming “green” parties, staging dramatic whale rescues, etc.).

Parallels between Globalization and Climate Change

Theories about globalization processes and outcomes provide the widest scope and closest parallels to climate change issues. Globalization encompasses issues of development and inequality, the relationship between humans and nature (e.g., expressed as traditional vs. modern methods of food production), and the role of Western science and technology as a global force. Therefore, in the following chapter I focus on globalization theories.

I explore the various approaches that scholars have used to analyze both globalization and the global issue of climate change and ways that participants in the debate might come to agreement about the issue. These analyses have three principal

emphases: economic, political, or cultural (including scientific). However, in all cases so far analyzed theorists have been unable to advance an effective way or ways of moving toward an agreement.

Content Analysis/Rhetorical Analysis Methodology

Theory about arguments in the climate change debate provides only a starting point for an analysis of potential bases for agreement. Theoretical analysis benefits from complementary empirical analysis, as Merton (1957) and others have pointed out. It is all very well to build and critique theories of how the (globalized and climate changing) world works, but at some point theory needs to account for the whole debate space without assumptions that a priori exclude certain types of arguments. To further explore the theoretical potential for agreement on the causes and remedies for climate change, I abstracted the elements of actual arguments people have made relevant to climate change. What may seem to be a positivist approach to an interpretive analysis is in practice a qualitative tool that preserves the context of each argument and allows comparison among all arguments.

This study assumes that, if there are bases for agreement about the existence of, sources of, and ways to address climate change, these bases will exist in the arguments made about climate change. One way of thinking about this is to picture a spectrum running from complete disagreement to complete agreement. At one end, rhetors have completely different and mutually unaccepted authorities, evidence, worldviews, and policy proposals. At the other end of the spectrum, rhetors have identical or at least mutually acceptable authorities, evidence, worldviews, and policy

proposals; everyone is “preaching to the choir.” All debates, including the climate change debate, exist somewhere between these two extremes. However, the complexities and uncertainties within the debate make it difficult to sort out what rhetors have in common or what they might find acceptable in other texts.

A content analytic approach provides a basic way of thinking about arguments used in the climate change debate. Content analysis uses systematic procedures to evaluate more even-handedly the content of communications. However, the present study seeks a structured way of comparing whole arguments instead of the more usual products of content analysis – quantitative analyses of how frequently certain items, symbols, or themes appear in texts (see Williamson et al. 1977). Furthermore, content analysis often is applied to study attitudes or beliefs of one group, either to understand a characteristic of that group (e.g., the ideology of business elites) or changes in the group over time or space (e.g., comparison of family magazine content in different cultures to show differences in families, a study of magazines advertisements to show a shift in national character over time). The content of arguments and the elucidation of differences among them are necessary steps but not this study’s eventual goal, which is to find potential bases for agreement among highly disparate groups, interests, and viewpoints.

I am interested to understand different arguments and standpoints, but I wished to avoid an analysis that uses any one argument or standpoint as a starting place. First, I was concerned to allow the arguments to emerge from actual debaters, not from any secondary or generalized knowledge about what those arguments are. Second, I wished to use an analytic framework that would be neutral as to content of the

arguments but would highlight non-content elements on which agreements might be built.

Since these are arguments, I use a framework derived from rhetorical (argumentation) theory. This framework avoids the political, economic, and cultural biases found in other analyses of the debate. First, I analyze selected documents to characterize the arguments themselves and identify rhetorical features of the arguments. I then use these analyses to identify argument “families” – coherent arguments made by several of the text writers.

Rhetorical Argumentation

I use rhetorical concepts and approaches to analyze arguments made in the public debates about climate change. I designed an approach that preserves the integrity of each argument but analyzes the various arguments within a common framework in order to identify similarities, differences, and potential bases for agreement.

I use the Aristotelian definition of rhetoric: the art of public speaking to persuade (Aristotle *Rhetoric*). In the Aristotelian discussion, rhetoric is the counterpart to, or opposite of dialectic, which is the art of logical discussion. Both rhetoric and dialectic have to do with means only; the end is always the truth. In dialectic, the speaker instructs in knowledge; in rhetoric, the speaker persuades using demonstration. “Rhetoric is a combination of the science of logic and of the ethical branch of politics” (Aristotle *Rhetoric*, section xx 35).

Aristotle specifies three modes of persuasion: (1) the personal character of the speaker (ethos) may carry conviction, (2) the hearers may be stirred up by emotions (pathos) and (3) the speech itself may prove the truth (logos). Furthermore, the rhetor argues using the enthymeme, a less formal variant of logic, which consists of a premise and a claim connected by a warrant. Warrants are usually – but not always – claimed to be true. As Perelman and Olbrechts-Tyteca (1971/1969) point out, the quasi-logical arguments in enthymemes are persuasive because they are like mathematical logic – including techniques such as contradiction, total/partial identity, transitivity, and whole-part connections – but without logic’s claims to absolute truth.

Aristotle has provided the model for rhetorical scholars and for the modern system of rhetorical education over the centuries. However, in the modern era, schools of thought based on the Aristotelian fundamentals have emphasized different aspects of his thinking. Klumpp (1993:48) describes “the two most vital strains of contemporary rhetorical study – dramatism and argumentation” – as developing separately from each other in the twentieth century. Kenneth Burke’s dramatic theories, originally developed in critique of formalistic argumentation theory, include a categorization device he called the pentad. The pentad, which treats an argument as though it were a dramatic production (a play), includes five aspects of an argument: act, scene, agent, purpose, and agency. Analyses using the pentad and others of Burke’s theories, however, have had no influence on argumentation scholars, among whom Klumpp names Chaim Perelman, Stephan Toulmin, and Jürgen Habermas. Dramatism emphasizes dynamic metaphors (e.g., molten combinations of elements in a constant process of reconfiguration), whereas argumentation focuses on structure

and separate elements of the structure. Burkean analysis is highly contextual and literary; argumentative propositions tend to be more formal and analytical. Furthermore, using the pentad in a Burkean analysis makes comparison highly problematic, since each object of analysis tends to be seen as unique.

Certainly the study of argumentative forms without context and in isolation from each other is sterile. However, empty formalism is not the necessary end of argumentation study. Toulmin and Habermas have explored and constructed frameworks that refer to the Aristotelian modes of rhetoric in ways that elucidate the bases and contexts for argument and that can be used comparatively to evaluate the potential for agreement among diverse arguments. Toulmin et al.'s (1984; see also Toulmin 1958) informal logic separates premise, claim, and warrant in arguments and provides a structure that allows comparison. Similarities and differences among various arguments can be seen clearly and compared to each other. Analysis and comparison in a common framework constitute a powerful tool for understanding the whole context and understanding places where alliances may be formed.

Habermas' ideas about "coming to agreement" draw strongly on the rhetorical tradition, among other sources. Habermas' (1982,1983) theories about communicative action can provide a theoretical framework in which to examine the rhetorical issues in climate change debates and discourses. Habermas treats communication as speech acts *oriented toward understanding*, as Aristotle assumed rhetors are oriented toward the truth. Communicative action may serve to establish and renew interpersonal relations, to represent states and events, and to express the speaker's experience (roughly equivalent to pathos, logos, and ethos). Speech acts thus make validity claims and can

be judged on the basis of whether they are morally correct, factually true, and subjectively sincere. These three bases seem to again draw an analytical distinction between scientific claims and other kinds of claims, but the distinction is not biased in either privileging or denigrating scientific claims. In fact, all communicative speech acts involve all these claims.

Thus, if a scientist shows data about the probability of risk from exposure, he or she is making a claim about the truth of the statements. Because the scientist knows that such statements can be contested, he or she frames the statements to be acceptable. It is in this sense that speech acts are oriented toward understanding. Similarly, if a citizen contests the scientist's claim, there is a counter truth claim that the citizen is hoping will be accepted. The citizen may, in commenting on a proposed science-based decision, express outrage or a sense of betrayal. Again, the orientation is toward achieving understanding, in this instance understanding of the everyday meaning of a technical decision. All the claims involve not only truth but also moral correctness and sincerity. The scientist who strives for objectivity is also asserting the morality of the scientific findings and personal sincerity; the citizen may simply be more explicit about the last two types of claims.

“Coming to an understanding” is the goal of communicative action. This means that the participants strive to reach an agreement that recognizes the validity of what the speaker says. Furthermore, agreement to one type of claim (e.g., truth) implies agreement with the other two implicitly raised claims (e.g., morality and sincerity).

The theory of communicative action paints a picture of the ideal speech act, where participants are competent listeners and speakers, working toward a rational consensus. The ideal speech act is often an implicit standard; for example, when people accuse each other of blocking behavior or making *ad hominem* attacks, they presuppose higher standards for communication than those they see in action. The ideal speech act thus provides both a standard for participants and a model to be used in comparing different rhetorical arguments, as I am proposing to do in this dissertation research.

“Coming to an understanding” is presumably the goal of arguments made about climate change policy. Each argument makes moral, factual, and sincerity claims that may be compared to gauge the similarities and differences, and thus the potential for agreement.

Richard Harvey Brown (1977) makes distinctions among the various metaphors used in sociology. The metaphors include social activity as exchange, dramaturgy, and discourse. Although, as Klumpp points out, both dramaturgy and discourse are rhetorical, this study falls into the category of discourse, that is, language constructing the world and scientific realities using the Aristotelian categories of rhetorical analysis.

Brown (1998) has extended his ideas further by a close analysis of the rhetorical strategies of science and how these can form the basis for a democratic science. In so doing, he contrasts rhetoric with positivism, asserting that “[a] main thrust of rhetorical criticism has been to relativize absolutist claims in philosophy, science, and social engineering and, thereby, to open space for alternate [sic]

discourses” (Brown 1998:188). Thus, Brown points to the insights a rhetorical approach offers into the nature of science and its relation to politics, a relation not necessarily based on the truth claims of scientists but on rhetorical arguments containing figures of speech (e.g., metaphors), and moral and sincerity claims.

Using rhetorical analysis in another way, social scientists such as Gross, Fuller, Knorr-Cetina, Pickering, Law, Bloor, and many others show that scientific problems, methods, and discoveries are socially constructed and describe how those constructions are built. With Brown, these scientists’ achievement brings scientific discourse out of its unassailable ivory tower and makes it available for comparison with other rhetorical discourse. Scientific argumentation can be evaluated alongside other arguments, not for “validity” but for the worldviews and values expressed and their likely effects upon listeners with different worldviews and values. The same impulse to democratic science that Brown describes is also an impulse toward admitting scientific rhetorical arguments into dialogue with nonscientific arguments.

Habermasian notions of coming to an understanding are again relevant here. Habermas has not only shown “how the rise of scientific expertise can drive a wedge between the efficient management of sociotechnical systems and the practices of everyday life” (Brown 1998:185), but also how people, using their everyday rationality, can create a public sphere, a space in which to critique the technical systems that control them (Habermas 1989). Although this theoretical construct remains “an unfinished project” (Brown and Goodman 2002), it points toward the rhetorical framework I have built. Science, in this view, provides one very coherent

rhetorical standpoint and takes its place among other, perhaps less explicitly coherent but extremely powerful standpoints.

Applying Rhetorical Analysis to Arguments about Climate Change

To perform an empirical rhetorical analysis, I collected 100 documents in which authors made arguments, including actions that should be taken, about climate change. The earliest of these documents dates to 1992, the year that the international Framework Convention on Climate Change was adopted at the Rio Earth Summit; the latest documents were published or disseminated in 2003. I used two strategies to collect documents. First, using my own knowledge of the debates and arguments, I collected documents from different disciplinary areas (economics, political science, sociology, geography, agricultural science, anthropology, etc.), and various problem/issue areas (those involved in emissions reduction, global agreements, fairness and equity, development, views of nature, economic efficiency, technological change, technology transfer, integrated assessment, scientific knowledge and decision-making, etc.). Second, to extend my own knowledge and experience base, I used two additional tactics. I performed internet searches using different framings of the climate change issue, such as “climate change,” “global warming,” “climate change and mountains,” “climate change and food”, and so on; these yielded some very different results than simply looking in mainstream literatures like those assessed by the Intergovernmental Panel on Climate Change. Internet searches enabled me to tap into “gray” literature (reports, newsletters, pamphlets, etc.). Finally, I explored areas that might not be primarily focused on climate change but might address it as part of a

larger issue (e.g., ecofeminism, deep ecology, and other global environmental issues like biodiversity and deforestation). These discourses often make general arguments relevant to all global environmental issues; however, a document had to include an argument about climate change specifically to be included in this set for analysis. I terminated my search when I saw only the same arguments over and over again, since the goal was to have the variety of arguments made about climate change represented in the document set. The set of documents cannot, however, be taken to represent the “shares” of space or attention given to the various arguments.

The focus of these documents is frequently on specific proposals, often referring to international policy agreements about climate change, both under the umbrella of the United Nations Framework on Climate Change and “side” agreements made by two or more countries. Sources included scientific journal articles and reports, environmental “activist” statements (environmental social movement groups), cultural/ethnic group statements (e.g., First Nations in Canada, deep ecologists, ecofeminists), negotiating positions and other policy-oriented statements (from industrialized and developing countries), and media articles or reports.

Representativeness of the sample is a problematic issue. Documents related to the climate change issue probably number in the tens of thousands, and there are no methods that can guarantee a representative random selection. Questions of whether or not to include a document were ultimately resolved by judgment, involving broad criteria related to the visibility/availability of the document or statement. My ten years’ experience in climate change research, particularly my experience in assessing the social science literature relevant to climate change, provided the contextual

knowledge used for evaluating candidate documents to include in the sample. One objective in the four-volume assessment, *Human Choice and Climate Change* (Rayner and Malone 1998), was to include as many viewpoints as possible. Moreover, the use of the internet to present and debate views and policy proposals on climate change is widespread. Nongovernmental organizations often use websites and email to keep in touch, plan activities, and present their viewpoints to policymakers.

The analytic process was designed to capture four primary dimensions of an argument:

- The authority of the rhetor
- The basis of the rhetorical claim(s) – i.e., what type of evidence is being used
- The worldview of the rhetor
- The action the rhetor desires the audience to take.

The first three correspond to the Aristotelian ethos, logos, and pathos; the fourth reflects my belief that specific proposals can gain adherents by means of quite disparate arguments. The rationale for these choices is discussed more fully in Chapter 5.

I performed a two-step analysis, following Shapiro and Markoff (1998). In the first step, I extracted information about each argument, using as far as possible the wording of the original document. In the second step, I categorized the information and developed codes to describe the different categories. As Shapiro and Markoff (1998:81-88) elucidate, such a two-step process reflects the “concrete” content of the actual documents well, while providing an empirical basis for developing an abstract

set of categories to be used for comparison. Preserving the original wording allows me (and readers of the study) to go back to the sources in reviewing the analysis.

In this first step of the analysis, I filled out a template table containing information about the document, including the four rhetorical dimensions, noting the exact wording of the relevant text for each cell of the table. Since it is probable that secondary and tertiary arguments, lines of evidence, and worldviews could provide a basis for agreement, I included them in my document/presentation analysis. Similarly, since it is possible for people to agree on specific actions without agreeing on the reasons for those actions, I included the proposed actions in the analysis. Table 3.1 shows the template; Appendix A contains the document analyses using the template.

Table 3.1. Template for Document Content Analysis

Document #: Citation				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Type of evidence				
Primary:				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary:				

Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary:				
Secondary:				
Tertiary:				
Notes				

I expected that the documents could be sorted into clusters based on this first-step analysis. I tested several classificatory schemes to find a “best fit” between the documents and the scheme. One candidate was cultural theory (Mary Douglas’ grid-group 2x2 matrix, expanded by Thompson, Ellis, and Wildavsky to include views of nature); perhaps the documents could be sorted into the four cells of the matrix. Another candidate classificatory scheme was the types of discourse identified by Habermas (instrumental, expressive, communicative). However, neither of these schemes was a good fit for the data. In general, theoretical classificatory schemes were simply too theoretical; that is, the abstract categories were too far removed from the actual contents of the documents to make classification either easy or reliable. Each scheme required a great deal of interpretation; few authors can be located in only one box of the grid-group matrix or use only one type of discourse to make their points. Classifications based on the four primary elements were confusing and overlapping. In the event, I used a common-sense approach of classifying the arguments and elements by their content.

After the first-step analysis, I sorted the documents into “families” of arguments. A “family” is defined as a coherent argument made about climate change and recommending at least one response. Eleven families emerged from the analysis,

that is, coherent arguments about the hypothesis that human activities contribute (or do not contribute) to climate change, the degree of threat that results from possible climate change, the basis for acting in response to the threat, and the specific actions that are necessary. Six of the families may be considered together as ecological modernization arguments or separately as arguments emphasizing different modernization strategies. Descriptions of the families are included in Chapter 5.

At the end of the second step of the empirical analysis, each document had been analyzed and sorted into a family, the families were described, and elements in common identified.

Social Network Analysis Methodology

In the third step of the empirical study, I performed a social network analysis to examine elements that may be regarded as links among participants in the climate change debate. If elements such as worldview or a specific proposal for action are shared by rhetors, these shared elements may be the bases for agreement. Shared elements based on rhetorical features of the arguments are treated in this analysis as network ties. I developed stable categories and a coding scheme for each value of each dimension in each document. I analyzed the set of documents by identifying the families to which they belonged and by characterizing the four rhetorical elements of each document; I also assigned an identifying number and included the year the document was issued (see Table 6.1 in Chapter 6). For the authority of the rhetor, I used two sub-elements: the personal authority of the rhetor and the type of

organization associated with the rhetor in the document (contributing to the rhetor's authority). I analyzed the four rhetorical elements together and separately.

Social network analysis emphasizes the importance of relations within social systems, rather than focusing on the importance of attributes or traditional structures. The links among the nodes of the network yield important insights about what is going on within the network. Ties can be of two sorts: self-described ties, such as "I am friends with" or "I get advice from"; or so-called event ties, such as mutual memberships in corporate boards or marriages among families.

Examples of the second sort of ties among people include studies of both academic and business networks – and, in this study, networks of rhetors in the climate change debate. In each of these spheres, the existence of network ties has important implications for the opportunities and constraints of individuals, as well as the behavior of the network as a whole.

In the academic realm, Merton's Citation Index has been used to link researchers through their citations of each other. Caplow and McGee (1958) first advanced a tripartite model of the U.S. university system (with "major league," "minor league," and "bush league" universities), then developed a "prestige system" theory to explain the recruitment and hiring activities of academic departments. The prestige-gaining and -losing activities result in increased mobility for professors at major-league universities and decreased mobility for professors at lower status universities.

Burt (1978) studies an elite network of sociologists who were considered expert in methodology and mathematics. One of his findings was that 26 of the 59 members of this elite network graduated from elite institutions, such as Columbia,

University of Chicago, University of Michigan, Harvard, and University of California at Berkeley. Burt then went on to show that “There is a tendency for experts trained in the top five universities to be employed in those universities and a tendency for experts trained in the second level of universities to be employed at the same level” (Burt 1978:109-110).

All major academic departments seek to maintain and improve their status in the hierarchy of academic departments. Despite the competitive nature of this relationship, there is little apparent strife among academic departments. Mintz and Schwartz (1985), and Mizruchi (1992) have noticed similar patterns of corporate behavior since the beginning of the twentieth century. Firms such as the Big Three automakers no longer seek to put each other out of business through cutthroat business practices. Rather, firms seek to be powerful by establishing centrality within networks of corporate firms. When a firm achieves this centrality, it has many ties to other firms within the network. Some of these ties are formed through interlocking directorates.

For this study I used the rhetorical elements of arguments as potential links between rhetors. For example, rhetors who are scientists are networked with all other scientists by training and practice, however much they disagree in other respects. Rhetors who argue that natural resources are finite and that humans are nearing the limits to growth have that point of view in common. Rhetors who advocate immediate reductions of greenhouse gas emissions are linked by their common proposal. I detail these and other links in Chapter 6.

I used the social network analysis software Ucinet (pronounced YOU-SEE-EYE-NET) (Borgatti et al. 2002) to explore the network ties formed by four major

elements in the arguments: the authority of the rhetor (as characterized by both personal and organizational identities), the type of evidence used, the worldview expressed, and the actions proposed. I then performed separate analyses on each of these elements, as well as an analysis of all four together.

For each analysis, I began with an affiliation matrix (rows of rhetors by columns of different values of the element(s) studied). I multiplied the matrix by its transpose to get a square matrix indicating the ties of each rhetor to the others formed by common types of the element(s). For example, if two rhetors are both scientists, the square matrix will show a tie between them; if two rhetors have nothing in common vis a vis their personal or organizational identities, the matrix will show no tie.

Having created a network matrix, I then used Ucinet to calculate the density of the network and dichotomized the cells of the network by specifying that any value greater than the average density plus one standard deviation would become a 1; any value equal to or below the average density plus one standard deviation would become a 0.

The third step was to use Ucinet's CONCOR to partition the network data by splitting blocks based upon the CONvergence of iterated CORrelations (CONCOR). Details of the procedure can be found in Borgatti et al. (2002). CONCOR produces blocks of rhetors linked through the various elements analyzed.

This approach is consonant with Ragin's diversity analysis and application of fuzzy sets to social science (2000, 1987). Ragin views causality as configurational. In contrast to the usual quantitative, variable-by-variable approach of regression analysis, causality often involves complex configurations of variables, in varying combinations.

For example, race riots in the United States may be linked to different causal variables in the North (where the economic gap between whites and blacks played a major role) and the South (where lack of black representation in the political sphere played a major role). Performing analysis on one of these variables over both North and South would generate equivocal results (Ragin 2000:51-52). Furthermore, Ragin advocates analysis that allows partial membership in sets to define fuzzy sets. Instead of crisp sets, where a person is either all in or all out of the set, persons may be anywhere on a continuum from zero to one. Moreover, the configuration of partial memberships has greater explanatory power than any individual membership or memberships considered sequentially.

In my study, instead of the demographic or worldview characteristics that have been posited as causes of people's attitudes toward the environment, several different configurations of variables may be involved. Furthermore, people's "membership" in the "set" of environmentalists may be partial and changing, indicating that a fuzzy-set analysis would be appropriate – and that partial memberships may be ties among people.

Theoretical Descriptions

The final step in this study is to suggest ways in which potential linkages among rhetors can provide the bases for coming to agreement – or at least closer to agreement – on if and how to address global climate change. The literatures on global change generally and climate change specifically suggest ways in which a global consensus could be built. Generally, these theories describe either the eventual

domination of/consensus around one discourse or the ways in which plural ideas achieve the goals of reducing emissions and adapting to climate change.

One category of theories holds out the possibility for one kind of discourse or another becoming universalized; that is, everyone would eventually agree on actions to take to address climate change. There are two major schools of thought:

- Certainly the technoscientific community believes that new technologies are the most promising ways to address climate change; that is, instrumental science, which has allowed humans to gain some measure of control over Nature, can help us extend that control so that we can refrain from doing more harm. This community, which presumes economic and technological development is a goal of less industrialized countries, offers concepts such as technology transfer, leapfrogging, clean coal, hydrogen fuel, and so on, to rally all countries in a we-can-do-it spirit. Strategies under the umbrella of “ecological modernization” fit this category.
- Just as certainly, anti-scientific and anti-modern voices assert that only by a “return” to a non-technological relationship with Nature can humankind address a host of environmental problems, including climate change. These voices include deep ecologists, ecofeminists, and “traditional” peoples. More moderate versions of the same impulse are found in the slogans “live lightly on the land” and “use it—use it up,” and in organizations whose goals are to reduce the consumption of manufactured products and to produce for one’s own consumption (rather than mass produce). Organic food with no additives, “natural” remedies and alternative medicine, and clothing/housing materials

without artificial chemicals are proposed in general; in reference to climate change, renewable energy and energy efficiency are two major strategies that are advocated.

The second general category of theories assumes that no one point of view will become hegemonic or universally accepted, and that pluralism will result in actions of all kinds, at all levels. The only agreement, then, would be that climate change should be addressed. Many groups will mitigate (i.e., reduce greenhouse gas emissions) and adapt in various ways. Others will retreat to “sustainable” communities, reducing both their consumption and fertility rates. Partial agreements can be built, and have been described:

- Epistemic communities (e.g., Haas).
- Postindustrial/postmaterial values that transcend narrow interests and values (e.g., Inglehart).
- Pluralisms, emphasizing local knowledge to solve local problems (e.g., Wynne).
- Alliances based on common ground (e.g., Thompson, Hodgkin and Watkins).
- Incremental agreements (learn-by-doing) (e.g., Dowlatabadi, Edmonds).

The purpose of analyzing documents and presentations within the global climate change debate is to discern whether these demonstrate the basis (or several bases) for agreement about policies and other actions to address climate change. By looking at various elements of the documents and presentations, I should be able to see whether different discourses are cut off from each other, whether they overlap, whether some voices can disagree in some (most) elements but agree in others, and so

on. If, for example, certain clusters of elements were tightly correlated with each other and not at all with other clusters, there would be little basis for agreement; people would simply be talking past each other and emphasizing their disagreements.

CHAPTER 4: THEORETICAL APPROACHES TO HOT TOPICS: GLOBALIZATION AND CLIMATE CHANGE⁵

Considering climate change and globalization together as a research topic can illuminate the structures and processes of both. Globalization and climate change theories can be categorized as economic, political, and cultural on one dimension, and on another dimension as emphasizing the conflicts between the global and national/local levels, the dominance of the global, or the hybrids and pastiches created by mixing the global and local. Climate change, as an issue that creates and is created by a global sense of the world, is bound up in both its analysis and its policy proposals with the same issues that confront globalization theorists.

Globalization theorists address many of the issues that are bound up in the climate change debate: inequality; development; global governance; the global environment; and the globalization of Western systems, including science. The proliferation of theories and analyses in globalization and climate change reflects the emerging nature of both areas of social scientific thought. Activities and “flows” are changing too rapidly to be satisfactorily categorized and mapped. Moreover, there are no clear advantages to one form of action, since all phenomena are multifaceted, with bundled positive, neutral, and negative characteristics.

⁵ A version of this chapter has been published in *Social Thought and Research* (Malone 2003).

However, the very explosion of ideas and proposals reflects the energy and willingness to seek future directions that will bring increased well-being for both humans and the environment. The fragmentation that accompanies globalization both tends to undermine agreement-seeking processes and to provide a proliferation of potential points of attachment. Older forms of negotiation, with their neo-realist assumptions, will likely become increasingly unproductive.

In separate literatures, globalization theorists invoke climate change as part of a vague and black-boxed globalized environment, and climate change analysts both blame globalization for environmental problems and attempt to mobilize support for environmental causes through appeals to global citizenship and responsibility. Although globalization has enabled climate change to become a point of debate and climate change has contributed to the definition of globalization, neither contains the other. Climate change has strong ties to the cultural aspects and issues of globalization (especially in the domain of science), but more local economic and political issues play large roles in the debates about the sources, consequences, and possible policies of climate change. The concepts relevant to globalization often gain definition from the ways they are revealed in more concrete problem spaces, and climate change, as a global problem par excellence, reveals the shape and mechanisms of globalization as well as defining potential responses.

This chapter examines the links and distinctions between global climate change and globalization in their economic, political, and cultural dimensions. Considering climate change and globalization together as a research topic can

illuminate the structures and processes of both, and perhaps suggest pathways toward agreement about global issues.

The chapter first discusses and maps current globalization theories, then theories about climate change. For each topic, theories fall largely (but not purely) into economic, political, and cultural categories. Within each of these categories, a theory may characterize conflict between globalism and nationalism/localism, a domination of global over national or local institutions, or the formation of global-national-local hybrids or pastiches. These theory maps will allow me to draw some tentative conclusions about the relationship between globalization and climate change, and the implications for coming to agreement about addressing climate change.

Approaches to Theorizing Globalization

Two widely cited definitions of globalization are those of Robertson and Giddens. Giddens (1990:64) defines globalization as “the intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa.” Robertson’s definition includes both the compression of the world and the intensification of consciousness of the world as a whole, and focuses on globalization as a “massive, two-fold process involving the interpenetration of the universalization of particularism and the particularization of universalism” (Robertson 1992:100). Robertson criticizes Giddens for thinking of globalization as a *consequence* of modernity and asserts that, in contrast, globalization is a general condition that *facilitated* modernity. However, both definitions of globalization refer to connections at a distance and the relationship of

things at different scales. Both the structure and process of globalization are viewed in different spheres of the social.

Two ways to classify approaches to globalization form a 3x3 matrix (Table 4.1). (I will later use this same matrix to categorize views on climate change.) The first classification is that of the social sphere: economics, politics, and culture. The second classification characterizes the *relationship* of globalization to nationalism or localism: the national and local resist the global, the global dominates the local, or global and local coexist as hybrids or pastiches. Table 4.1 shows examples of the intersections of these two classification schemes. I will discuss the two dimensions generally, then in more detail, organizing my discussion according to the intersections under each column heading, while recognizing that no example is purely in one category in either axis.

Table 4.1. Dimensions of Globalization and Examples

	Economic globalization	Political globalization	Cultural globalization
Global versus national or local	Nationalization of multinational industry	Resistance to WTO, jihad	Separatism of native groups
Global domination in content/form	Flexible specialization, capitalist crisis	Transnational social movements, standard state forms	Commodification of local cultures, McDonaldization
Hybrids and pastiches	Western goods sold at bazaars, risks from pollutants	“Global village,” global “-scapes”	Blended musical forms

Theorists approach globalization as a process and a product within the broad spheres of social life: economic, political, and cultural. The economic approach focuses on the

increasingly global nature of capitalism, with multinational companies, international markets, and a transnational financial system. A second, politically oriented strain of globalization theory examines its relationship to nationalism, using globalization to illuminate the changing role and power of the nation-state, particularly since the end of the Cold War. A third approach examines the broad cultural implications of globalization. None of these approaches is exclusive, of course, but typically one dimension is seen as dominant, if not determinative.

A second way to categorize globalization theories is on the basis of whether they emphasize *differences* between globalization and something else (global versus local, or global versus national) or the *interpenetration* of global and local or national elements. The emphasis on differences tends to draw boundaries and describe conflicts, while the emphasis on interpenetration tends to describe ways in which either the global swamps the local or elements from global/national/local become compounds or mixtures.

Globalization of the Economic System

Economics dominates many discussions of globalization. Most globalization theorists focus on global economic forms and organizations (e.g., multinational firms) as replacing national and local economic activities, and the diversity of markets and goods that result from the introduction of global products and forms to localities. Nations and locales may resist global economic flows (e.g., by nationalizing foreign businesses or forbidding American fast food restaurants) or come to be dominated by

them (e.g., as multinationals seek new markets and countries seek economic development).

Countries may resist or be unable to participate in economic globalization forces. Economic development theorists explore the factors involved in managing the process, along with the reasons for persistent non- or under-development. Easterly's (1999) recent analysis of the resistance of countries to World-Bank-style development demonstrates the error of targeted, single strategies for development, such as investments in machines, education, population control programs, and simple provision of foreign aid. He focuses on countries that show no positive results after decades of foreign investment – countries that have resisted development. Such countries, he says, lack *incentives* such as good governments and economic institutions would be able to provide; and, he points out, just plain luck also plays an important role in economic development.

Theorists such as Piore and Sable (1984), Wallerstein (1974, 1983), and Harvey (1990)⁶ focus on globalization as associated with capitalism. Capitalism's growth orientation, exploitation of labor, and technological and organizational dynamism lead to overaccumulation. Increasingly, this overaccumulation is managed by absorption through temporal or spatial displacement. Temporal displacement comprises exploring future uses and speeding turnover of goods, while spatial displacement involves finding new geographic or other spaces for production and

⁶ Harvey's main argument is cultural, but he includes a relevant discussion of the globalization of the economic system.

consumption. Managing overaccumulation in these ways results in a trend away from Fordist production to what Piore and Sabel call flexible specialization, meaning decentralized technologies that can produce a range of products for different customers (e.g., specialty steels). Piore and Sabel contrast the hegemonic Fordist system to flexible specialization and speculate that the latter may come to be dominant. Both, however, are global systems. Harvey sees an increasingly diverse mix of global economic systems, reflecting expanded market coordination, changing composition in the workforce, an “extraordinary efflorescence and transformation in financial markets” (Harvey 1990:194), and a weakened but still powerful state. The concept of “flexibilization” makes the same point, but with an emphasis on consequent insecurities of workers, who become temporary or part-time employees (see Beck et al. 1994, Beck 1999).

In Wallerstein’s analysis of the economic world system, national and local *contribute to* the global because they are part of it. Since Wallerstein’s basic viewpoint is of a global system, globalization is his starting point; the results are his focus. He sees the global economic system as having reached a crisis, brought upon by the internal contradictions of capitalist civilization: dilemmas of accumulation, political legitimation, and the geocultural agenda (Wallerstein 1983). He foresees “explosions in all directions,” economic/political/cultural disorder followed by a reordering of some type—perhaps neo-feudalism, democratic fascism, or decentralized and egalitarian world order.

The third type of economic globalization theory sees the advent of global goods at local markets (Abu-Lughod 1997). Equally, global “bads” such as global

environmental problems (Yearley 1996) and global risks produced by industrialization (Giddens 1991, Beck 1992, Sachs 2000) arrive at all national and local places. For example, localities experience the threat of nuclear fallout, sea level rise, air pollution, and industrial runoff—all products of the global industrial system – although the localities themselves may not have produced nuclear bombs nor emitted vast quantities of greenhouse gases nor initiated industrial plants.

Political Globalization

Globalization is often seen politically in opposition to nationalism. To the extent that the modern nation-state has close ties to the economic system, the political and economic are intertwined, but governance can be examined as at least a semi-autonomous category. Some analysts celebrate the triumphs of the local in the face of globalization (e.g., Abu-Lughod 1997, Watson 1997) or warn of the dangers of new ethnic localisms (e.g., Barber 1995, Kaplan 1994). Many theorists describe dominance of globalization processes or, at least, major accommodations of national and local political institutions.

Hybrids and pastiches of political institutions also exist, part global, part national. Focusing on the conflict between the state and global governance organizations, Mann (1993) sees the nation-state as actually strengthening its role on the international scene. As international bodies such as the United Nations and the European Union attempt to coordinate various national interests, the national actors have important powers to change or veto proposed actions. Moreover, local ethnic forces (Barber 1995, Appadurai 1996) can assert themselves and be real (irrational and

terroristic) dangers to the world order. The protests at World Trade Organization (WTO) meetings are an example, as are the terrorist attacks on the United States in September 2001.

Meyer (1999) points to the domination of globalized forms of the nation-state. Modern states are isomorphic, have the same organizations, and “are constituted and constructed as ultimately similar actors under exogenous universalistic and rationalized cultural models” (Meyer 1999:137). Similarly, Thomas and Meyer (1984) see the dominant global system as constructing isomorphic systems such as education for citizenship, citizens with rights to improved welfare, the family as part of the political order, and the political roles of scientists and professionals as agents and legitimators of the state.

Also emphasizing the theme of global domination in the political dimension, Hobsbaum (1990) sees globalization’s emphasis on competition as undermining the ability of states, particularly Western liberal democracies, to protect and provide for the welfare of their citizens. More and more, elites are choosing to opt out of their nationally based solidarities with poor and disadvantaged in their own nations, joining their counterparts in global and more affluent groups, resulting in “global rich” and “global poor.” Globalization is not the only threat to state protective power (fragmentation of states is another), but it is perhaps the most serious. Supranational economic forces (e.g., McDonaldization) and institutions (e.g., banks) operate with little reference to the state, and electronic communications have rendered state boundaries irrelevant (see also Appadurai 1996). The role of the state in redistributing wealth among its citizens has been greatly weakened, with nothing to take its place.

Galtung (1997:190) takes this argument further, saying that a globalized world will hold “larger domains for structures and cultural meanings” that “imply thinner scopes and more reliance on least common denominators. . . . Here are no Greeks, no Jews; no women, no men: we are all one in Coca-Cola.”

Agreeing, Stuart Hall (1997) proclaims that the new globalization is American. The manifestations of globalization are world organization, global environmental problems, and world markets. However, with the decline of nations and nationalism, “one can see a regression to a very defensive and highly dangerous form of national identity which is driven by a very aggressive form of racism” (Hall 1997:26). That is, globalization has created its own reactionary forces (Wallerstein 1999).

Appadurai (1996) exemplifies the view of global culture as a melding of formerly localized processes, now globalized. He describes a global system that is constituted, not by nations any longer, but by five elements that flow into and around each other: groups of people (ethnoscapes), technology (technoscapes), capital (financescapes), communications (mediascapes) and images (ideoscapes). He sees globalization as “a deeply historical, uneven, and even *localizing* process” that “does not necessarily or even frequently imply homogenization or Americanization” (Appadurai 1996:17).

Globalization of Culture

Lash (Beck et al. 1994) asserts that culture, formerly a less important dimension of society than politics and economics, is becoming more important in two ways. First, the cultural is becoming a central focus of the global debate. Second,

institutions of every stripe are becoming more cultural, as companies strive to become seen as patrons of the arts and governments support certain lifestyles. Thus, culture, variously defined as aesthetics, popular films/food/fashion/etc., and customary lifestyles and stages, is an important dimension of globalization theory.

There are, as for economics and politics, three ways to relate global culture to local cultures. First, global and local cultures may compete in specific places; separatist ethnic groups resisting “tourism” is one good example (see Friedman 1990 on the Hawaiian Ainu). Second, globalization may mean that all culture becomes global, a melding of local cultures. This implies cultural imperialism, American culture being the most frequent nominee (Ritzer and Malone 2000). In another form of global domination, global culture may mean the organization or structure of many cultures, so that the content differs but the commodification processes and systems remain similar for each culture; one manifestation of this theoretical perspective is the “culture follows structure” argument. Third, global culture may simply be one additional culture, to be examined alongside national and local cultures, with no particular hierarchy involved; one can pick and choose from global, national, and local products (and identities).

Robertson (1995) asserts the persistence of resistance to globalization by summarizing the arguments against cultural imperialism, citing four counter-factors: (1) “global” messages are notoriously subject to differing hearings and interpretations in various localities; (2) global organizations are tailoring their messages and products to different locales; (3) national symbolic resources are increasingly available to international markets; and (4) cultural flows from developing countries to

industrialized countries are copious. Ritzer (2000) details resistance to American cultural imperialism in the form of the Slow Food movement, protests against opening new McDonald's restaurants, and so on.

Anthony Smith (1990) argues that the current model of cultural imperialisms is eclectic, unity in diversity; we can expect a standard production-and-consumption system with watered-down "folk" content from many national and local cultures. Ritzer and Malone (2000) elaborate on the standard production-and-consumption system, part economics and part culture, that the United States exports in the forms of McDonalidization, credit cards, Disney Worlds, "eatertainment" establishments, and shopping malls. Hall (1997), in consonance with this analysis, declares that the international language is English, and American culture is everywhere.

Robertson (1992, 1995) sketches the outlines of a global world that is highly diverse yet highly conscious of its holistic character. Robertson (1992:100) stresses the simultaneity of the global and local. Modern transportation and communication enable people everywhere to see places around the world as easily as places next door to them—and to experience different cultures, environments and conditions (even—or maybe especially—war and famine) via print and electronic media. The McLuhan phrase "global village" captures this sense of the world as a small place where most people are aware of their neighbors. Under globalization, says Robertson, people realize that the world holds more "others," who are experienced as highly diverse yet virtually present.

Hannerz (1990, 1997) argues that world culture "is marked by an organization of diversity rather than by a replication of uniformity" (Hannerz 1990:237). Late

Western capitalism “exports culture to peripheral countries.” Global homogenization may happen by gradual saturation, although local cultures will reshape Western culture to their own needs. The cross-national network of social relationships is the organizing impulse that connects diverse local cultures. “Cosmopolitans,” people who take on roles in many cultures (unlike the “locals” who want to stay at home wherever they go), help to provide coherence to the world culture.

Abu-Lughod (1997), in response to Hannerz, rejects a simplistic core-to-periphery analysis. On the one hand, developing countries contribute more equally to global hybrids, such as in the melding of Western rock music and Bedouin “dancing horse” patterns (cf. Garcia Canclini 1995 and Pieterse 1995). On the other hand, developed niches occur in many places around the globe, for example, Tunis, with its Gucci and couture sweatshops and its modern Census office. Watson (1997) details the ways in which local and national cultures domesticate the McDonald’s restaurants that arrive in various East Asian cities.

Seeing global and more local cultures as pastiches, Featherstone (1990:2) speaks of global culture “in terms of the diversity, variety and richness of popular and local discourses, codes and practices which resist and play-back systemicity and order.” Far from giving us a universally homogenous culture, globalization defines a space in which the world’s cultures rub elbows and generate new meanings and understandings. Featherstone and Lash (1995:2) delineate a world in which “international social, political and cultural (for example, the media) organizations are standing alongside and beginning to replace their national counterparts.” They see

every culture in the mix, so that it is possible to discuss Americanization, Europeanization, Japanization—and even Brazilianization.

Contributions of Theorists to Understanding Globalization

Globalization theorists have explored a wide range of possible social relations resulting from contemporary processes and products of globalization (including the possibility that globalization is not unique in history nor so pervasive as is usually thought; see Hirst 1997 and Henwood 1999).

The economic analyses allow us to see (and perhaps counter) the implications of a global economy, including the disadvantages to workers of flexible specialization (e.g., uncertain, intermittent work; greater mechanization), the inequalities of global trade, and the continuing domination of core economies.

Politically, as nation-states continue to be established, they use the established state forms whether or not their history and culture allow these forms to be successful; furthermore, poor and new states struggle for (or against) the “benefits” of economic development. The politically oriented insights of globalization theory help us to understand these processes and (hopefully) to see ways to improve global well-being. Also, globalization theories add to explanations of global social movements such as those concerned with the environment, feminism, and implications of “free” world trade; in order to be successful, such social movements must espouse valid transnational (global) principles yet relate them to what’s happening in each locale.

In the cultural dimension, globalization theories provide descriptions and insights about how the process of identity formation is changing. Hannerz’ (1990)

characterization of “cosmopolitans” and “locals” is one example; these ideal types of identity are polar responses to globalization. Friedman’s dichotomous types (1990) include *les sapeurs* in the People’s Republic of Congo, who combine Paris fashions with local status, and the Hawaiian Ainu, who exemplify cultural separatism. Another view is that of Robertson (1992), who analyzes how people constitute their identities by connecting to global-level groups on the basis of, e.g., gender, profession, interest in humankind (perhaps in social movements), or economic group. A third possibility is Stuart Hall’s vision of individual identities being formed out of bits and pieces of national and ethnic cultures in a kind of bricolage. A relatively pessimistic view is taken by Castells (1997: 365), who sees the “dissolution of shared identities” and the rise of nonsocial identities in “basic instincts, power drives, self-centered strategic calculations” and power-hungry remnants of state structures. The future of resistance identities, such as the women’s movement, religious groups, and environmental movements, is uncertain.

Approaches to Theorizing Climate Change

Global climate change, or “global warming,” as it is sometimes termed,⁷ is simultaneously an exemplar of globalization and a type of universalization that

⁷ Most physical scientists who perform climate change research think “global warming” a reductionist term, since climate change includes a multitude of possible changes, up to and including increased frequency and intensity of storms, species

transcends globalization. It may be the result of capitalism/consumerism (an economic dimension), modernity (a political/governance dimension), or science itself (a cultural dimension).

The scientific narrative about climate change usually begins with Svante Arrhenius, a Swedish chemist who at the turn of the twentieth century hypothesized that increasing levels of carbon dioxide in the atmosphere would cause Earth's climate to become warmer. But it was not until after World War II that general and specific factors enabled scientists to investigate the link between carbon dioxide (and other radiatively active gases) and changes in Earth's climate. The scientific factors include improved and expanded measurements, and advances in computational power. During the postwar period, countries were actively seeking international scientific cooperation, which resulted in a global network of atmospheric observing and measurement stations under the newly formed World Meteorological Organization (WMO). In 1958, the International Geophysical Year, David Keeling began measuring the level of carbon dioxide in the atmosphere over Mauna Loa; this record clearly showed rising levels. Meanwhile, computer models of the climate system were being developed, first of the atmosphere, then the ocean. By the 1970s the US Department of Energy and other agencies were sponsoring climate model runs of increased atmospheric carbon dioxide. The 1980s and 1990s showed increasing levels of research, at both national and international scales. The central scientific organization

dislocation, sea level rise, and the disruption of the Atlantic Ocean's "conveyor belt," the Gulf Stream.

in this area, the Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 under the auspices of the United Nations Environment Programme and the WMO.

But these scientific activities unfolded in a historical context of globalization. After World War II, the United Nations was organized and the Bretton Woods system of international finance came into being. After the beginning of the Cold War, the United States sought national security through international scientific and political cooperation. The stage was thus set for political, economic, and cultural globalization (led, in the “free world,” by the United States) and for scientific investigations of climate change (and other “global” problems).

Most discussions of globalization that include the environment as a topic include climate change in a list of global environmental changes, such as the ozone layer, biodiversity, sustainable development, pollution and overfishing in the oceans, and acid rain. Although he acknowledges and maps the diversity of environmental organizational types, Castells (1997) treats these problems and their associated groups together as “the Environmental Movement” and points to its influence on governance, corporations, and individual identities as environmentalists. Further, the environmental movement is a prime example of the network society, with “a direct correspondence between the themes put forward by the environmental movement and the fundamental dimensions of the new social structure, the network society” (Castells 1997:122). These themes include a love-hate attitude toward science and technology, which are simultaneously the source of many environmental problems and the source of information about them; control over space and an emphasis on locality; control over

time in a “glacial time” perspective; and a view of the global unity of species and matter as a whole.

However, Miller and Edwards (2001:3) argue that climate change “can no longer be viewed as simply another in a laundry list of environmental issues; rather, it has become a key site in the global transformation of world order.” The new regimes and institutions constructed around the issue of climate change are extensive, reaching from science to policy to grassroots movements and raising hotly debated questions about whose knowledge is used and who speaks for Nature.

Climate change too can be analyzed in the three-by-three matrix used in the discussion of globalization (see Table 4.2).

Table 4.2. Dimensions of Climate Change

	Economic aspects of climate change	Political aspects of climate change	Cultural aspects of climate change
Global versus national or local	GATT, ITO, NAFTA, etc. v. national environmental standards	Association of Small Island States v. Framework Convention on Climate Change	Concern for global climate v. issues of responsibility for the problem and equity between nations
Global domination in content/form	Capitalist world system mires some nations in poverty & vulnerability to climate change	Transnational social movements, standard state forms, “ecological modernization”	Western science and scientists define the problem & solutions
Hybrids and pastiches	Emissions trading systems, ecological economics, sustainability	Green parties seek to reduce emissions	“Local knowledge” added to scientific knowledge

Economic Globalization and Climate Change

In the economic dimension, climate change and other environmental issues raise questions about the values of the capitalist production system and its tendency to favor here-and-now benefits over delayed but more uncertain benefits (the so-called high discount rate). The capitalist system is global, and the logic and operating principles of this global system swamp any local, traditional economies it may come in contact with. Free trade, universal access to markets, and economic efficiency are the explicit pathways to Western/Northern-style prosperity and well-being. Furthermore, capitalist enterprises produce both goods and environmental degradation. The world cannot have the good life without the bad environment.

Finally, the production of environmental bads is a direct function of the capitalist need to use “free” resources in order to accumulate capital (Saurin 1996, Wallerstein 1999). Efforts to “value” the environment (e.g., the “polluter pays principle”) are steadfastly resisted or, when resistance is futile, such costs are passed on to consumers. Or, as Beck (1999) notes, the polluter pays a fine and continues to pollute. Wallerstein (1999) opines that the need of capitalist enterprises for free natural resources is so great that environmental economics is contributing to the fall of capitalism. Governments are buying time by such strategies as shipping wastes to a politically weaker South and constraining growth in newly industrializing countries. But eventually there are only three options: (1) force businesses to pay all costs, resulting in drastically reduced profits; (2) make governments pay, resulting in large tax increases and probably a profit squeeze from reduced consumption; or (3) do

nothing and face various ecocatastrophes. In this discussion, it is difficult to separate climate change from other environmental issues, especially those considered “global.”

Tied to issues of economic globalization is the concept of sustainable development, which includes climate as one feature of the world that should not be degraded for future generations. Redclift (2000) articulates three views of the links between economic growth and sustainability.

- They may be more or less compatible, recognizing the need for international regulations protecting endangered species and ecosystems.
- They may be totally incompatible; as Daly (1992:200) says, “sustainable growth is an oxymoron.”
- Their compatibility may depend on how we define such crucial variables as “wealth,” “the needs of future generations,” and “economic efficiency”; certainly we need to switch priorities and put sustainability first.

All three views recognize that unchecked economic globalization will continue to exacerbate (if it does not cause) problems such as climate change, indoor pollution, household and industrial wastes, water availability, poor air quality, and extinction of species. However, only the second view holds that economic growth is the cause of many global problems. According to this view, we cannot manage our way out of climate change (and other global environmental problems); we must dismantle the capitalist system and re-become just another of Nature’s species in a world of multiple mutual dependencies. The first and third views retain capitalist institutions and processes. The first view leaves economic change in the driver’s seat; either climate change regulations are add-ons or – in the view of economists such as Ausabel (1990)

– the fact that people are accumulating wealth and technoscientific knowledge will allow them to mitigate or adapt to whatever climatic changes may come. The third view is more aggressive about tinkering with the present system, putting sustainability ahead of profit as the primary criterion for making choices. This reorientation may be accomplished through ecological economic principles, which are based on the writings of Mancur Olson, Kenneth Boulding, and others; environmental goods such as clean air, water supplies, forests, scenery, and biodiversity must enter the market system and be valued so they are not degraded. Alternatives to the calculation of gross domestic products include the net national product (NNP), which subtracts depreciation costs from nonrenewable resources (Solow 1991); the new economic welfare (NEW) approach, which subtracts items such as the unmet cost of pollution and the disamenities of urbanization (Tobin and Nordhaus 1972); and the Genuine Progress Report, which discounts the cost of products that result from environmental degradation (Cobb, Halstead and Rowe 1995). (See Yohe and Cantor 1998 for other examples.)

Political Globalization and Climate Change

Global political issues under the label of “modernity” have been held up as the all-purpose cause of climate change. In the political dimension, the global and national are almost conflated. Indeed, the global modern has also created the nation-state; nation-states are constituted and organized according to a global template (Meyer 1999), which includes an environmental ministry or agency. Modernity substitutes centralized technocratic governance and institutional engineering for traditional

systems of all kinds. Specific governing principles accompany this replacement: utilitarianism, free markets as productive of the highest human welfare, and rational actors. This is the political system that reinforces globalization and allows unchecked greenhouse gas emissions, especially from energy production and land-use change, two primary mechanisms of modernization.

The governance accompaniment to “sustainable development,” which focuses on changing the present system, is ecological modernization. In this view, a great mistake of modernity was to define the environment (Nature) as external to human societies and their production/consumption systems. The “human exemptionalist paradigm” (HEP), which expresses the assumption of most social theorists up to the 1980s that humans are exempt from natural constraints, needed to be replaced with a “new environmental paradigm” (NEP) that encompassed humans and their natural environment together (see Catton and Dunlap 1978, 1980). One reaction to this insight is “de-modernization theory” (Spaargaren 2000), an aspiration to a green society of small communities that live in harmony with nature and the natural climate. Another is ecological modernization, which seeks to update modernization by including the environment (including clean air and water) along with other factors of production and the costs of environmental damage along with other costs of production. This is ecological economics, but it has strong implications for modern governance. In essence, we can repair this mistake of modernity by enlarging modernity to include the management of environmental resources as well as societies. Ecological modernization posits the potential for controlled, sustainable growth that can yield both economic prosperity and no environmental damage, as expressed in the slogans

“win-wins,” “win-win-wins” (the “triple bottom line”), and “pollution prevention pays.” In climate change, ecological modernization is the theory that underpins proposed policies like emissions trading schemes and tax breaks for renewable energy industries and technologies.

The formation and organization of the modern nation-state have overturned the culture and customs of native peoples, many of whom may have lived sustainably on their land. That is, modernization upsets the balance and causes environmental degradation of all kinds, including greenhouse gas emissions. Scott (1998) details the modernist horrors of villagization in Tanzania and Russia as well as of modernist cities such as Brasilia. Davis (2001) provides an example of this view, with the added force of colonialism. He analyzes the devastating results of bringing India and China into world markets in the nineteenth century; the forcible breakdown of various traditional systems resulted in massive starvation and death when severe droughts occurred.

Specific climate change examples focus on the inequalities of the world-system, now intensified by climate change. Industrialized countries are responsible for the historic emissions that are the cause of the steep rise in atmospheric greenhouse gases. But the resulting climate change impacts will largely be felt in the tropics, where most of the poor and non-industrialized countries lie (see, for example, Agarwal and Narain 1991). Here the global modern swamps the national/local, with negative results for the environment and the already-poor. Boehmer-Christiansen (2003) shows that a proposed global transition to “green” fuels and technologies in order to mitigate climate change will similarly and disproportionately disadvantage poor groups and

nations. Sachs (2000), in discussing the prospects for sustainability, notes that economic and political globalization, with an “openness” that few poor nations can exploit, fosters a new colonization of Nature; as poor countries fall into debt, they are forced to sell the products of “free” natural resources. O’Brien and Leichenko (2000) dub this situation the “double exposure” of the poor to economic globalization and to climate change.

Inequality is an issue both among nations and within nations. Although an issue of economic well-being, the focus on much of the inequality literature is on the role of governance. The Framework Convention on Climate Change (FCCC) articulates the recognition that more industrialized countries and less industrialized countries are indeed highly unequal in almost every way and that these inequalities place the latter at a disadvantage with regard to climate change impacts.⁸ Inequality within less industrialized countries is, in contrast to assumed between-nation assumption of the FCCC, also exacerbates vulnerability to climate change. In-country inequality contributes to vulnerability principally by failing to provide for the maintenance of marginal populations.

⁸ The exceptions to this view include sometimes-romanticized descriptions of contented peasants living in harmony with Nature and the peaceful solidarity of peasant communities.

Analysts have typically used income data as an indicator of inequality. If the society is highly proletarianized⁹—that is, if the wages workers receive for their services constitute their principal incomes—income inequality measures may be good proxies. However, in semi-proletarianized regions, especially predominantly subsistence agricultural and pastoral areas, income inequality misses essential elements of well-being. A US income of a certain level, for instance, may be a good proxy for adequate shelter and food, access to health care, and accident and health insurance. But levels of income data in many Latin American, African, and East Asian countries may not be good proxies for any of these; people may have low incomes but plenty of food and adequate shelter, or they may have relatively high incomes but also crushing debt and taxes, indicating acute vulnerability. For less industrialized countries, questions about inequality go far beyond income data. As Kiester (2000) points out, wealth distributions may indicate striking inequality, even in a highly industrialized society like the United States. Asset or consumption measures (Macro International 2001, World Bank 2001, LIS 2001) may be better indicators in societies where wages are often only one way to ensure well-being.

In agricultural or pastoral areas that do not participate significantly in cash markets, comparative measures should take account of a broader range of access to resources. Such an analysis follows Sen's (1981, 2000) conception of poverty: as a deprivation of basic capabilities rather than as low income. Resources here might

⁹ See, e.g., Wallerstein (1983) for a discussion of the implications of proletarianization of societies.

include reciprocal relationships between elites and peasants, landownership or tenure rights, access to common resources such as forests and water, livestock and seeds, food reserves, and friendship or kinship networks that engage in work exchanges and other mutual help. For peasant families, a principal asset is the health of the primary worker(s). The fact that such a complex of resources and rights may be hard to measure does not make them less important, only more challenging.

One important element of inequality in developing countries is land tenure, broadly conceived as rights to land and the fruits of that land. If people have access to resources that will allow them to “live the lives that they would like to live” (Sen 2000), then analyses of vulnerability to climate change will become more meaningful than its current manifestations, which look suspiciously like measures of how industrialized and globalized a country is.

Another facet of the political dimension is that social and political theorists have taken the nation-state to be both the unit of analysis and the unit of governance in the nineteenth and twentieth centuries (Vogler and Imber 1996). “Realist” views of the anarchy in the international sphere assume that no global authority will gain legitimacy in governing environmental matters. International relations (IR) theory, having been dominated by (neo)realism, views all global environmental changes, including climate change, as items on the international agenda – and secondary items at best, after the perennial items of war, security and national self-interest (Saurin 1996). International institutionalists, such as Paterson (1996) add extra-governmental institutions to the mix, while retaining the focus on political processes.

With regard to the environment, countries have achieved international agreements codified in treaties and conventions, but implementation has fallen far short of what is envisioned in, for example, the UN Framework Convention on Climate Change (1992). Redclift (2000) calls this a crisis of authority, since organizations such as the United Nations lack the legitimacy necessary for implementation, monitoring, and enforcement. Furthermore, international agreements depend upon individual nation-states to implement the terms of the agreement. However, the nation-state may in fact be too small to effectively meet global environmental challenges and too big to implement appropriate policies at local levels.¹⁰ Saurin (1996), among others, noting that global is *not* a synonym for international, calls for new institutions capable of dealing with the ordering processes involved in the scale, spread, complexity, and dynamics of global environmental changes.

Cultural (Scientific) Globalization and Climate Change

Science is the principal cultural element involved in climate change issues. Science is associated with larger issues of knowledge production and use. And, indeed, relegating science to the cultural realm, along with fashion, film, and fast food, runs the danger of minimizing its close interrelationships with both the capitalist

¹⁰ This idea is attributed by Mol (2000) to Lash and Urry, but attributed by Saurin (1996) to Raymond Williams.

system and modern governance.¹¹ Beck (1992[1986]) uses the concept of the risk society to integrate the three dimensions I have separated into analytic categories. Risks are the “*wholesale product* of industrialization”; they are revealed by scientific investigation, which also promises their resolution; and they prompt a “*reorganization of power and authority*” in the attempted political management of both politicized nature and society (Beck 1992[1986]:21 and 24).

Nevertheless, science plays a special role in global climate change related to the problem itself and to the nature of scientific knowledge and its uses. Science has constructed the problem and constructed it as a global problem with at least some human causes in the emissions of so-called greenhouse gases. As a scientific issue, climate change was “discovered” by advances in scientific understanding and methodology, and computational capacity, as outlined earlier.

Of course, these scientific methods and conclusions are the subject of intense debate. Perhaps the measurement of greenhouse gases does not represent the global atmosphere; there is uncertainty about emissions of greenhouse gases, particularly from land-use changes; the models, because they are global models, cannot be verified and may neglect important processes; and the current warming trend may be unrelated to human activities and more dependent upon sunspot cycles, for example (see Edwards 2001, Norton and Suppe 2001). The issues of “globalizing science” in

¹¹ In this analytic scheme, fashion, film, and fast food are relegated to the economic sphere as the products of capitalism.

general relate to generalizing from localized experiments or data; Jasanoff and Wynne (1998) provide an account of the processes of globalizing climate change science.

Global climate change is global in its very nature, unlike earlier problems with far-ranging relevance. Pasteur's work, for example, had global relevance, because wherever contagious disease is present his constructs can be applied. But Pasteur did not need to collect data on a global system like the climate system but rather to replicate his relatively small-scale experiments and hygienic practices at multiple locations. In contrast, the global climate system must be considered as a whole. Storms in the Pacific Ocean drive much of the weather that much of the world experiences. Emissions of carbon dioxide go into the stocks of the whole atmosphere.

Science is indispensable in discussions about global climate change. "The debate over environmental change is in large part a battle in the social construction of knowledge and meaning which is fought out in a global arena" (Saurin 1996:81). Indeed, scientific research has made it possible for people to think of the globe as a symbol of a common humanity. The picture of the Earth from space (the "big blue marble") has evoked descriptions of its fragility, its limited resources, and human dependence. Associated images of Spaceship Earth and Gaia (the sense of the whole Earth as a living being) join earlier images of Mother Earth with powerful, global messages to "protect" the Earth and "Love your Mother." These are global images, cultural constructions that provide the appropriate settings for global climate change discussions.

But global climate change has more localized and differentiated sources and impacts as well. Rich industrialized nations are largely responsible for increasing

concentrations of greenhouse gases in the atmosphere, especially when historical contributions are accounted for; these same nations are likely to experience only mildly negative impacts from climate change, at least over the course of the next century. Poorer but industrializing nations (such as India and China) are contributing a smaller but increasing share of global emissions; these nations, however, are likely to experience more severe consequences of climate change. Given this lumpiness, questions arise about whose knowledge counts and how any knowledge will be used. Prescriptions from industrialized nations, such as advice to less industrialized nations on “clean development” and technology-dependent “solutions,” are likely to face skepticism. Calls for development assistance without the strings of capitalist institutions may well fall on deaf ears. The current state of negotiations on climate change exhibit many features that a neorealist would recognize, with self-interests dictating outcomes rather than a game-theoretic recognition that cooperation may bring advantages for all.

Globalization and Climate Change: More Heat than Light?

What is the relationship between globalization and climate change? Economic, political, and cultural globalization is deeply implicated as the causes of climate change and our knowledge about it. In each dimension, analysts have suggested both “more” and “less” to meet the challenges of climate change. Milton (1996) suggests that “the global environmental debate encapsulates the tension between ‘globalizing’ and ‘deglobaling’ tendencies identified by Robertson” – that is, we should either promote globalization as the best way of protecting the environment or dismantle the

global economy and allow localities to control their own resources. In the economic sphere, capitalism may either be expanded to account for the input costs of and damages to the environment, or be superseded by another economic system. In the political sphere, modernist governance needs to extend itself to manage the environment along with social systems or retreat to locally sustainable governments. In the cultural sphere, science needs to specify methods to mitigate and to adapt to more fully characterized climate changes, or to lose its hubris and make space for local knowledges and for moral and ethical approaches to the issues raised by global climate change.

Climate change, as perhaps the limit case of globalization gone wrong, provides a site where economic, political, and cultural/scientific issues can be debated. Climate change globalizes the environment by specifying the connections among what happens in specific places and the whole climate system. Nongovernmental organizations and institutions have gone a certain distance toward including multiple knowledges and North/South viewpoints. The Intergovernmental Panel on Climate Change, although dominated by industrialized-nation scientists, has come to conclusions not in the interests of their nations. The United Nations Environment Program and Development Program have had some modest success in providing assistance to poor nations who are not well adapted to current climate variability and who face further problems under long-term climate change. Still, there is little indication that industrialized nations are preparing to overhaul their systems of producing energy and goods, and little indication of systematic planning for adaptations that will be necessary.

The focus of this research study is global climate change as a site from which to analyze the possibilities for coming to agreement. In this broadly conceptualized research area, cultural approaches within globalization theories that link global and local views of desirable human and human/Nature relationships are the most promising. How identities are formed from global, national, and local elements, and how effective collective institutions (like epistemic communities [Haas 1992]) are constructed—these are crucial questions in determining the possibilities for globally shared values as the basis for policy and action. The political and economic realities of globalization are established constraints and possibilities, but social action is located in the abilities of social movement organizations and individual actors to see clearly and take advantage of various points of attachment. This is a view that can draw from and extend the theoretical insights of Robertson (1992, 1995, 2001). Another fruitful avenue is indicated by Castells, who sees social movements as having two main agencies: prophets (both “good” and “bad”) and “a *networking, decentered form of organization and intervention*” (Castells 1997:362) that actually distributes cultural codes in the globalized informational society.

The proliferation of theories and analyses in both globalization and climate change reflects the emerging nature of both areas of social scientific thought. Activities and “flows” are changing too rapidly to be satisfactorily categorized and mapped. Moreover, there are no clear advantages to one form of action, since all phenomena are multifaceted, with bundled positive, neutral, and negative characteristics. For example, global policy on climate change could benefit all nations on average but leave specific groups mired in poverty and at risk of climate change

impacts. However, local initiatives, while empowering stakeholders and taking advantage of local knowledge, may be limited in resources and subject to countervailing activities elsewhere (as when forests are spared in one place but cut down in another). Nongovernmental organizations can work across national boundaries on sustainable development programs but be undermined by local and national governments. “Green” communities reduce their emissions of greenhouse gases and serve as models for other communities; they may also be marginalized and powerless to effect change in larger political spheres.

If this is an incoherent assemblage of activities, it is also a vibrant and plurivocal one. Climate change forums have provided venues for many voices to be heard on a global stage, and climate change concerns have galvanized scientific research, policy debate, and local action. Sonnenfeld and Mol (2002) point to innovations in the form of supranational environmental institutions, market-based environmental regulatory instruments, and the rise of engagement from a global civil society. Guston (2001) analyzes boundary organizations in environmental policy and science, including three climate change studies.

Still, there are important contradictions to be sorted out. An overwhelming majority of people wants a less degraded environment, and seemingly at the same time everyone wants more goods and energy to improve the world’s standard of living.¹² Governments pay lip service to improving or protecting the environment, but “the

¹² Wallerstein (1999:5) suggests that “a lot of them simply segregate the two demands in their minds.”

unpalatable implications” (Held et al. 1999:410) of many environmental policies mean that few effective ones have been enacted and implemented. International institutions or nongovernmental organizations may be more matched to the scale and complexity of climate change, but they do not have the power “to force compromises, extract significant concessions from participants or take independent action” (Held et al. 1999:411).

Although it is tempting to resign oneself to expect the reproduction of existing power structures in the debate about climate change, history contains examples of large social changes against the expectations of the powerful; social revolutions that resulted in democratic governments constitutes an obvious example. Perhaps future large-scale changes in the economics, politics, and culture related to climate change will become objects of widespread social scientific study, as globalization is now.

CHAPTER 5: RHETORICAL ANALYSIS OF ARGUMENTS MADE IN THE GLOBAL CLIMATE CHANGE DEBATE

The possibility that human activities have become so large in scale that they are affecting the global climate system has become a matter of extensive debate, and it is this debate and the arguments made in it that are the focus of this empirical study. Intentional human attempts to affect the weather have a long history, of course; people have prayed or danced or sacrificed or performed other rituals to persuade the gods to send rain, fair weather, or whatever conditions would facilitate human endeavors. What is different in the present situation is that a scientific basis exists to believe that humans, without intending to, may be affecting the climate and that climate change may have negative consequences. The debate, then, is over whether human emissions of so-called greenhouse gases are affecting the climate and, if so, what people should do to address the potential for climate change.

The first task that a person who makes an argument faces is that of convincing the audience that there is something requiring their attention. If scientists have discovered the truth about anthropogenic climate change, then the rhetorical situation contains the exigence that Bitzer (1968) discusses: something arising from outside themselves and suddenly confronting people, like the exigence that arises in military battles or political situations such as the Cuban Missile Crisis. But, as Vatz (1973) argues, any seeming externality, like the Civil War and the Cuban Missile Crisis, is itself constructed by rhetors who argue that the evidence presents a problem that people should take notice of and do something about. The evidence of climate change

(rising carbon dioxide concentrations, emissions of greenhouse gases, etc.) became support for a scientific argument about how climate is or may be affected by emissions of carbon dioxide and other greenhouse gases to the atmosphere. Thus, scientific rhetors were the first to construct the exigence of the current rhetorical situation. This is an especially important element in the rhetorical situation of potential climate change, because, unlike battlefields or photos of missile silos, the evidence of climate change is a highly artificial construct. The evidence that carbon dioxide concentrations in the atmosphere are rising comes from complex scientific instrument measurements, represented by a graphic curve familiar to climate scientists but not empirically verifiable by a nonscientist, as an oil spill or smog is. Projections of climate change are presented as graphs, charts, and other visualizations of computerized simulations.

The scientific basis for potential climate change caused by humans has many people worried, but many others remain unconvinced. That is, some accept the exigence *as* exigence and argue for (and against) particular actions to respond to the threat; for those who do not accept the exigence of the situation, the framing of the problem continues in scholarly and political (rhetorical) debates.

Within the ranks of those who believe human-caused climate change is a problem, research attention in recent years has begun to focus on the processes involved in constructing climate change as a social-environmental “problem,” creating evidence of it, and attempting to develop solutions at the global level. After the initial agreement (the Framework Convention on Climate Change came into force in 1994), progress has been slow at best, and the Framework Convention is seemingly at an impasse. The number of policy proposals is legion, but even the modest emissions

reductions agreed to in the 1997 Kyoto Protocol will likely not be implemented and the protocol itself has not come into force. Argumentative fissures have appeared, not only in the arguments associated with so-called “developed” versus “developing” countries, but also within these groups of countries.

Rhetorical Analytic Approaches to Comparative Analysis

Given the seeming inability of people to come to agreement about what (if anything) to do about the prospect of climate change, should the world’s societies continue to try to find a path forward? In order to answer this question, we should examine the arguments people are making. A rhetorical analysis of the arguments in the debate should shed some light on the potential for agreement. If there are bases for agreement, they should exist in the arguments themselves – in the definition of the situation, or in one or more of the premises, or in proposals made. Even conceding the well-known phenomenon that people do not always say what they mean or believe, opponents in the debate will ferret out hidden motivations and arguments, so research that examines a wide range of arguments should be able to capture most of the “real” arguments. Perhaps differences in the characteristics of the speakers or perceived biases form the bases for disagreement, rather than the content of the premises or conclusions. Furthermore, a closer look at the arguments in the debate may yield insights about how to build on areas of agreement and gain adherence to one or more proposals for action.

Rhetorical analysis is a tool well suited to examining what is going on in the climate change debate. Rhetoric, the art of persuasive speaking and writing,

characterizes the dimensions of the various arguments and the means people use to make their arguments as forceful as possible. The Aristotelian categories of ethos, pathos, and logos ground the analysis in the essential elements of a speech act: the character of the speaker (ethos), the appeal to the emotions of the audience (pathos), and the claims of the matter itself (logos). Who is the speaker and why should others listen to him or her? How does the subject connect with the values the audience holds dear? And why is the subject important? Each person who constructs an argument must wrestle with each of these three dimensions. And each speaker in a debate constructs an argument based on a worldview that is presumably shared among speaker and hearers; otherwise, the argument would be unconvincing or, indeed, unintelligible.

Modern rhetorical theories and tools are numerous and varied. Criteria for judging their usefulness for a comparative examination of arguments center around their ability to apply analytic categories to elements of each argument, yet preserve the content of the argument. Another important criterion is that the theories and tools be as evenhanded as possible, i.e., they should have little or no inherent bias toward either scientific discourse (as stated at the beginning of this chapter, an important element in the exigence and in the debate) or nonscientific discourses such as traditional knowledge and narratives. The overall objective is to use the tools of rhetorical analysis in a structured and consistent way in order to draw some conclusions about the distinctions and commonalities among the arguments.

In this effort to analyze arguments in the climate change debate, a brief examination of some of the major figures of modern rhetorical theory is in order,

perhaps to draw from them eclectically or from one or more materially, and perhaps to use their insights as sources to design a schema suitable to the question being investigated. With the question in mind, I discuss and evaluate the dramatism of Kenneth Burke, speech act theory as propounded by J.L. Austin and extended by Jürgen Habermas, and the “New Rhetoric” of Chaim Perelman and Lucie Olbrechts-Tyteca.

Burke’s dramatistic approach has been used extensively in rhetorical analysis. The use of Burkean analysis provides rich insights into single texts or types of texts. Burke himself provides rich critiques of texts such as *Mein Kampf* (Burke 1989). The pentad (act, scene, agent, purpose, and agency) and the “ratios” between pentadic elements (the relationships between the elements of the pentad as used in literature or rhetoric, e.g., the act-scene ratio) reveal the (in)coherence of an argument (Burke 1989, Ling 1989). For example, if an audience does not believe that a certain agent would perform a specified act (“he just wouldn’t do that”), the argument that rests on a posited ratio between the two will be unconvincing. Similarly, if the rhetor carefully chooses the boundaries of a scene, he or she can limit the possibilities for action within the scene (“in this case, she couldn’t have done anything else than what she did”).

However, the Burkean approach does not lend itself to the question of bases for agreement in many arguments about climate change. First, Burke himself reveals his own bias against “scientific” or “behavioristic” language. Dramatism is in fact defined in contradistinction to behaviorism, and a scientific approach (language as definition) is contrasted to a dramatistic approach (language as act). Although one

could use a dramatistic approach to debunk scientific claims to objectivity and authoritative definition, this analysis of arguments about climate change acknowledges the claims of all rhetors to the truths they construct. It is not concerned with reducing all arguments to the same terms (no matter if the rhetors would agree or not), nor do I wish to draw a heavy, dichotomous line between scientific and nonscientific discourses.

Moreover, as Klumpp (1993) points out, using the pentad as a rigorous analytic framework tends to result in sterile, formulaic analyses. Attempts to transform the Burkean pentad into a set of argumentative propositions, says Klumpp, destroys its contextualist assumptions and produces results to be “shuddered at.” Using the pentad in a Burkean analysis also makes comparison highly problematic; each object of analysis tends to be seen as unique. Moreover, many of the arguments made in the climate change debate are not complete in the way that, for example, *Mein Kampf* is (see Burke 1989); attempts to discern the five elements of the pentad plus the ten ratios would necessitate extensive and inferential analysis.

Another major figure in modern rhetorical analysis is J.L. Austin (1962), who showed that all statements are also acts – hence the term “speech act theory.” That is, a speaker is always seeking to have an effect by making statements. One way in which speech act theory bore fruit was in Jürgen Habermas’ (1984, 1987) theories about the ideal speech situation, in which Habermas treats communication as speech acts *oriented toward understanding*, as Aristotle assumed rhetors are oriented toward the truth. Communicative action may serve to establish and renew interpersonal relations, to represent states and events, and to express the speaker’s experience (roughly

equivalent to Aristotelian pathos, logos, and ethos). Speech acts thus make validity claims and can be judged on the basis of whether they are morally correct, factually true, and subjectively sincere. Thus, if a scientist shows data about the probability of risk from exposure to a toxic chemical, he or she is making a claim about the truth of the statements. Because the scientist knows that such statements can be contested, he or she frames the statements to be acceptable to the audience. Similarly, if a citizen contests the scientist's claim, there is a counter truth claim that the citizen is hoping will be accepted. It is in this sense that speech acts are oriented toward understanding, which presumably will lead to agreement about contested issues and resulting actions.

To the rational arguments that Habermas focuses on, Wells (1996:123-124) adds Lacan's term "drive" in formulating an intersubjective rhetoric to use in analyzing discourses of modernity:

If Habermas tells the happy story of communicative action as a practice of reason, capable of sustaining more and more intense differentiation, available for reflecting on a broader and broader social terrain, Lacan tells the sad story of action as necessarily implicated in error, necessarily unsuccessful, bringing us into a relation with the other marked by domination and frustration (123-124).

Wells' analyses of "rational" discourses such as the MOVE Commission report in Philadelphia and articles in an issue of *Science* magazine on cosmology show how they are "suffused with desire," but her Lacanian analysis of a student outburst does not demonstrate its rationality, merely opposes it to a university and professorial rationality that in the end cannot cope with the outburst. Thus, her approach reveals

itself as a way to expose the nonrational elements of modernist discourse in opposition to rational elements – again, against the purpose of a comparative analysis of arguments in the climate change debate. That is, I am pursuing bases for agreement, not the dichotomous presentation of rational versus nonrational (which tends to reinforce explanations of disagreement, not bases for agreement), nor the by-now-conventional revelation that each has properties of the other.

Habermas, with little or none of the anti-scientific bias of Burke and Wells, has a broader concept of rationality than technical or scientific discourse. In his separation of the system and the lifeworld, rational discourse belongs to both. And in what he calls the public sphere (Habermas, 1989[1969]), citizens, using their lifeworld rationality, come together to critique the system. The lifeworld includes practical, everyday concerns about how to make a living, how to conduct family life, and how to improve the functioning of civil society. Thus, Habermas provides a general way to talk about how rhetors and arguments interact without privileging one type of discourse over another.

Bitzer and Vatz, and Austin and Habermas, thus provide some rough, classificatory tools with which to begin this analysis, but the issue of comparability of arguments remains. Perelman and Olbrechts-Tyteca (1971[1969]:190) provide a principal concept that allows examination of the differences and commonalities among arguments. They classify arguments by whether they are characterized by processes of *association* or *dissociation*. Association processes “bring separate elements together and allow us to establish a unity among them, which aims either at organizing them or at evaluating them, positively or negatively, by means of one another.” Dissociation

includes “techniques of separation which have the purpose of dissociating, separating, disuniting elements which are regarded as forming a whole or at least a unified group within some system of thought.” This primary level of classification allows us to notice, at the level of the whole argument, what elements are being associated or dissociated in arguments about climate change, without specifying elements that belong to types of discourse.

Other aspects of the Perelman and Olbrechts-Tyteca treatise promise to further facilitate the comparative analysis. I will touch on three in particular: the concept of the universal audience, the penetrating discussion of data (which ties in with the classical stases; see below), and the emphasis on probable arguments and the degree of adherence to an argument.

The first is the concept of the universal audience, which consists of “the whole of mankind, or at least, of all normal, adult persons” (Perelman and Olbrechts-Tyteca 1971[1969]:30) who, if they understand the reasons given in the argument, would have to accept the conclusions. “For each speaker, at each moment, there exists an audience transcending all others, which cannot easily be forced within the bounds of a particular audience.” More than in most debates, the rhetors in the climate change debate address the universal audience – sometimes grandly specified as humankind or all travelers on Spaceship Earth, sometimes the implied audience for scientific “discoveries” (i.e., everyone should be convinced by scientific arguments and evidence). This concept accords well with Habermas’ ideal speech situation, which includes all competent parties to the argument and within which all rhetors are oriented toward “coming to agreement.”

The second aspect that is helpful is the discussion of data. One kind of data “consists of the agreements available to the speaker as supports for his argument” (Perelman and Olbrechts-Tyteca (1971[1969]:115). The *selection* of the facts of the case is thus supremely important in the efficacy of the argument; choices reveal both what the rhetor thinks will be most convincing and what may be counted on as agreements. When a rhetor selects certain data, he or she gives them presence in the argument. Moreover, the *interpretation* of facts is important, especially in distinguishing different arguments that use the same agreed-on facts. In climate change, for instance, many rhetors agree that concentrations of greenhouse gases are rising, but there are many interpretations of these data. Perelman and Olbrechts-Tyteca discuss some of the ways that multiple interpretations can be generated. People do not understand data in the same ways, interpretations may invoke different levels (e.g., the same act could be “interpreted as a symbol, a means, a precedent, a step in a direction” [Perelman and Olbrechts-Tyteca 1971(1969):121]), or ambiguity may be present in the data.

The third aspect is the recognition that there are degrees of adherence to arguments and degrees of probability that rhetors assign to the arguments. Establishing proof or truth is not the goal but rather “*to induce or to increase the mind’s adherence to the theses presented for its assent*.” What is characteristic of the adherence of minds is its variable intensity” (Perelman and Olbrechts-Tyteca 1971[1969]:4). In the climate change arena, most of the arguments about taking action concern a future in which the uncertainties are very large – some say they amount to indeterminacy. Therefore, uniform agreement cannot be expected. Indeed, this study is at least partially an

investigation into whether there exist partial adherences, based on one or multiple network ties.

Toulmin (1958) also accounts for the variable degrees of adherence to arguments. He looks at the logic of discourse as not amenable to the rules of formal logic and builds a diagram of an argument with the elements of claim, data, warrant (with backing), modal qualifier, and rebuttal. In terms of *informal* logic, the qualifier expresses the degree of certainty or probability of the argument. Laying out an argument using Toulmin's schema should show clearly where rhetors agree and disagree and about what elements. However, the schema is restricted to micro-arguments, not the macro-argument level of this analysis.

Similarly, the elaborate schema Perelman and Olbrechts-Tyteca present is not suited for the high-level analysis I wish to pursue. I will use their distinction between association and dissociation, and examine the arguments in two broad categories suggested by Jeanne Fahnestock and Marie Secor (1983): arguments from definition (categorical propositions) and arguments from cause-and-effect (agency). Both kinds of arguments are used in proposals, which constitute my document sample.

A Methodology for Comparative Analysis of Arguments

I have used a rhetorical approach to analyze the arguments in 100 documents and public statements explicitly directed to global environmental debates. (See Appendix 2 for a list of the documents.) The focus is principally on documents related to specific proposals for political, economic, and social changes to address issues raised in the global climate change debate. Sources include scientific journal articles

and reports, environmental “activist” statements (environmental social movement groups), cultural/ethnic group statements (e.g., First Nations in Canada, deep ecologists, ecofeminists), negotiating positions and other policy-oriented statements (from industrialized and developing countries), and media articles or reports.

The purpose of analyzing documents and presentations within the global climate change debate is to discern whether these demonstrate a basis (or several bases) for agreement about policies and other actions to address climate change. By looking at various elements of the documents and presentations, I should be able to see whether different discourses are cut off from each other, whether they overlap, whether some voices can disagree in some (most) elements but agree in others, and so on. If, for example, certain clusters of elements are tightly correlated with each other and not at all with other clusters, there would be little basis for agreement; people would simply be talking past each other and emphasizing their disagreements.

Earlier attempts, including at least one in-depth analysis, have been made to classify the arguments made in the climate change debate. Earlier studies attempted to attribute people’s views of nature, the value of the environment, and climate change specifically to demographic characteristics (see, for example, Dunlap 1991). Jaeger et al. (1993) showed that demographic characteristics were poor predictors of attitudes toward the environment and that cultural beliefs were much more explanatory.

Cultural explanations have included several theories. Based on Maslow’s hierarchy of needs, Douglas et al. (1998) discuss the theory that people who have primary needs for food and shelter met then can seek to satisfy more aesthetic and altruistic needs, such as a good environment. Inglehart (1990) posits the emergence of

“postmaterial values” in a globalized world; these values include environmental protection.

Thompson and Rayner (1998), building on cultural theory (Thompson, Ellis and Wildavsky 1990), identify four “myths of nature” that guide people’s arguments about the problem and proposed solutions. Nature can be thought of as *benign* (able to renew itself no matter what humans do to it), *perverse/tolerant* (robust, but with the possibility that thresholds may be breached and that that irrecoverable damage may result), *ephemeral* (delicately balanced, easily capable of collapse), or *capricious* (essentially unknowable and unpredictable). Except for the last (which does not allow for policy to address climate change), Thompson and Rayner associate these myths of nature with institutional voices in the climate change debate.

- Those who think of nature as benign also tend to think of climate change as resulting from a failure to account for the value of natural resources in market transactions; the solution to this problem is to be found within the market, by removing price distortions, privatizing resources, or having the government set markets for them.
- Those who think of nature as perverse/tolerant also tend to diagnose the climate change problem as one of exploding population, which perforce places pressure on natural resources; the solution lies in family planning, the availability of technologies that help limit fertility, and in associated education, especially for women.
- Those who think of nature as ephemeral also tend to argue that the cause of climate change is rampant industrialism and consumerism, which places

inordinate demands on natural resources, especially for energy, and allows capitalists to expropriate resources from (for example) farmers; the remedy is to be found in frugality and equality.

This analysis privileges cultural beliefs about nature, but theoretically this is only one source of attitudes about climate change. People's political interests, economic situation, group and national status, and many other factors could play roles. Examining what people have actually said should allow space for other factors and their relative importance.

I limited my analysis to 100 documents published or released between 1992 (the year that the Framework Convention on Climate Change was adopted at the Rio Summit) and 2003. Each document has a clear (or clearly implied) policy prescription; i.e., research documents that only report results and perhaps outline further research that is needed were not selected. Discourse on other global environmental issues (e.g., biodiversity, acid rain, the ozone layer, deforestation, overfishing) was used as additional evidence and illustrations. Documents were publicly available, but I especially sought out documents from the "gray" literature (newsletters, advocacy briefs, etc.); I expected that many or most of the documents from less industrialized countries were of this type, since the trappings of peer-reviewed journals are less common there. Additional details about selection of the documents can be found in Chapter 3.

I reviewed these documents, categorized the argument itself and four primary rhetorical dimensions:

- Who is making the statement and what group or groups are associated with the rhetor? How is this person or group influential (positive and negative)?
(Aristotelian ethos)
- What are the bases of the rhetorical claim(s) – i.e., what type of evidence is being used? (Aristotelian logos)
- What is the worldview of the rhetor, especially as it relates to the viewpoint expressed about the relationship between people and the rest of nature?
(Aristotelian ethos)
- What are the actions the rhetor is proposing?

Since it is probable that secondary and tertiary arguments, lines of evidence, and worldviews could provide a basis for agreement, I included them in my document analysis. Similarly, since it is possible for people to agree on specific actions without agreeing on the reasons for those actions, I included any proposed actions in the analysis. As a first step, I filled out the template depicted in Table 5.1 for each document.

Table 5.1. Example of Template for First-Order Document/Presentation Analysis

Document #: Citation				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary:				
Secondary:				

Tertiary:				
Notes:				
Type of evidence				
Primary:				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary:				
Secondary:				
Tertiary:				
Notes				

In the second step, I clustered the arguments themselves into “families” that were similar in their claims and evidence. This allows a more detailed comparative analysis – the next level of analysis beyond the information in Table 5.1 for each individual argument. Again, the goal was comparative analysis of arguments to discern bases for potential agreement on actions that could or should be taken to address climate change.

In the third step, I evaluated and compared selected arguments using three tools: the high-level classifications of Perelman and Olbrechts-Tyteca, the two basic argument types identified by Fahnestock and Secor, and the classification of arguments into their stases (a classical rhetorical tool). The stases provide a useful way to classify arguments because they provide a structure to sequentially and hierarchically order the matters that, one by one, have to be agreed on. Fahnestock and Secor (1985:217) have modified the classical stases “to fit contemporary

argumentative practices.” Each of the stases gives us a vantage point from which to view the relationships among the families of arguments about climate change.

- First, people must agree that something happened – a matter of fact or conjecture. For the purposes of the study, the question is usually framed as establishing either or both that the concentration of greenhouse gases in the atmosphere has been rising and/or the global mean temperature has risen over the nineteenth and twentieth centuries.
- Second, people must agree about how to define the fact(s). In practical terms, arguing about definitions can send the argument back to the first stasis. For example, in this case, some rhetors define the phenomena established in the first stasis as climate change. Others accept the “facts” of rising concentrations and mean temperature and yet disagree that these facts can be defined as the beginning of long-term climate change.
- Third, people need to agree about the causes of the phenomena that are the subject of the argument. This is a stasis inserted by Fahnestock and Secor to account for the contemporary emphasis on causal inquiry in the social, political, and natural sciences. In the case of climate change, this is often a sticking point. People may agree that atmospheric concentrations and global mean temperature are rising, and that this may be defined as climate change. But can climate change be attributed to human emissions of so-called greenhouse gases?
- Fourth, people need to agree about the quality or value of the phenomena. Is it bad or good, serious or trivial? In this stasis, other facts and definitions may be

brought in; in an example used by Fahnestock and Secor, an argument about treatment with placebos will often involve a definition of the right relationship between doctor and patient. In the case of climate change, the argument at this stage relates to the seriousness of the situation, which may relate to the views of nature discussed above. If a person thinks nature is essentially fragile, he or she will likely believe that human interference in the climate system is a very serious matter indeed.

- Fifth and last, people need to agree that they must take action. In ancient legal use, this stasis was associated with reaching a verdict and passing sentence, but of course action can take many forms. The call to action depends on what Fahnestock and Secor (1985:222) call a “warrant of jurisdiction, an assumption that the audience addressed is indeed the appropriate, effectual audience to take action – that they have the right to take it, the time and occasion to take it, the means to take it, in short the power to take it.” In the climate change debate, the calls to action are various and aimed at sometimes diverse universal audiences.

We have already seen that the basic concepts of Bitzer (1968) and Vatz (1973) help to array the arguments along the stases. If exigence can be awakened, a rhetor will find it easier to get to the final stasis, a call to action. Rhetors may feel the exigence of the situation, but they must be sure to construct or reinforce a sense of exigence in the audience. This sense of exigence is important in this study because it is one of the cleavages among rhetors in the climate change debate.

The three specifically rhetorical tools help to characterize the arguments as arguments and to provide a basis for comparison. For example, a “deep ecologist” might argue that humanity’s true nature has been violated in industrialization, thus associating the true nature of people with a kind of primitive lifestyle. Moreover, the deep ecologist would likely be arguing at the third or fourth stases, since the major points have to do with the cause of the problem (the human embrace of industrialization) and its seriousness (violation of humanity’s true nature). In contrast, a scientist might argue that it is human destiny to control nature and reap the benefit of natural resources, thus associating the true nature of people with techno-scientific decision-making. The scientist is likely arguing at the fifth stasis, focusing on the ways humans can manage nature and industry better. The elements being associated or dissociated within the arguments provide insights into potential bases for agreement among rhetors. Both can be seen as arguments about definition (of the true nature of human beings) or causes (a relationship gone wrong in the past or simple mistakes that can be corrected in the future), so it is important to examine the evidence for the categories.

I expected that comparing the families of arguments would reveal sets of elements that are closely correlated in each family. For example, a set of correlated elements could consist of the following:

- noted scientist as the source of the document or presentation
- quantitative data as evidence (measurement, equations, etc.)
- a worldview that posits humans as controllers of Nature and Nature as highly resilient to human interference

- proposals to reduce carbon dioxide emissions using a carbon tax.

If all of these elements are strongly associated with each other and not at all with alternative elements, this analysis would indicate that scientific voices in the debate talk to each other but not to nonscientific audiences, despite ubiquitous calls for scientific communication. However, if scientists typically appeal to the authority of the Framework Convention on Climate Change (perhaps as a secondary argument), this gesture to the authority of international law gives them something in common with environmentalist groups, who make the same appeal.

I expected that the most interesting and potentially fruitful correlations would be at the margins of the analysis, e.g., two secondary types of arguments that are widely shared across the boundaries of science, social solidarity, and politics/policy.

I grouped the documents into “families of arguments.” There are at least 11 coherent arguments about the hypothesis that human activities contribute to climate change, the degree of threat that results from possible climate change, the basis for acting in response to the threat, and the specific actions that are necessary. I have termed these families of arguments “No Problem!,” “Climate Change Could Be Good for You,” “Science Provides Knowledge about Climate Change,” “More Modernization Is the Cure” (five different families), “Inequality Is the Problem,” and “Rift with Nature.”

Table 5.2 shows the distribution of families within the 100 documents, as well as a brief overview of the analysis using the three rhetorical tools (the stases, association/ dissociation, and definition/cause and effect). Note that the “shares” of

arguments in this set of documents cannot be taken to represent the importance or proportional presence of different arguments in the actual debate.

Table 5.2. Overview of Document Set and Rhetorical Classifications

	Number of arguments	Stasis	Associate climate change with...	Argument from...
No Problem!	3	1	bad science	definition
Climate Change Could Be Good for You	8	2 and 4	normal problems that humans have shown they can solve	definition
Science Provides Knowledge about Climate Change	9	3	an issue open to scientific inquiry	definition
More Modernization Is the Cure (five families)	48	5	one more problem that can be addressed through politics, economics, and technology	definition, cause and effect
Inequality Is the Problem	17	3 and 4	inequality of nations and people	definition, cause and effect
Rift with Nature	15	3 and 4	unhealthy, subject-object relationship with nature	definition, cause and effect

I next briefly discuss each family and analyze example arguments. Grouping into families and characterizing the families rhetorically helps to map the debate space.

Family #1: No Problem!

One family of arguments denies the exigence that others construct. Many of these rhetors claim that climate change is an easily falsified hypothesis. Or they claim that

climate change is possible but the science is very uncertain. Or the claim is that climate change may be happening, but the causes are unrelated to any human activities. Their arguments are located at the first stasis, and they hold that nothing we can call human-induced climate change has been demonstrated. Of the 100 documents, 3 are clearly in this family.

Scientist-rhetors in this family express skepticism that climate change is a plausible scientific argument – or, if they allow that climate change is possible, they dispute its anthropogenic causes. Thus, people need not be concerned about reducing emissions of greenhouse gases. The scientific evidence can be countered by other scientific evidence; for example, the historical record may be said to demonstrate that carbon dioxide concentrations fluctuate without correlation to temperature, so the correlation of the past two centuries does not indicate a causal relationship. Cosmic rays cause climate warming, not greenhouse gases. The climate models are too crude for us to place any faith in their projections/predictions. Or scientists are simply engaging in what one U.S. senator called “junk science” and only concerned to keep the research dollars coming by continuing to investigate the “threat” of climate change.

The science itself may not be contested, but the degree of uncertainty, say some, is such that we are unjustified in taking any mitigating actions – especially if these actions are costly.

A representative example of the *scientifically* based “no problem!” argument is the paper by Richard Lindzen (no date), a professor at MIT (see Table 5.3). Lindzen rhetorically *associates* himself with the debate within the scientific community and

dissociates the scientific debate from the political activities that brought climate change to the attention of governments. He stakes out his ground by saying, “as a scientist, I can find no substantive basis for the warming scenarios being popularly described.” On the dissociative side, he characterizes the politics as “a global warming circus” based on a “crude idea” (not even a theory) that fits in with other political agendas, such as the push to reduce oil imports from the Middle East. This is an argument from definition: climate change is a scientific problem, not a political one. His conclusion: climate change does not exist.

Table 5.3 First-Step Analysis of Lindzen Argument

#46: Lindzen, Richard S. n.d. (downloaded March 2003). <i>Global Warming: The Origin and Nature of the Alleged Scientific Consensus</i> . Cato Institute, Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Lindzen is a prominent skeptic, well respected as a scientist (MIT) but also affiliated with Cato, which is seen as ideological				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “as a scientist, I can find no substantive basis for the warming scenarios being popularly described.”				
Secondary: “Moreover, according to many studies I have read by economists, agronomists, and hydrologists, there would be little difficulty adapting to such warming if it were to occur.”				
Tertiary: “present hysteria formally began in the summer of 1988” with a hot summer and James Hansen’s meaningless statement, and quickly became a “global warming circus” – scientific debate OK, politicization dreadful – warming does fit with other agendas, such as ee, reduced oil from the MidEast, dissatisfaction with industrialization, international competition, enhanced revenue from C taxes, and enhanced power				
Notes				
Type of evidence				

Primary: “Such was also the conclusion of the recent National Research Council’s report of adapting to global change. Many aspects of the catastrophic scenario have already been largely discounted by the scientific community.”				
Secondary: examines the arguments: agrees that CO2 in the atmosphere has been increasing, but says an inaccurate model was used to predict a doubling of preindustrial levels by 2030 – “The simple picture of the greenhouse mechanism is seriously oversimplified.” – water vapor and clouds account for most of the effect, convection must be taken into account, models cannot duplicate the motions of the atmosphere, feedbacks are highly uncertain and not understood – predictions are exaggerated				
Tertiary: history of the political process; Al Gore, environmental advocacy groups, Claudine Schneider (“scientists may disagree, but we can hear Mother Earth, and she is crying”), refusal of Science to print Lindzen’s critique, various actors, Michael Openheimer/EDF, Greenpeace, etc.				
Notes: puts “greenhouse theory” in quotes, refers to “popular presentation” and “crude idea” of this theory				
Worldview/view of nature				
Primary: “improved technology and increased societal wealth are what allow society to deal with environmental threats most effectively.”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Allow science to take its course, admitting the flaws of the models – get politics out of the picture.				
Secondary: Focus on the control of societal instability				

Family #2: Climate Change May Be Good for You

Rhetors in this family claim that climate change (if it happens) may be “good for you,” and in any case would be so slow that people can adapt. In all of these cases, the proposal is the same: do nothing. There is no exigence because matters will take care of themselves and will likely entail more positive than negative changes. This family or arguments is located at the second stasis; most acknowledge that long-term changes in the climate are apparent; however, they argue that these changes should not be defined as a “problem” to be addressed. Or the argument may be at the fourth stasis, accepting the evidence of climate change and even of human causes – but, still, they

say, the situation is not a problem. Climate change may be good for people. Of the 100 documents, 8 are in this family.

Many of the rhetors who deny exigence express faith that people will be able to adjust as manifestations of climate change become apparent. Therefore, it is unwise to take speculative and (probably) expensive actions now, when we really don't know, first, if climate change will occur; second, what the impacts will be; and, third, what climate change will mean for each region and locality.

A representative example of this argument is the article by Ausubel (2001; see Table 5.4), in which he provides a long list of beneficial adaptations that people have made to climate. Ausubel's argument is an associative one – adapting to a changing climate is an old problem, with a long history of successful adaptations. In contrast to analysts who carefully document the uniqueness of the current climate change problem (the anthropogenic causes, the likely magnitude, the long timescale), Ausubel attempts to “normalize” the problem by briefly describing past adaptations and then listing a long catalogue of ways we have come to adapt to our current climate in ingenious ways: cisterns and dams, tractors, new crop cultivars, information technologies, tide tables, irrigation scheduling, weather forecasts, agricultural credit banks, national parks, green political parties, flood insurance, food preservatives, light bulbs, and refrigeration/air conditioning. In fact, we have adapted so well that our industries, transportation, and daily lives are becoming more and more impervious to climate considerations. Surely we can extend our ingenuity to adapt as changes happen.

Again, this is an argument from definition: climate change is a familiar and age-old problem and, because we have seen it before, we have many ways to deal with it. However, Ausubel is at the fourth stasis. He accepts the evidence and the definition of the evidence as at least the possibility of climate change. He elides the third stasis by not engaging the issue of whether or not humans have caused climate change. At the fourth stasis, his argument is that climate change is not a “problem” at all, much less a serious problem calling for action.

Table 5.4 First-Step Analysis of Ausubel Argument

#3: Ausubel, Jesse H. 2001. Some ways to lessen worries about climate. <i>The Electricity Journal</i> (January-February), 24-33.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Ausubel is “director of the Program for the Human Environment at The Rockefeller University, New York. He was one of the main organizers of the first United Nations World Climate Conference, held in Geneva in 1979.”				
Secondary:				
Tertiary:				
Notes: “This article is adapted from the keynote address to the Business Roundtable’s National Summit on Technology and Climate Change,” August 31, 2000.				
Type of argument				
Primary: It is likely that human emissions of GHGs will change the climate but we do not know how and probably cannot know. “But gambling with the climate does not strike me as a good bet.”				
Secondary: “Societies are always trying to climate-proof themselves” (25) and many successful adaptations exist.				
Tertiary: Technological change is a continuing process that demonstrates our adaptability, potential to design offsets, and engage in prevention strategies such as the Zero-Emission Power Plant (ZEPP).				
Notes				
Type of evidence				
Primary: Graphics showing technological cycles and improvements (recording media, RAM, transportation modes, and power plant size), with accompanying text				
Secondary: long lists of ways we adapt to climate, e.g., “from antifreeze, air conditioning, and corn futures markets to windshield wipers, radar, and domed stadiums” (25).				

Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature is essentially unpredictable; people can control their behavior.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “So, I say, let us prepare, just in case. Purchase some insurance. ... Publish and private entities should research and invest in all three” forms of climate insurance: adaptation, offsets, and prevention (25).				
Secondary: “We should choose long-term solutions for emissions compatible with the evolution of the energy system. This means shift to methane, focus offsets on the carbon in methane, prepare the hydrogen economy, and anticipate the nuclear millennium that will follow our Methane Age” (33).				
Tertiary:				
Notes				

Family #3: Science Provides Knowledge about Climate Change

This family of explicitly scientific arguments typically takes climate change as a starting datum, which the audience will agree is a fact. The questions to be investigated within this basic agreement concern the degree of change and its possible impacts. Nine of the documents examined are in this family; probably this is an undersampled category because many scientific studies stop short of making explicit policy recommendations. Most come to the familiar conclusion, “More research is needed.” Scientists who perform core sampling to reconstruct past concentrations of greenhouse gases or who describe the atmospheric chemistry of greenhouse gas decay in the atmosphere leave it to others to use their findings in a constructed, policy-relevant argument.

Because not even all scientists can be counted upon to take the same view of climate change, scientific rhetors provide sometimes lengthy introductions to their

journal articles, framing the climate change issue as one of both science (with citations) and policy (with reference to the Framework Convention on Climate Change). These introductions legitimate the scientific inquiry that is being reported; they define, in part, the scope of the investigation (i.e., some aspect of climate change). In such scientific arguments, the potential for climate change is an assumption, not a term of the argument. Researchers then define, within the climate change problem space, the issues and questions relevant to the research they are reporting. Next come the description of the methodology (including, typically, a computer-based model), results and findings. The final section suggests policy implications and further research.

So far I have described an example of the standard genre of scientific articles. Although the structure and style of the scientific article is one source of its authority, with the identity of the author(s) and the reputation of the journal adding to that authority, the content of the argument itself and the evidence should carry the bulk of the responsibility for convincing the audience, since science is based on evidence.

A representative example of this argument is an article by scientists from the Economic Research Service of the U.S. Department of Agriculture (Darwin et al. 1996; see Table 5.5). These researchers are “ecological economists” who used a computer-based model (the Future Agricultural Resources Model, or FARM) to make projections of changes in land use and land cover using different scenarios of climate and social change. Computer-based modeling is a mainstream method for science-based projections of climate, socioeconomic conditions, energy use and greenhouse gas emissions, and so on. A large proportion of the article (12 of 24 pages) is spent

explaining the architecture of the model, its data sources (three tables and a map), and the modeled relationships.

The authors chose to model land use and land cover because these constitute an “integrating concept,” which brings together primary productivity, the principal source for human food and fiber, and competition among humans and other species for food. Thus, the scientists intend that an examination of land use and land cover will yield results worth knowing about how both human economy and ecology will respond to climate change. However, the results of the modeled scenarios are ambivalent – “whether the correlation with a particular economic variable [and forest depletion in Southeast Asia] is positive or negative depends on the global change scenario” (Darwin et al. 1996:180). The best they can do for a recommendation is to say that climate change (along with population growth and deregulation of agricultural trade) will likely have “adverse effects on the health and integrity of tropical forest ecosystems” but that improvements in models are needed before scientists can make definitive statements.

This argument contains several notable elements. First, the ethos is unmistakably scientific; typically the venue is a specialized and technical journal, there are multiple authors, all from a research organization in a government agency. Thus, they associate climate change with other scientific problems: it is open to empirical examination, mathematical manipulation, and hypothesis testing. They assert that “interactions between economic and ecological phenomena are complex” (Darwin et al. 1996:180) but treat these interactions as knowable, and more knowable as models of them are developed. Second, the authors analytically distinguish between

climate change and socioeconomic conditions. In their model, the two are dissociated, presumably so that the independent effect of climate change can be studied. The effect of this strategy, however, is that the alleged human causes of climate change disappear into the background. Thus, this framing of the issue as a scientific problem dissociated from social causes and uncertain social effects is quite different from the close association of climate change and social dimensions that is found in other arguments.

The argument is principally an argument from definition (climate change is a scientific problem), but cause and effect are explored by means of the FARM model. *If* climate changes like this and socioeconomic conditions change like that, *then* the impacts will be harmful (or benign). This very carefully hedged type of cause-and-effect argument is very typical of scientific studies of climate change – and the type of argument that leaves ample ambiguous space for political proposals. Darwin et al.’s argument is situated at the third stasis; they are inquiring into how climate change (as a cause) will affect land use and land cover (as results).

Table 5.5 First-Step Analysis of Darwin et al. Argument

#19: Darwin, Roy, Marinow Tsigas, Janm Lewandrowski and Anton Raneses 1996. Land use and cover in ecological economics. <i>Ecological Economics</i> 17, 157-181.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The authors were at the Economic Research Service, U.S. Dept of Agriculture				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Land use/cover is a “integrating concept”: (1) “the main resource governing primary productivity can be defined in terms of land” (157); (2) “land remains the				

primary source of the energy and mass that compose our food and fiber” (158); (3) “the most important interaction between humans and other biological communities is the competition for land.” (158)				
Secondary:				
Tertiary:				
Notes: “A basic premise of ecological economics is that the world economy is embedded in and dependent upon Earth’s ecosystem. This dependency is captured by the concept of ‘throughput’ (Boulding, 1966) or ‘entropic flow’ (Georgescu-Roegen, 1971) – the one-way flow of energy and mass through an economy that begins with resources and ends with waste.” (157)				
Type of evidence				
Primary: “We present a model that integrates economic-ecological activities with land use and cover.” (157) – the Future Agricultural Resources Model (FARM), developed at USDA “to evaluate impacts of global climate change on the world’s agricultural system” (158), which includes a GIS and a CGE economic model (description 159-171)				
Secondary:				
Tertiary:				
Notes: full-page flowchart of the model, 3 tables and a map re land class endowments				
Worldview/view of nature				
Primary: “interactions between economic and ecological phenomena are complex” (180) – “Whether the correlation with a particular economic variable [and forest depletion in Southeast Asia] is positive or negative depends on the global change scenario” (180)				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Results from our scenarios [of global climate change, population growth, and deregulation of agricultural trade] indicate that such changes are likely to have adverse effects on the health and integrity of tropical forest ecosystems.” (180)				
Secondary: “Improved throughput analyses require better tracking of resource stocks (soil, water, forests, fossil fuels, etc.) coupled with waste emission coefficients for various economic sectors. Methods for simulating inter- and intraregional labor migration, investment in human and physical capital, and technological change are needed to conduct dynamic analyses.” (180)				
Tertiary:				

Families #4-9: More Modernization Is the Cure

By far the largest number of arguments has in common the underlying assumption that climate change is a serious, possibly catastrophic problem that is at

least partially caused by humans and that humans can mitigate with the strategies of modernity: technological change, economic accounting, and rational negotiations. These rhetors have moved to the final stasis – the call to action – indicating agreement on all the previous stases, i.e., something has happened, that “something” is climate change, it is caused by human activities, and it is a serious problem. Considered as one family, this group is the largest, with 48 of 100 texts in this category. However, the group can be further disaggregated by the foci of their arguments. Families #4-9 share their underlying assumptions about the need for and efficacy of human managerial actions, but they differ in their arguments about where and in what ways the actions should be undertaken.

Agreement along all the stases should indicate a fairly high level of agreement overall, but this is not necessarily the case. I will analyze several examples of different approaches to and proposals for action. Among scientists the different approaches are recognizably disciplinary; that is, political scientists focus on the roles of international agreements and domestic policies, economists focus on the role of markets in preserving natural resources and preventing pollution, and engineers focus on the role of technological change. Among policymakers and environmentally concerned advocates, these lines become blurred; mixed solutions, involving a range of actions from lifestyle changes to renewable energy development to environmental cleanup, come as a palette of recommendations.

One group treats the political process as the essential element of action on climate change; this is **Family #4** (8 members). These rhetors advocate the development and implementation of effective treaties, conventions, protocols, and

other policy mechanisms. Many political analysts, such as Benedick, cite the Montreal Protocol, under which ozone-depleting substances were phased out and which has been widely regarded as a successful international agreement.

A good example of a more-modernization argument that focuses on political processes is a Worldwatch press release called “Global War on Global Warming Heats Up” (2002; see Table 5.6), a review of *Reading the Weathervane: Climate Policy from Rio to Johannesburg*.¹³ The document asserts that in the decade after the UNFCCC was adopted, “the scientific case for action continued to strengthen,” but most policies “have been too weak, only partially implemented, or discontinued” and “the existence of ‘perverse practices’ – including subsidies for fossil fuel production and consumption... has been a major impediment to climate policymaking.” Here the blame for the failure to reduce emissions is laid squarely on the failure of governments to make and implement effective policies – not, for example, on population growth or excessive consumption. The actions proposed are similarly political: bring the Kyoto Protocol into force, forget about “voluntary” commitments (they don’t work), and focus on reducing emissions in the transportation sector.

Worldwatch thus also makes one argument from definition: climate change is a political problem, solvable by political means. However, the press release also argues

¹³ “Rio” refers to the 1992 international conference at which the Framework Convention on Climate Change was adopted. “Johannesburg” refers to the 2002 international conference on sustainable development that prompted many “10 years after” analyses.

that the causes of climate change also can be found in governance, for example, “perverse practices” like subsidies that encourage continued fossil fuel use.

Table 5.6. First-Step Analysis of Worldwatch Argument

#97: Worldwatch Institute. 2002. Global War on Global Warming Heats Up. Press Release. http://www.worldwatch.org/press/news/2002/08/01				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Worldwatch Institute is a well-known environmentalist group that produces an annual <i>State of the World</i> report. In the press release, it describes itself as “a Washington, D.C.-based research organization.”				
Secondary:				
Tertiary:				
Notes: This is a review of <i>Reading the Weathervane: Climate Policy from Rio to Johannesburg</i> by Seth Dunn.				
Type of argument				
Primary: “The scientific case for action continued to strengthen” 1990-2001 but most policies “have been too weak, only partially implemented, or discontinued”; governments have “failed to develop ‘diversified portfolios’ of policies”; and “the existence of ‘perverse practices’—including subsidies for fossil fuel production and consumption ... has been a major impediment to climate policymaking.” Emissions have generally risen since 1990 (e.g., EU, Japan, US, Australia, Canada), except in Germany (-17.1%), the UK (-4.1%), and Russia (-30.5%).				
Secondary: India, China and Brazil are not “rogue emitters” but have been slowing emissions growth, China because of lower coal use and energy efficiency				
Tertiary: Lowering emissions will not be costly, as conventional model results indicate.				
Notes				
Type of evidence				
Primary: stats about emissions, energy intensity, etc.				
Secondary: history of the FCCC and international actions based on it				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans have an obligation to reduce GHG emissions.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				

Primary: Bring the Kyoto Protocol into force
Secondary: Leave the era of voluntary commitments behind
Tertiary: Deal with the transportation sector
Notes

Other rhetors – here gathered in **Family #5** (10 members) – focus on the reform of the energy system as the key to forestalling climate change. The technology-focused arguments can be gathered under the term “ecological modernization.” This is the idea that humans have the ingenuity to alter their own technologies so they will be environmentally harmless. For example, renewable forms of energy – solar, wind, geothermal, hydro – can be developed that will meet people’s needs without causing environmental damage. This argument is often coupled with arguments for sustainable development, defined as meeting the needs of people without harming the future environment (World Commission 1987).

A good example of a more-modernization argument that focuses on technological change in the energy system is the speech in which John Browne, the CEO of British Petroleum (BP) (or, as the corporation now styles itself, “Beyond Petroleum”), announced that his corporation had decided to take climate change seriously and initiate some planning and mitigation actions (Browne 1997; see Table 5.7). Industrial firms, especially in the energy industry, generally have been opponents of taking action to reduce greenhouse gas emissions, since they often see such actions as costly for them – developing new technologies, perhaps retiring capital stock before the end of its useful life, and perhaps bearing the costs of carbon taxes. But Browne and BP “broke ranks” with the rest of the energy industry. His argument associates BP and its employees with the rest of society: “The passing of some of the old divisions

reminds us we are all citizens of one world, and we must take shared responsibility for its future, and for its sustainable development.” Browne says that people who work at BP have these convictions, as do consumers. He uses the metaphor of a journey, with the need for partnerships and accommodations to the interests of all who are on the journey.

Browne then catalogues the actions BP has taken and intends to take. The multinational corporation has reduced oil discharges to the North Sea, invested \$100 million to eliminate volatile organic compounds, reduced flaring at its operations in Norway, become a partner in a project to conserve 1.5 million hectares of forests in Bolivia, and invested in solar power. He announces BP’s plan to have an in-house emissions trading system to reduce emissions and fund research. In the long term, BP will work toward sustainability, “simultaneously being profitable and responding to the reality and the concerns of the world in which you operate.” In other words, industry can change; modernization can combat climate change. Climate change is a technical problem that, like other problems we encounter along life’s journey, can be faced and solved. Stated thus, this definition of climate change as a problem is fairly close to the definition of climate change as a scientific problem. In both cases, the problem can be investigated and solutions can be found. (In his optimism Browne is like Ausubel, described in Family 2; unlike Ausubel, Browne is rolling up his sleeves and getting to work on a list of specific actions – and he doesn’t think climate change will be good for humanity.)

Table 5.7. First-Step Analysis of Browne Argument

#47: Browne, John 1997. Climate change speech. Given at Stanford University. Available at http://icc370.igc.org/bp.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Browne is the CEO of BP, perhaps the world’s largest petroleum company				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “The passing of some of the old divisions reminds us we are all citizens of one world, and we must take shared responsibility for its future, and for its sustainable development.” – people who work at BP have these convictions, so do consumers				
Secondary: “The time to consider the policy dimensions of climate change is not when the link between greenhouse gases and climate change is conclusively proven – but when the possibility cannot be discounted and is taken seriously by the society of which we are part. We in BP have reached that point.”				
Tertiary:				
Notes				
Type of evidence				
Primary: the science is uncertain, but scientists and others take the possibility seriously (i.e., we are all in this together) – metaphor of a journey, with partnerships and accommodations to the interests of all who are on the journey				
Secondary: factual evidence – CO2 like a small weight that overbalances, and only a small fraction comes from transport, and only a fraction of that from BP (~95 Mt)				
Tertiary: catalogue of actions that show BP is proactive: reduced oil discharges to the North Sea, investing \$100M to eliminate VOCs, reduced flaring in Norway; example of project in Bolivia to conserve 1.5 m ha of forests; example of investment in solar				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: First, do the low-hanging fruit: control own emissions, fund research, initiatives for JI, develop alternative fuels, contribute to public policy debate				
Secondary: strive toward sustainability, “simultaneously being profitable and responding to the reality and the concerns of the world in which you operate.”				
Tertiary:				
Notes				

Broadening from concerns about the energy system to consider all forms of mitigation (reductions of greenhouse gas emissions and development of carbon sinks) are the arguments that constitute **Family #6** (10 members). Climate mitigation arguments posit emissions reductions as the way to “solve” the climate “problem,” whether those reductions come from reforming the energy system, changing industrial processes such as aluminum smelting and cement manufacture, controlling methane emissions from agricultural operations and landfills, creating carbon sinks through forest growth and management, or other proposed controls.

However, the rhetors in **Family #7** (4 members) argue that countries, businesses, and individuals must plan adaptation strategies for changes in the climate that are underway and “in the pipeline” from current and projected emissions. For example, if a likely impact of climate change is a different precipitation pattern, then farmers and policymakers ought to be planning for alternative crops, varieties, and management strategies. Between its Second Assessment in 1996 and the Third Assessment in 2001, the Intergovernmental Panel on Climate Change expanded the focus of its impacts working group to include adaptation, vulnerability, and sustainable development (see Document #48, Summary for Policymakers, 2001).

Family #8 (5 members) comprises economists and others who argue that there are economically viable and efficient ways to reduce emissions and take other actions to address climate change. Ecological economists may hold this view and couple it with arguments promoting the concept of sustainable development. It was a mistake to treat natural resources as “free” goods, as is done in classical economics, they say; but

once we can figure out good ways to price water, parkland, biodiversity, and other natural goods, the market will (help) take care of the environment.

A good example of a more-modernization argument from an economic perspective is a report by Jae Edmonds and Michael J. Scott (1999), *International Emissions Trading and Global Climate Change* (see Table 5.8). This report was commissioned and issued by the Pew Center on Global Climate Change, which aims to provide scientifically based information about climate change to an informed but “lay” audience. Edmonds and Scott examine the question of how costly it would be to reduce emissions enough to stabilize the climate. They take a century-scale view, reasoning that the total amount of greenhouse gases emitted matters, but *when* they are emitted matters less. Therefore, gases may be emitted later in the century, when it is cheaper to do so. Similarly, reductions should be taken *where* it is least expensive to do so (usually in countries with little capital stock that might become useless). Therefore, emissions trading (i.e., allowing some countries to “buy” emissions reductions elsewhere instead of reducing domestic emissions) should reduce the cost of a climate mitigation program (although Edmonds and Scott point out that actual savings depend on the design of the program). Thus, their recommendations are to allow emissions trading in any scheme to reduce emissions worldwide and to ensure that the program is designed to maximize savings.

This argument defines climate change narrowly as a problem of cost calculation. It is an argument that assumes that its readers agree that climate change is a problem and a human-caused problem. It therefore focuses on determining a least-cost pathway to mitigation. And, although this is strictly an economic analysis, many

of the climate change arguments take as at least their ostensible subject whether or not it is too costly for the world to deal with a problem that is so uncertain and so far off. This report's contribution to that sub-debate is to show both that costs can be reduced and that the overall cost of mitigation is very small relative to the likely economic product of the world over the twenty-first century.

Table 5.8. First-Step Analysis of Edmonds and Scott Argument

#15: Edmonds, Jae and Michael J. Scott et al. 1999. <i>International Emissions Trading and Global Climate Change</i> . Pew Center on Global Climate Change, Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Jae Edmonds was one of the first modelers of emissions and energy related to global climate change and an early integrated assessment modeler.				
Secondary: The Pew Center is an advocacy group but strives for balance in its reports.				
Tertiary:				
Notes				
Type of argument				
Primary: Because emissions mitigation addresses a century-scale problem, costs must be low if action is to be undertaken (i.e., there is no immediate benefit resulting from costs).				
Secondary: Theory favors trading to lower costs, but actual costs depend on the design of the program.				
Tertiary:				
Notes				
Type of evidence				
Primary: discussion of the principles of trade				
Secondary: model results showing benefits of emissions trading relative to no trading				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans and human activities are the focus; nature is secondary				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				

Primary: Allow emissions trading in any scheme to reduce emissions.
Secondary: “Programs must be carefully designed to assure that the potential gains from trade are realized.” (iv) Actual costs likely to be lower because “models do not include the various measurement, verification, trading, and enforcement costs that would characterize any real trading system.” (iv)
Tertiary:
Notes

In **Family #9** (10 members) are rhetors who call for broad-based actions, both mitigation and adaptation. These rhetors make little or no distinction among mitigation and adaptation activities but only seek to propose doable actions that often provide “co-benefits” in, for example, smog reduction, traffic congestion, and water availability. The California National Assessment Report (2002), for instance, proposes an emphasis on “multiple benefits” and “no regrets” strategies, such as energy efficiency, waste reduction, better cost signals to consumers about the use of resources, floodplain management, public education, limits on the footprint of development, management of stormwater runoff to let water percolate into the soil, careful coastal land use planning, and so on.

Theoretically, it is too facile to simply fuse Families #4-9 into a single family of arguments that share the conviction that thoroughly modern people can fix their thoroughly modern problems. Hence, I have grouped the families that share this conviction but separated them into families, recognizing their real, sometimes vehement, disagreements with each other. For example, the Worldwatch assertion that voluntary commitments do not work is a realization that most corporations will not undertake emissions-reducing activities unless required to do so (in contrast to Browne’s argument about BP). Edmonds and Scott also recognize that there is no cost incentive for corporations or governments to address climate change. However,

Browne, using inclusive pronouns, asserts that corporations, after all, are made up of people; and that these people-run corporations will realize that it is in their own interests to undertake emissions-reducing activities.

This brief description of some of the arguments made at the last stasis – the call to action – shows that the common agreement among rhetors that *something* can be done may be undermined or even negated by disagreements about *what* should be done.

Family #10: Inequality Is the Problem

Another family of arguments constructs climate change as one in a long list of manifestations of the inequality of countries and people – the rich and powerful versus the poor and powerless. Over the course of centuries, a world system of nations has evolved that has preserved and increased inequality through various types of colonialization. In Immanuel Wallerstein's (1974, 1983) terms, the core countries retain power over countries on the periphery through terms of trade, control of technology, and so on. Within the climate change debate, this is typically thought of as the argument of the so-called South or the developing countries. Of the 100 texts, 17 are members of this family. However, the authorship of the documents is split about equally between Southern and Northern authors. These arguments move back to the middle stases, being concerned with the root cause of climate change (third stasis) and the meaning or value of the issue (fourth stasis).

An example of this argument is a text from the Indian Centre for Science and the Environment (see Table 5.9). The authors, Agarwal and Narain (1996), argue that

rich countries are attempting to associate the political processes surrounding global warming with other political processes. Global warming, they say, is just one more issue on the agenda of rich countries who wish to preserve the present inequality. A pattern has been set up: an issue of supposedly common concern arises, and rich countries, whose colonialism/imperialism has caused the problem, impose the “solution” on poor nations, at the cost of the latter. Ahmed and Ahmed (2000:95) put this point more strongly: “With the assault on the nature perpetrated largely by the now developed countries while increasing their wealth, and more recently by the developing countries seeking to improve their economic conditions, the climatic balance has been seriously destabilized.”

In this case, proposals espoused by rich countries, under the Framework Convention on Climate Change, provide for emissions to be reduced based on a fraction of annual emissions. That is, the present status quo, the current levels of emissions, would be accepted as the starting basis for any mitigation action. Agarwal and Narain, speaking from the perspective of a developing country, argue that the two – the present unequal status of countries and global warming – should be dissociated, and that global warming instead should be treated as a pollution problem (i.e., associated with other pollution regimes, rather than with the unequal world-system); the principal polluters would then be responsible for reducing pollution and paying for the damage. In this case, total emissions from the start of the Industrial Revolution would be considered and counted against the principal emitters; the starting point for any future mitigation would be emissions per capita (i.e., industrialized countries would be responsible for much greater mitigation than non-industrialized countries).

Table 5.9. First-Step Analysis of Agarwal and Narain Argument

<p>#1: Agarwal, Anil and Sunita Narain 1996. The atmospheric rights of all people on Earth: Why is it necessary to move towards the ‘ultimate objective’ of the Framework Convention on Climate Change? Centre for Science and the Environment, http://www.cseindia.org/html/cmp/cmp31.htm</p>				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
<p>Primary: Agarwal and Narain are known for definitive statements of the developing country perspective on climate change (cf. <i>Global Warming in an Unequal World</i>)</p>				
<p>Secondary: the authority of CSE as a voice in the climate change issue, beginning before FCCC and continuing by NGO participation in further COPs</p>				
<p>Tertiary:</p>				
<p>Notes</p>				
<p>Type of argument</p>				
<p>Primary: The world is unequal; rich countries have caused global warming (“historical emissions”) and should pay the true costs of their consumption (“polluter pays”) and should set up time-bound targets for greenhouse gas emissions reduction.</p>				
<p>Secondary:</p>				
<p>Tertiary:</p>				
<p>Notes</p>				
<p>Type of evidence</p>				
<p>Primary: historical recounting of events in negotiations; first, ozone, which “remains a weak treaty, then WRI vs. “Global Warming in an unequal world”” CSE’s role in climate issues</p>				
<p>Secondary: facts about total emissions vs. per capita emissions</p>				
<p>Tertiary:</p>				
<p>Notes: what the developed countries say, but what we say</p>				
Worldview/view of nature				
<p>Primary: Economic orientation: atmosphere a global public good; rich countries who damage it should pay for the damage.</p>				
<p>Secondary: World system is unequal; environmental agreements perpetuate inequality.</p>				
<p>Tertiary:</p>				
<p>Notes:</p>				
Action(s) proposed				
<p>Primary: “rights-based approach in regulating climate change; treating the atmosphere as a limited common resource to be managed under an equity regime based on per capita entitlements (freezing the per capita entitlements on the basis of a population distribution index for a chosen year)”</p>				
<p>Secondary: “Surplus entitlements with less polluting countries can give way to an international emission trading regime. An international tax can be levied on countries</p>				

exceeding the limits imposed by their permissible entitlement allocation” (using the polluter pays principle).
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Tertiary:

Notes

The demographer Anthony J. McMichael’s (1993:7) argument rests on his identification of “the one underlying problem [which] is the entrenched inequality between rich and poor countries,” manifested in “(1) rapid, poverty-related, population growth and land degradation in poor countries, and (2) excessive consumption of energy and materials, with high production of wastes, in rich countries.” His proposed solutions differ, however, from those of Agarwal and Narain in being broader in scope – control population growth, reduce the use of fossil-fuel-based energy, and redistribute wealth to poor countries.

Agarwal and Narain’s argument is from definition: climate change *is not* an unequal-business-as-usual case, where the North can call the shots; climate change *is* a pollution problem, and the industrialized countries of the North are the polluters. However, a cause-and-effect claim plays a large part in the overall argument; industrialized countries are the cause of climate change and thus should pay necessary mitigation and adaptation costs. McMichael’s argument stresses the causal argument, laying the blame for climate change at the door of industrialized countries.

Family #11: Rift with Nature

Another family of arguments focuses attention on climate change as just one symptom of people’s disturbed and dysfunctional relationship with the rest of nature.

Other symptoms include various types of pollution, overfishing and overhunting, loss of various kinds of natural systems and habits, and many technological “advances,” such as genetically modified organisms. A retreat from industrialization is in order. We must “live lightly on the land,” “respect Mother Earth,” and so on. We must consider ourselves just one species on the earth and respect the (equal) rights of other animals and plants to live and thrive. We should direct our efforts toward preserving the natural state of things. Often, these arguments are made for a broad range of environmental problems; climate change may or may not be on the list. I classified 15 of the 100 documents analyzed in this study in this family. Again, these are arguments at the third and fourth stases (root causal analysis and value/meaning of the issue), which lead to calls for action quite different from those of the “more modernization” family.

An example of this argument is Donella Meadows’ (1997) depiction of Gaia’s reaction to the negotiations leading to the Kyoto Protocol (see Table 5.10). Gaia is the Earth as a whole organism that keeps life in balance (Lovelock, 1988). Meadows, an adjunct professor of environmental studies at Dartmouth College, argues that people have got it all wrong but may have a chance to fix it. She associates the natural harmony in Nature with the ethical life; she associates a human preoccupation with power and money with wrong-headedness that could spell catastrophe for them.

Speaking as Gaia, she says, “I may have made a mistake when I evolved that two-legged, large-brained life-form. ... Deciding the composition of the atmosphere by counting up money ‘costs’ makes as much sense as deciding whether a plane will fly by the position of a football on a field. Wrong measure. Wrong field. Wrong

game.” At the end of the monologue, she says, “Maybe that won’t be necessary, though. ... The big-brains do have the capacity to see beyond power and money, see into the future, understand the fundamentals of my laws, distinguish between symbols and reality. Some of them know how many kinds of energy they can harness that don’t put carbon back into the atmosphere. ... But they’d better hurry. ... I hope they do. I’m really quite fond of them.”

The argument makes a strong claim about what the appropriate role is for people as part of Nature and about the consequence (effect) of not using their big brains to see beyond power and money (cause).

Table 5.10. First-Step Analysis of Meadows Argument

#8: Meadows, Donella H. 1997. “Mother Gaia reflects on the global climate conference.” http://csf.colorado.edu/forums/ecofem/dec97/0009.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Meadows “is an adjunct professor of environmental studies at Dartmouth College.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “I may have made a mistake when I evolved that two-legged, large-brained life-form. ... Deciding the composition of the atmosphere by counting up money ‘costs’ makes as much sense as deciding whether a plane will fly by the position of a football on a field. Wrong measure. Wrong field. Wrong game.”				
Secondary:				
Tertiary:				
Notes:				
Type of evidence				
Primary: An imaginative monologue by Gaia				
Secondary:				
Tertiary:				
Notes				

Worldview/view of nature				
Primary: Nature is much larger and still in charge. Humans are arrogant if they think they can try to control climate and survive.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “If they don’t figure that out, I’m going to have to take a few million years and try to evolve a higher form of intelligence.”				
Secondary: “Maybe that won’t be necessary, though. ... The big-brains do have the capacity to see beyond power and money, see into the future, understand the fundamentals of my laws, distinguish between symbols and reality. Some of them know how many kinds of energy they can harness that don’t put carbon back into the atmosphere. ...But they’d better hurry. ... I hope they do. I’m really quite fond of them.”				
Tertiary:				
Notes				

Also in this family are “deep green” and ecofeminist arguments, often made in more general terms than climate change, but explicitly including it as an example of a seriously mis-conceived relationship with nature.

Family Ties?

Each of these families of arguments has its own story to tell about climate change. Are there indications in the arguments themselves that the gaps between families can be bridged? Or has each tribe staked out a position from which there can be little communication, trade, or marriage? We can make a preliminary examination of commonalities among the families here, with a more in-depth study to come in the next chapter.

First, all the families – representing most of the national governments of the world, thousands of scientists, environmental organizations at every level, and

countless others – take the question of climate change seriously, and none rules the prospect completely out.

Second, all agree that vast uncertainties exist. Some claim that uncertainty is a reason to wait and see, others that uncertainty is a reason to act as quickly as possible.

Third, all agree that climate change is not a problem *sui generis*. Socioeconomic factors are involved in the industrialization that may be causing climate change, in the feasibility of reducing emissions of greenhouse gases, and in the potential for adaptation to climate change. Development (or lack thereof) is an issue; the credibility of science, especially scientific models, is another. Even the argument that climate change is not a problem of *climate* locates a problem in political issues.

Fourth, they all argue from definition, although some arguments also include cause-and-effect arguments.

These elements provide only a tenuous basis for coming to agreement. The voices in the debate agree that climate change is an issue worth serious discussion and that the definitions and the context matter in that discussion. When we look at most, instead of all, rhetors, we see more bases (not surprisingly). Although some have hard-and-fast positions, most rhetors show their awareness of other arguments besides their own and the need to deal with, even accommodate those arguments. In more than half of the documents, the rhetors specifically refer to international processes (primarily the Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change) and clearly consider these processes as having some authority – that is, the debate can be mediated by formal, organizational coordination and negotiation within the framework of international agreements. Most accept and use scientific

evidence. The debate thus continues with an expectation (or at least a hope) of coming to agreement through the process of argumentation.

CHAPTER 6: SOCIAL NETWORK TIES AMONG RHETORS IN THE CLIMATE CHANGE DEBATE

Sorting the arguments about climate change into “families” helps to map the debate space and to identify some basic areas of agreement. However, a further analysis is needed to point to specific elements of specific arguments that rhetors share – both within and across family boundaries.

The rhetorical arguments made about climate change can be analyzed using social network analysis to examine the ties formed among rhetors through common elements in their arguments. Such ties can exist because rhetors have the same claims to authority (professional position or organizational affiliation), because they use the same kind of evidence, because they have similar worldviews, or because they advocate similar actions. An analysis using Ucinet software indicates that the ties linking rhetors most closely with their families are those of worldview; that is, families and worldviews are strongly correlated. However, the diversity of other rhetorical dimensions among those holding the same worldview indicates that many weaker ties may provide multiple bases to find common ground upon which to build agreements on actions to be taken in response to the prospect of climate change.

Social Network Analysis Applied to Potential Bases for Agreement

This study assumes that, if there are bases for agreement about the existence of, sources of, and ways to address climate change, these bases will exist in the arguments made about climate change. One way of thinking about this is to picture a

spectrum running from complete disagreement to complete agreement. At one end, rhetors have completely different and mutually unaccepted authorities, evidence, worldviews, and policy proposals. At the other end of the spectrum, rhetors have identical or at least mutually acceptable authorities, evidence, worldviews, and policy proposals. All debates, including the climate change debate, exist somewhere between these two extremes, or they would not be debates. However, the complexities and uncertainties within the debate make it difficult to sort out what rhetors have in common or what they might find acceptable in other texts.

Separating and characterizing the elements of arguments helps in this sorting out process and may reveal patterns that indicate how agreements might be built within and across “families of arguments,” as discussed in Chapter 5.

At the end of the first step of my empirical analysis of 100 documents, each document had been analyzed and sorted into a family. In this third step of the analysis, I developed stable categories and a coding scheme for each value of each dimension. These categories, listed in Table 6.1 below, comprise the argument “family” the document belongs to, the personal authority of the rhetor and the type of organization associated with the rhetor in the document (used together to characterize the authority of the rhetor), the type of evidence presented, the worldview expressed, and proposed actions. I also assigned an identifying number and recorded the year the document was issued.

Table 6.1. Argument Elements that May Form Social Ties among Rhetors

Name of Variable	Value	Code
Document #		1-100
Argument Family		
	Climate change is not a problem	FAM01
	Climate change could be good for people	FAM02
	Science can solve the problem of climate change	FAM03
	Modernization – policy is the key	FAM04
	Modernization – reform the energy system	FAM05
	Modernization – focus on mitigation	FAM06
	Modernization – focus on adaptation	FAM07
	Modernization – economics can find efficient solutions	FAM08
	Modernization – mitigation and adaptation are both important	FAM09
	Reduce inequality in order to deal with climate change	FAM10
	Worldviews must alter to “back to nature” or accord nature rights	FAM11
Authority of Rhetor		
	Scientist	AUSCI
	Policymaker/government official	AUSPOL
	Representative of a nongovernmental organization (NGO)	AUENV
	Representative of a Trade Association/Business	AUTRA
	Academic	AUACA
Organization type		
	Research	ORRES
	Government	ORGOV
	NGO	ORNGO
	Trade Association	ORIND
	Business	ORBSS
	University	ORUNI
	Church	ORCHU
Type of evidence		
	Historical	EVHIS
	Scientific/literature citations and discussion	EVSCT

	Rights-based	EVRIT
	Utilitarian/economic	EVUTI
	Case studies	EVCAS
	Anecdotes/personal testimony	EVANE
	Data-based/models	EVDAT
	Theory	EVTHE
	Experts' opinions	EVEXP
	Political analysis	EVPAN
	Metaphor	EVMET
	Pictures	EVPIX
Worldview/view of nature		
	Economic	WVECN
	Moral/inequality	WVMOR
	Ecocentric	WVECO
	Ecomodernism	WVMOD
	Political	WVPLY
	Nature fragile/ unknowable/finite carrying capacity	WVNAT
	Social construction	WVSCO
	Nature robust	WVROB
	Religious/stewardship ethic	WVREL
Proposed actions		
	Reduce emissions/ fossil fuel use	ACEMI
	Polluter pays	ACPAY
	Contraction and convergence	ACCNC
	ICs first/DCs develop	ACDIF
	Better technology	ACTEC
	Implement Kyoto	ACKYO
	Emissions trading	ACETR
	Integrate cc with other policy	ACINT
	Prepare to adapt	ACADA
	Develop sinks	ACSNK
	Back to nature/ simple lifestyle	ACBAC
	Control pop growth	ACPOP
	Work toward equality	ACEQU
	Build sustainability	ACSUS
	Restore humans-nature balance	ACRST
	Assist most-affected people	ACAFF
	Educate	ACEDU
	Monitor impacts	AC,PM
	Work backward from scenarios	ACSCE
	Fund mitigation/ adaptation projects	ACFND

	“no regrets”	ACNRG
	Do more research	ACRCH
	Use history to understand	ACHST
	Do nothing	ACZER
	Revise government incentives	ACINC
	Improve models	ACMDL
	Engage industry	ACEGA
	Act-learn-act	ACALA
	Cap per capita emissions	ACPCE
	Grow economies	ACGRO
	Continue international negotiations	ACNEG
Year	1991-2003	Y1991- Y2003

Authority of the Rhetor and Organization Type

The credentials and standing of the rhetor and his or her organization are likely to influence the audience’s reception of the argument. As it is impossible to make an objective judgment about how respected a rhetor is, I have chosen to characterize the rhetors of the 100 documents by their professional positions: scientist, policymaker/ government official, member of an NGO (typically an organization in the environmental social movement), representative of a trade association, leader of a business, or faculty member at a college or university. Almost the same categories apply to the organization type, with the addition of “church” as a type of organization. (None of the rhetors was identified as a church professional.)

Audiences expect that the authority of the rhetor and organization will vary according to type. People normally credit scientists with understanding the technical bases for belief that anthropogenic activities are affecting the global climate; scientists also share professional backgrounds and the use of defined (i.e., scientific) methods. Policymakers and government officials have certain responsibilities for ensuring the

well-being of citizens. NGO members typically are actively working against the status quo on behalf of the environment and/or people who are the victims of its degradation. Trade organization and business people are seen as against anything that will reduce profits, such as installing extra equipment to prevent emissions of carbon dioxide. Universities and their faculty members are supposed to have a more disinterested view of things, on the one hand; but, on the other hand, they can be seen as impractical in their conclusions and proposals for action. Church officials may have built-in biases towards a stewardship ethic and against consumerist lifestyles; audiences may discount what they say by citing these biases.

Moreover, the type of rhetor and type of organization provide a way of linking rhetors in a sub-network, for example, on the basis of their scientific backgrounds or environmental advocacy or industry affiliation. Authority characteristics are thus proxies for social network ties.

Type of Evidence

Rhetors use at least 12 types of evidence, listed in no particular order in Table 6.1: historical evidence, scientific literature (as citations/references), rights-based arguments, utilitarianism or economic evidence, case studies, anecdotes/personal stories, data and computerized models, theory, expert testimony, political analysis, metaphor, and pictures. For each document, I distinguished up to three types of evidence, basing the categorizations on my judgment of what “carries” the argument. Many types of scientific writing are metaphorical, for example, but, if the rhetor

obviously intends the data to authorize his or her argument, the document evidence was categorized as “data and computerized models.”

Historical arguments are generally of two types. The rhetor may explain the history of views of nature and shifts in how nature is perceived, as Cronon (1995) does. Or the document may contain a history of the political response to climate change, perhaps beginning with the debates leading to the 1992 Rio Summit and the Framework Convention on Climate Change, then retailing the subsequent Conferences of the Parties and the politics of these negotiations.

If a rhetor uses scientific literature-based evidence, the attempt is, as Latour (1987) says, to gather the authorities that exist to attest to the truth of what is being said. In its simplest form, this can be statements that begin, “Scientists agree that...” Its more complex forms use technical citation methods to array studies that provide backing for the current argument, as when a scientific article’s first sentence contains dozens of citations. This latter use of scientific evidence places the current rhetor in the company of supposedly learned people, to be considered one of the company.

Rights-based and utilitarian/economic arguments are often seen as opposed. The former type insists on every individual’s rights to, among other things, clean air and stable climate. Rights-based arguments are often opposed on principle to averaging and the perpetuation of inequality; thus, rhetors from the global “South” often use rights-based arguments. Utilitarian arguments attempt to provide the most clean air and stable climate to most people – to maximize the greatest good to the greatest number – while recognizing that there will be winners and losers (and that winners will need to compensate losers). Averages, normal curves, and the use of

existing unequal institutions are the stock-in-trade of economist utilitarians, who are often identified with rhetors from the global “North.”

Case studies are commonly used in rights-based arguments, but can be used in other arguments as well. Cases are typically analyzed at a country or sub-national level – for example, a case study of how six developing countries have slowed the growth of emissions in their countries. Case studies differ from personal or anecdotal evidence in that the former is more rigorously and self-consciously scientific, where the latter is manifestly a retelling of one person’s experience; case studies can be used to develop theory that may be applied to other cases; anecdotes try to capture a “truth” about climate change or to persuade an audience who will be moved to sympathize with the plight, for example, of a Bangladeshi who must choose to save only one of two children in a flood.

Data and computerized models are more likely to be used in utilitarian or cost-benefit arguments. They provide sources of evidence about rising concentrations of greenhouse gases and their effects on climate. So it is not surprising to find elaborate data tables and models used extensively in arguments about climate change, with regard not only to the physics and chemistry of climate change but also to emissions-producing human activities and international negotiations about the issue.

Sometimes an argument is pure theory – about relationships between humans and nonhuman nature, about modernization and its effects, about globalization and climate change, about ecofeminist attitudes toward environmental damage, and so on. Social theorists, although typically making much broader arguments, may include

climate change as an example of a global problem that demonstrates the theoretical argument.

Rhetors may call upon experts to give testimony about climate change, as experts do about other issues. A few arguments consist largely of a string of quotations, direct and indirect, from people in positions of authority.

Political analysis can be the principal evidence for an argument, as when neo-institutionalists argue that climate change is a unique problem for policymakers, necessitating different institutions than the ones the world has.

Explicitly metaphorical arguments can speak directly to certain audiences. One example in this set of documents is the use of the Gaia metaphor (Gaia being the principle of self-regulation in the Earth system; see Lovelock 1988). One document pictures Gaia as a woman talking about where humans have gone wrong and what they might be able to do to avoid extinction.

Only one document in this set primarily uses pictures to make an argument about how climate is changing around the globe. However, other documents include pictures to “bring home” their messages of ecological damage, for example, from sea level rise.

Worldview

A rhetor’s worldview, especially related to the relationship between humans and non-human nature, may constitute the main argument, or it may remain largely implicit in the argument. Jaeger et al. (1993) found that the worldview, or cultural type, of a person was a better predictor of the person’s views on environmental issues

than the demographic characteristics often linked to environmental views. Thompson and Rayner (1998) link the cultural types defined by Mary Douglas (1982) to views of nature.

This set of documents exhibits nine worldviews: (1) economic, the view that nature is a storehouse of scarce resources that must be accounted for; (2) moral, the view that people have (but do not enjoy) equal rights to use natural resources; (3) ecocentric, the view that plants, animals, and indeed geographical features have the same rights to exist and be healthy that humans have; (4) ecomodern, the view that people can improve their efficient uses of natural resources; (5) political, the view that changes in nature are the direct result of political actions, and that therefore politics should be the primary focus on environmentalist efforts; (6) cautious, respectful, or alarmist because nature is fragile, unknowable, or of an unknown finite “carrying capacity”; (7) constructivist, the view that social ideas of nature determine our treatment of and response to nature; (8) confident that nature is robust and will survive anything that humans can do to it; and (9) religious, the view that people have been designated as “stewards” of natural resources and thus should use them cautiously and with care for their health.

Proposed Actions

Within this set of documents are 31 proposed actions, sometimes espoused singly, sometimes in combination with others. They are listed in a very abbreviated form in the Table 6.1; below they are listed in a more comprehensible fashion.

1. All countries (and other entities) should reduce emissions of greenhouse gases, particularly from fossil fuel use, but also from activities involving methane, nitrous oxide, and other greenhouse gases.
2. Those who have polluted the atmosphere with greenhouse gases should pay for remediation, by compensating those who will be negatively affected by climate change, investing in ways to reduce emissions, or both.
3. “Contraction and convergence” is the term used to describe a strategy of focusing on reducing global emission permits while establishing a universally applied individual emissions allowance, and working to have industrialized and non-industrialized countries converge on that allowance.
4. Industrialized countries should reduce emissions immediately, but non-industrialized countries should be allowed to develop economically first.
5. Zero- or low-emitting technologies should be developed, especially in the areas of power generation.
6. The Kyoto Protocol should be implemented.
7. An emissions trading system should be implemented, to reduce the cost of mitigation.
8. Climate change policies should be integrated with other policies, e.g., in improving human well-being.
9. Countries and individuals should prepare to adapt to climate change.
10. “Carbon sinks” should be developed to capture and store carbon rather than releasing it to the atmosphere.
11. People should return to a simpler lifestyle in order not to affect the climate.

12. Controlling population growth will control climate change.
13. Equality among nations will allow us to deal with climate change.
14. We should build sustainable systems (i.e., join climate change and sustainability issues).
15. The balance between humans and nature should be restored.
16. The most-affected people should be assisted.
17. People should be educated about the causes and impacts of climate change.
18. The impacts of climate change should be monitored.
19. We should create desirable scenarios of the future and work towards them.
20. Both mitigation and adaptation projects should be supported/funded.
21. We should focus on “no regrets” activities, i.e., those that would be good-to-do even if climate does not change.
22. Scientists should do more research to understand the causes and impacts of climate change.
23. We can understand the prospects of climate change by examining how climate has changed in the past and societal responses to the changes.
24. We should do nothing – climate change is not a problem.
25. Government incentives should be revised to reward, e.g., actions to improve energy efficiency.
26. Scientists should improve their models of climate change, impacts, etc.
27. Industry should be engaged in the effort to reduce emissions.
28. Because much is uncertain, we should use an act-learn-act approach.
29. We should cap per-capita emissions.

30. We should grow the world's economies; rich economies can mitigate or adapt to climate change, as well as other types of change.

31. The international negotiations should continue.

Results of the Categorization

The analysis produced a database that often includes several values for each element; no predetermined limit was set. For example, if a document has two authors, one may be a university scientist, one a government policymaker. At different points in a document, different types of evidence may be used (up to four types), different worldviews may be expressed (up to three), and multiple proposals may be made (up to five) at as many as four levels. On the other hand, some values were missing. A document retrieved from a website, for example, may not give an author's bona fides or the organization that supports him or her. If I use the maximum number of types in each dimension, there are 16 possible ties for each document/rhetor. However, the range of actual values for any document is 4-11. The values for each document are given in Table 6.2, which is sorted by argument family.

Table 6.2. Arguments Sorted by Family with Coded Rhetorical Features

DocNum	DocName	FAM	AU	OR	EV	WV	AC1	AC2	AC3	AC4	AC5	Y
DC022	CALDER	FAM01	AUACA	ORUNI	EVSCT	WVROB	ACZER	0	0	0	0	Y1998
DC030	SINGER	FAM01	AUSCI	ORUNI	EVDAT	WVROB	ACZER	ACMDL	0	0	0	Y2000
DC046	LINDZE	FAM01	AUSCI	ORUNI	EVSCT	WVPLY	ACTEC	ACRCH	ACZER	0	0	Y2003
					EVANE							
DC003	AUSUBE	FAM02	AUACA	ORUNI	EVDAT	WVMOD	ACTEC	ACFND	0	0	0	Y2001
DC023	IDSOCD	FAM02	0	ORNGO	EVSCT	WVROB	ACZER	0	0	0	0	Y2002
DC034	APIPOS	FAM02	AUTRA	ORIND	EVDAT	WVECN	ACTEC	ACRCH	ACINC	0	0	Y1997
					EVSCT							
DC059	CASTEC	FAM02	AUSCI	ORNGO	EVCAS	WVMOD	ACADA	ACSUS	ACRCH	0	1	Y1992
DC073	USDOST	FAM02	0	ORGOV	EVDAT	WVROB	ACTEC	ACSUS	ACRCH	0	1	Y2003
DC074	COONCH	FAM02	AUACA	ORNGO	EVPAN	WVECN	ACTEC	ACRCH	0	0	0	Y2002
DC081	GLOBAL	FAM02	AUTRA	ORIND	EVDAT	WVECN	ACTEC	ACZER	0	0	0	Y1997
					EVANE							
DC087	WHATAB	FAM02	0	ORNGO	EVDAT	WVROB	ACZER	0	0	0	0	0
DC009	MARTEN	FAM03	AUSCI	ORRES	EVDAT	WVECO	ACSUS	ACRCH	0	0	1	Y1994
DC019	DARWIN	FAM03	AUSCI	ORGOV	EVDAT	WVECO	ACMON	ACMDL	0	0	0	Y1996
DC038	COHENS	FAM03	AUSCI	ORGOV	EVSCT	WVMOD	ACEDU	ACMON	ACNRG	0	0	Y1993
					WVMOD							
DC039	ECIMOV	FAM03	AUSCI	ORUNI	EVDAT	WVNAT	ACSUS	ACNEG	0	0	1	Y2002
DC041	VANASS	FAM03	AUSCI	ORRES	EVDAT	WVSCO	ACMDL	0	0	0	0	Y2002
DC053	PARKSN	FAM03	0	0	EVEXP	WVMOD	ACMON	ACRCH	0	0	0	Y2002
					EVCAS							
DC054	TAUBES	FAM03	0	ORRES	EVEXP	WVECO	ACRCH	0	0	0	0	Y1997
DC085	SLADEH	FAM03	AUPOL	ORGOV	EVHIS	WVPLY	ACINT	ACSUS	ACNRG	ACRCH	1	Y2000
DC086	ASHFOR	FAM03	AUSCI	ORNGO	EVDAT	WVECN	ACEDU	ACMON	ACRCH	0	0	Y2001
					EVANE	WVMOD						
DC002	BENEDI	FAM04	AUPOL	ORNGO	EVPAN	WVPLY	ACTEC	ACNEG	0	0	0	Y2001
					EVUTI							
DC005	GOULDE	FAM04	AUACA	ORUNI	EVDAT	WVMOD	ACALA	ACNEG	0	0	0	Y2002
					EVHIS							
DC013	EDWARD	FAM04	AUSCI	ORUNI	EVDAT	WVSCO	ACMDL	ACALA	0	0	0	Y1996
					WVPLY							
DC020	ATHANA	FAM04	AUENV	ORNGO	EVSCT	WVNAT	ACTEC	ACINT	0	0	0	Y2003
DC060	SANDAL	FAM04	AUSCI	ORNGO	EVSCT	WVPLY	ACKYO	0	0	0	0	Y2001

DC075	ROBINS	FAM04	AUTRA	ORUNI ORGOV	EV PAN EV EXP EV RIT	WVSCO WVPLY	ACKYO	0	0	0	0	Y2002
DC079	BLANCH	FAM04	0	ORNGO	EVDAT EV HIS	WVPLY	ACEMI	ACCNC	ACDIF	ACETR	0	Y2001
DC097	WORLDW	FAM04	AUENV	ORNGO	EVDAT	WV MOD	ACEMI	ACKYO	0	0	0	Y2002
DC010	USEAUS	FAM05	AUPOL AUTRA	ORGOV ORIND	EVDAT EV SCT	WV MOD	ACEDU	ACNRG	0	0	0	Y1999
DC024	HOFFER	FAM05	AUSCI	ORRES	EVDAT	WV MOD	ACTEC	ACRCH	ACNEG	0	0	Y2002
DC026	KAWASH	FAM05	AUSCI	ORGOV	EV PAN	WV ECO	ACNRG	0	0	0	0	Y2000
DC065	PORRIT	FAM05	AUENV AUSCI	ORNGO	EVDAT	WV MOD WV E CN	ACEMI	ACKYO	0	0	0	Y2003
DC068	WORLDE	FAM05	AUENV	ORNGO	EV PAN EV CAS	WVPLY	ACEMI	ACTEC	ACETR	ACEQU	ACSUS	Y1998
DC082	GEFUND	FAM05	0	ORGOV	EVDAT EVDAT	WV MOD	ACEMI	ACTEC	0	0	0	0
DC089	KIRBYA	FAM05	AUENV	ORRES	EVPIX	WV MOD	ACTEC	0	0	0	0	Y1999
DC095	GERMAN	FAM05	0	ORNGO	EV SCT EV SCT	WV NAT	ACEMI	ACTEC	ACSUS	ACFND	ACRCH	Y2003
DC096	DOEFEN	FAM05	0	ORGOV	EV PAN EVDAT	WV MOD	ACTEC	0	0	0	0	Y1999
DC100	AMORYL	FAM05	AUENV	ORNGO	EV THE	WV MOD	ACTEC	0	0	0	0	Y1999
DC007	MEYERS	FAM06	AUSCI	0	EVDAT EV SCT	WV NAT WV MOD	ACPOP	ACPCE	0	0	0	Y2002
DC040	SATHAY	FAM06	AUSCI	ORRES	EVDAT EV CAS EVDAT	WV NAT	ACNRG	0	0	0	0	Y1998
DC047	BROWNE	FAM06	AUTRA	ORIND	EV MET	WV MOD WV E CN WV MOD	ACEMI	ACSUS	ACNRG	ACRCH	1	Y1997
DC049	IPCTWO	FAM06	AUSCI	ORNGO	EVDAT	WVPLY	ACTEC	ACINT	ACSUS	ACRCH	1	Y2001
DC069	BURNET	FAM06	AUSCI AUSCI	ORNGO ORNGO	EV SCT	WV NAT	ACEDU	ACGRO	0	0	0	Y2002
DC083	JOHANS	FAM06	AUACA	ORUNI	EVDAT	WV NAT	ACEMI	0	0	0	0	Y1999
DC088	MINNES	FAM06	0	ORNGO	EV CAS	WV MOD	ACEMI	ACNRG	0	0	0	Y2002

					EVDAT								
					EVDAT								
DC091	CLEANW	FAM06	0	ORNGO	EVPAN	WVECO	ACEMI	ACRST	0	0	0	0	Y2003
DC093	SOCIET	FAM06	0	ORCHU	EVTHE	WVREL	ACEMI	ACTEC	0	0	0	0	Y1998
					EVSCT								
DC098	HANSEN	FAM06	AUSCI	ORRES	EVDAT	WVMOD	ACEMI	ACTEC	0	0	0	0	Y2000
						WVMOD							
DC014	ROSENZ	FAM07	AUSCI	ORGOV	EVDAT	WVNAT	ACADA	ACALA	0	0	0	0	Y1995
DC032	STAKHI	FAM07	AUSCI	ORGOV	EVSCT	WVMOD	ACTEC	ACINT	0	0	0	0	Y1998
					EVSCT								
DC048	IPCTHR	FAM07	AUSCI	ORNGO	EVDAT	WVMOD	ACADA	ACMON	ACRCH	ACMDL	0	0	Y2001
DC067	UKCLIM	FAM07	AUSCI	ORGOV	EVPAN	WVMOD	ACNRG	ACALA	0	0	0	0	Y2003
					EVUTI								
DC015	EDMOND	FAM08	AUSCI	ORNGO	EVDAT	WVECN	ACETR	0	0	1	0	0	Y1999
DC027	TOMANM	FAM08	AUSCI	0	EVUTI	WVECN	ACEMI	ACADA	ACNEG	0	0	0	Y2001
					EVDAT								
DC028	INOVES	FAM08	AUTRA	ORIND	EVPAN	WVMOD	ACETR	ACRCH	ACINC	1	0	0	Y2002
					EVANE								
DC051	LINDEN	FAM08	0	0	EVDAT	WVNAT	ACEGA	0	0	0	0	0	Y2003
DC062	SHACKE	FAM08	AUSCI	ORGOV	EVSCT	WVMOD	ACEQU	ACNRG	0	0	0	0	Y2003
			AUSCI	ORGOV	EVCAS								
DC017	RESPON	FAM09	AUACA	ORUNI	EVANE	WVMOD	ACADA	ACSUS	ACNRG	0	1	0	Y2002
DC029	PREPAR	FAM09	AUSCI	ORGOV	EVDAT	WVMOD	ACINT	ACEDU	ACINC	ACMDL	0	0	Y2000
				ORRES	EVSCT	WVECO							
DC043	KOTEEN	FAM09	AUENV	ORNGO	EVPIX	WVMOD	ACEMI	ACADA	0	0	0	0	Y2001
					EVSCT								
DC045	WWFCCP	FAM09	0	ORNGO	EVDAT	WVNAT	ACEMI	ACKYO	ACADA	ACEDU	ACEGA	0	Y2003
DC057	HAYESD	FAM09	AUENV	ORNGO	EVDAT	WVNAT	ACEMI	ACTEC	ACINC	0	0	0	Y2000
					EVHIS								
					EVSCT								
DC076	DESSAI	FAM09	AUENV	ORNGO	EVDAT	WVSCO	ACEMI	ACADA	ACEQU	0	0	0	Y2002
					EVSCT								
DC077	BRAASC	FAM09	0	ORNGO	EVDAT	WVNAT	ACEMI	ACBAC	ACSUS	0	1	0	Y2003
				ORUNI	EVPIX								
					EVDAT								
DC084	SHOVEE	FAM09	AUSCI	ORUNI	EVTHE	WVSCO	ACSCE	0	0	0	0	0	Y1996
DC090	CAMPAL	FAM09	0	ORNGO	EVSCT	WVMOD	ACEMI	0	0	0	0	0	Y1997

DC099	WISCON	FAM09	0	ORGOV	EVEXP EVSC EVANE	WVNAT	ACEMI	ACSNK	0	0	0	0
DC001	AGARWA	FAM10	AUENV	ORNGO	EVHIS EVRIT	WVEC WVMOR	ACPAY	ACPCE	0	0	0	Y1996
DC004	RAYNER	FAM10	AUSCI	ORRES	EVANE EVMET	WVSCO	ACINT	ACAFF	0	0	0	Y1998
DC006	JAMIES	FAM10	AUACA	ORUNI	EVHIS EVPAN	WVMOR	ACEQU	ACPCE	0	0	0	Y2001
DC011	AHMEDQ	FAM10	AUENV	ORNGO	WVECO EVDAT	WVNAT	ACINT	ACEQU	0	0	0	Y2000
DC016	GREENW	FAM10	AUENV	ORNGO	EVCAS WVMOD	WVMOD	ACAFF	0	0	0	0	Y2001
DC018	GLANTZ	FAM10	AUSCI	ORGOV	ORRES EVSCT	WVSCO	ACEDU	ACRCH	0	0	0	Y2001
DC021	RIBOTJ	FAM10	AUSCI	ORUNI	ORNGO EVRIT	EVCAS WVMOR	ACEQU	ACHST	0	0	0	Y1996
DC031	BOEHME	FAM10	AUSCI	0	EVPAN	WVPLY	ACNEG	0	0	0	0	Y1994
DC033	QUICKM	FAM10	0	ORCHU	EVRIT	WVMOR	ACBAC	ACEQU	ACPCE	ACCNC	0	Y2003
DC036	SOKONA	FAM10	AUSCI	ORNGO	WVMOR EVSCT	WVPLY	ACEMI	ACEQU	ACPCE	ACNEG	0	Y2002
DC037	GYAWAL	FAM10	AUSCI	ORGOV	EVDAT EVPAN	WVNAT	ACTEC	ACMON	ACRCH	0	0	Y1996
DC044	LAVINA	FAM10	AUENV	ORNGO	EVDAT EVPAN	WVNAT	ACADA	ACEQU	ACAFF	ACEDU	0	Y2002
DC061	CHANDL	FAM10	AUSCI	ORNGO	EVDAT EVEXP	WVEC WVPLY	ACEMI	ACMON	ACFND	0	0	Y1997
DC063	CHATTE	FAM10	AUACA	ORIND ORUNI	EVHIS EVSC EVPAN	WVNAT	ACINT	ACSUS	ACRST	0	1	Y1994
DC066	MCMICH	FAM10	AUSCI	ORNGO	EVDAT	WVNAT	ACEMI	ACPOP	ACEQU	0	0	Y1993
DC078	HUQSAL	FAM10	AUSCI	ORNGO	EVPAN	WVMOD	ACADA	ACNEG	0	0	0	Y2001
DC080	UNFAIR	FAM10	AUPOL	ORGOV	EVRIT	WVMOD	ACDIF	ACINT	0	0	0	Y1997
DC094	MULLER	FAM10	AUTRA	0	EVDAT EVPAN	WVMOR	WVPLY	ACAFF	0	0	0	Y2002
DC008	MEADOW	FAM11	AUACA	ORUNI	EVMET	WVECO	ACRST	0	0	0	0	Y1997

DC012	GOREAL	FAM11	AUPOL	ORGOV	EVHIS EVANE EVSCT	WVECO WVNAT	ACINT	ACRST	0	0	0	Y1992
DC025	BERGER	FAM11	AUSCI	0	EVMET EVSCT	WVNAT	ACEMI	ACINC	0	0	0	Y2000
DC035	NRDCOU	FAM11	0	ORNGO	EVDAT EVHIS	WVNAT WVNAT	ACEMI	ACNEG	0	0	0	Y2002
DC042	SCHARP	FAM11	AUACA	ORUNI	EVMET EVSCT	WVREL	ACBAC	ACRST	0	0	0	Y2002
DC050	MEYERA	FAM11	AUACA	0	EVPAN	WVNAT	ACRST	ACEDU	ACNRG	0	0	Y1993
DC052	NWFEDE	FAM11	0	ORNGO	EVSCT	WVECO	ACEMI	ACINC	0	0	0	Y2000
DC055	SUZUKI	FAM11	AUSCI	ORNGO	EVSCT EVSCT	WVNAT	ACEMI	ACKYO	0	0	0	Y2002
DC056	FOEINT	FAM11	0	ORNGO	EVANE EVDAT	WVNAT	ACKYO	ACEQU	ACPCE	0	0	Y2000
DC058	ADHIKA	FAM11	0	ORNGO	EVEXP	WVMOD	ACFND	0	0	0	0	Y2002
DC064	PLUMWO	FAM11	AUACA	ORUNI	EVANE EVHIS	WVSCO WVMOR	ACEQU	ACRST	0	0	0	Y1993
DC070	HARRER	FAM11	AUACA	ORUNI	EVCAS	WVSCO	ACEQU	ACNEG	0	0	0	Y1999
DC071	CONWAY	FAM11	AUACA	ORUNI	EVTHE EVHIS	WVSCO	ACNRG	ACHST	0	0	0	Y1999
DC072	WORSTE	FAM11	AUACA	ORUNI	EVMET	WVSCO WVECO	ACBAC	ACRST	ACINC	0	0	Y1999
DC092	MCKIBB	FAM11	AUSCI	ORUNI	EVTHE	WVREL	ACSUS	ACSCE	0	0	1	Y2001

Within-Family Analysis

Coding and tabulating the family identification and rhetorical elements facilitates the analysis of families to examine whether the elements I have theorized as constituting network links in fact link the members of individual families.

Inspection of Table 6.2 demonstrates that the rhetorical elements of authority (ethos), evidence (logos), and worldview (pathos) do indeed link members of families, but that proposed actions, the fourth category, do not seem to be links within families.

Authority provides within-family links; however, the kinds of rhetors and organizations in the climate change debate as a whole constitute a limited set. Scientists are the most prominent rhetors in all families except Family #11 (where academics predominate), Family #2 (3 nonattributions, 2 trade association representatives, 2 academics, and a scientist), and Family #4 (2 of the 8 rhetors are scientists and two are environmental advocates; the rest are single types). Environmental advocates have substantive voices in Families #5, #9, and #10. Organization types provide some – but not overwhelming – coherence, as seen in the list below:

Family #1	3 total: 3 universities
Family #2	8 total: 4 NGOs
Family #3	9 total: 3 government, 3 research organizations
Family #4	8 total: 6 NGOs
Family #5	10 total: 4 government, 4 NGOs
Family #6	10 total: 5 NGOs, 2 research organizations
Family #7	4 total: 3 government
Family #8	5 total: 2 nonattributions, rest single types

Family #9 10 total: 6 NGOs, 3 government, 3 universities

Family #10 18 total: 9 NGOs, 3 government, 3 universities

Family #11 15 total: 7 universities, 5 NGOs

The predominant types of evidence used by all families except #10 and #11 are data and scientific literature; this is in keeping with the dominance of scientists as rhetors. Family #10 exhibits a wide range of evidence types, with most rhetors using two or more types; political analysis (7 uses), data (6 uses), rights-based evidence (4 uses), scientific literature (4 uses), and history (3 uses) are the most frequent types in this family. Family #11 rhetors have a smaller range of frequently used evidence types: scientific literature (6 uses), metaphor (4 uses), history (4 uses), and anecdote/personal testimony (3 uses).

It is in worldview where the most coherence within families can be seen. As expected, in Families #5-9 (who all espouse More Modernization) an ecomodern worldview predominates; Family #4, also a pro-modernization family, has 3 instances of an ecomodern worldview and 5 instances of a political worldview. Two members of Family #1 and three members of Family #2 hold the view that nature is robust; the remaining Family #1 member holds a political worldview, and in Family #2 three other members hold an economic worldview and the remaining two hold a ecomodern worldview. Three-quarters of Family #10 rhetors hold moral, nature-as-fragile, or political worldviews, in keeping with the focus on inequality. And almost all Family #11 rhetors hold ecocentric, nature-as-fragile, or social constructivist worldviews.

No such coherence can be found in the actions proposed by rhetors within families. Proposed actions are not clustered in families, with a few exceptions: Family #1 members all propose no action; 5 (of 8) members of Family #2 and 7 (of 10) members of

Family #5 propose technology solutions; and 6 (of 10) members of Family #6 and 7 (of 10) members of Family #9 propose emissions reductions. Especially when one considers that rhetors proposed up to 5 actions, this lack of agreement within families is striking.

Results of the Ucinet Analysis

Details of the software methodology are given in Chapter 3. Results from the analysis of all factors are shown in Table 6.3 (All Factors). The table also gives details of the four rhetorical factors. Ucinet/CONCOR partitioned the set into four groups, three fairly even in size (35, 30, and 31 members) and one 4-member group; the table lists these groups, numbered for convenience to show the subgroups. The group compositions are identical to the groups formed by CONCOR when only the worldview values were used. Only the subgroups in Group 2 are somewhat different.

Table 6.3. Ucinet Groups from Analysis of All Factors

Ucinet Group	Author or Title	Argument Family (number)	Authority	Evidence	Worldview	Proposed Actions
All.1a	Agarwal & Narain	Reduce inequality (10)	Environmentalists, NGO	History, rights	Economic, moral	Polluters pay, cap per capita emissions
	Chandler	Reduce inequality (10)	Scientist, NGO	Data, expert testimony	Economic	Reduce emissions, monitor, fund projects
	Toman	Economics (8)	Scientist	Utilitarian	Economic	Reduce emissions, , prepare to adapt, continue to negotiate
	Edmonds & Scott	Economics (8)	Scientists, NGO	Utilitarian, data	Economic	Emissions trading
	Global Warming—A Corporate Perspective	Could be good (2)	Trade organization, industry	Data	Economic	Develop technology, do nothing
	American Petroleum Institute	Could be good (2)	Trade organization, industry	Data	Economic	Develop technology, do more research, revise govt incentives
	Coon	Could be good (2)	Academic, NGO	Policy analysis	Economic	Develop technology, do more research
	World Energy Modernization Plan	Energy modernization (5)	Scientist & environmentalist, NGO	Policy analysis	Economic, policy	Develop technology, reduce emissions, emissions trading, work toward equality, build sustainability
	Ashford & Castleden	Science solutions (3)	Scientist, NGO	Data	Economic	Educate, monitor, do more research
All.1b	Blanchard, Criqui, Trommetter & Viguier	Political modernization (4)	NGO	Data, rights	Policy	Reduce emissions, , emissions trading, , contraction and convergence, developed countries first
	Robinson	Political modernization (4)	Government	Expert testimony	Policy	Adopt Kyoto Protocol
	Müller	Reduce inequality	Member of a trade	Data, policy	Moral, policy	Assist the most affected

		(10)	organization	analysis		
	Quick	Reduce inequality (10)	Church	Rights	Moral	Contraction & convergence, back to nature, work toward equality
	Boehmer-Christiansen	Reduce inequality (10)	Scientist	Policy analysis	Policy	Continue to negotiate
	Jamieson	Reduce inequality (10)	Academic, university	History, policy analysis	Moral	Work toward equality, reduce per capita emissions
	Ribot	Reduce inequality (10)	Scientist, NGO & university	Rights, case studies	Moral	Work toward equality, use history to understand
	Sokona, Najam & Huq	Reduce inequality (10)	Scientist, NGO	Scientific literature	Moral, policy	Reduce emissions, work toward equality, reduce per capita emissions, continue to negotiate
	Slade	Science solutions (3)	Policymaker, government	History	Policy	Integrate climate change with other policy, build sustainability, no regrets, , do more research
	Lindzen	No problem! (1)	Scientist, university	Scientific literature	Policy	Develop technology, do more research, do nothing
All.1c	Rayner & Malone	Reduce inequality (10)	Scientists, research org	Anecdote, metaphor	Social construction	Integrate climate change with other policy, assist the most affected
	Glantz	Reduce inequality (10)	Scientist, research org & government	Scientific literature, metaphor	Social construction	Educate, do more research
	Sandalow & Bowles	Political modernization (4)	Scientist, NGO & university	Scientific literature, policy analysis	Policy, social construction	Adopt Kyoto Protocol
	Edwards	Political modernization (4)	Scientist, university	History, data	Social construction	Improve models, act-learn-act
	Plumwood	Rights of nature (11)	Academic, university	Anecdote	Social construction	Work toward equality, restore people-nature balance
	Conway, Keniston & Marx	Rights of nature (11)	Academic, university	Theory	Social construction	No regrets, use history to understand

	Worster	Rights of nature (11)	Academic, university	History, metaphor	Social construction	Back to nature, restore people-nature balance, change govt incentives
	Harré, Brockmeier & Mühlhäusier	Rights of nature (11)	Academic, university	History, case studies	Moral, social construction	Work toward equality, continue to negotiate
	Van Asselt & Rotmans	Science solutions (3)	Scientists, research org	Data	Social construction	Improve models
	Dessai	Mitigation plus adaptation (9)	Environmentalist, NGO	History, scientific lit, data	Social construction	Reduce emissions, prepare to adapt, work toward equality
	Shove	Mitigation plus adaptation (9)	Scientist, university	Data, theory	Social construction	Work back from desirable scenarios
All.1d	Greening Earth Society	Could be good (2)	NGO	Anecdote, data	Nature robust	Do nothing
	US Dept. of State	Could be good (2)	Government	Data	Nature robust	Develop technology, build sustainability, do more research
	Idso & Idso	Could be good (2)	Ngo	Scientific lit	Nature robust	Do nothing
	Singer	No problem! (1)	Scientist, university	Data	Nature robust	Do nothing, improve models
	Calder	No problem! (1)	Academic, university	Scientific lit	Nature robust	Do nothing
All.2a	National Wildlife Federation	Rights of nature (11)	NGO	Scientific lit	Ecological	Reduce emissions, revise govt incentives
	Meadows	Rights of nature (11)	Academic, university	Metaphor	Ecological	Restore people-nature balance
	McKibben	Rights of nature (11)	Scientist, university	Theory	Ecological, religious	Build sustainability, work back from desirable scenarios
	Kawashima	Energy modernization (5)	Scientist, government	Policy	Ecological	No regrets
	Taubes	Science solutions (3)	Research org	Case studies, expert testimony	Ecological	Do more research
	Darwin, Tsigas,	Science solutions	Scientist,	Data	Ecological	Monitor, improve models

	Lewandrowski & Raneses	(3)	government			
	Martens, Rotmans & Niessen	Science solutions (3)	Scientist, research org	Data	Ecological	Build sustainability, do more research
	Clean Water Action	Mitigation (6)	NGO	Data, policy analysis	Ecological	Reduce emissions, restore people-nature balance
All.2b	Society, Religion & Technology Project	Mitigation (6)	Church	Theory	Religious	Reduce emissions, develop technology
All.2c	Braasch	Mitigation plus adaptation (9)	NGO, university	Scientific lit, data, pictures	Nature fragile	Reduce emissions, back to nature, build sustainability
	Hayes	Mitigation plus adaptation (9)	Environmentalist, NGO	Data	Nature fragile	Reduce emissions, develop technology, revise govt incentives
	Worldwide Fund	Mitigation plus adaptation (9)	NGO	Scientific lit, data	Nature fragile	Reduce emissions, adopt Kyoto Protocol, prepare to adapt, educate, engage industry
	Wisconsin Dept. Natural Resources	Mitigation plus adaptation (9)	Government	Scientific lit, anecdote	Nature fragile	Reduce emissions, develop sinks
	Berger	Rights of nature (11)	Scientist	Scientific lit, metaphor	Nature fragile	Reduce emissions, revise govt incentives
	Suzuki	Rights of nature (11)	Scientist, NGO	Scientific lit	Nature fragile	Reduce emissions, adopt Kyoto Protocol
	Gore	Rights of nature (11)	Policymaker, government	History, anecdote	Ecological, nature fragile	Integrate climate change with other policy, restore people-nature balance
	Scharper	Rights of nature (11)	Academic, university	History, metaphor	Nature fragile, religious	Back to nature, restore people-nature balance
	Friends of the Earth Int.	Rights of nature (11)	NGO	Scientific lit, anecdote	Nature fragile	Adopt Kyoto Protocol, work toward equality, reduce per capita emissions
	Meyer-Abich	Rights of nature (11)	Academic	Scientific lit, policy analysis	Nature fragile	Restore people-nature balance, educate, no regrets

	National Resources Defense Council	Rights of nature (11)	NGO	Scientific lit, data	Nature fragile	Reduce emissions, continue to negotiate
	Linden	Economics (8)		Anecdote	Nature fragile	Engage industry
	Burnett	Mitigation (6)	NGO	Scientific lit	Nature fragile	Educate, grow economies
	Johansen	Mitigation (6)	Scientist & academic, NGO & university	Data	Nature fragile	Reduce emissions
	Chatterjee & Finger	Reduce inequality (10)	Academic, Industry & university	History, scientific lit, expert testimony, policy analysis	Nature fragile	Integrate climate change into other policy, build sustainability, restore people-nature balance
	Gyawali	Reduce inequality (10)	Scientist, government	Data, policy analysis	Nature fragile	Develop technology, monitor, do more research
	McMichael	Reduce inequality (10)	Scientist, NGO	Scientific lit, data	Nature fragile	Reduce emissions, control population, work toward equality
	Ahmed & Ahmed	Reduce inequality (10)	Environmentalism, NGO	Data	Ecological, nature fragile	Integrate climate change with other policy, work toward equality
	German Advisory Council on Global Change	Energy modernization (5)	NGO	Scientific lit	Nature fragile	Reduce emissions, develop technology, build sustainability, fund projects, do more research
All.2d	La Vina	Reduce inequality (10)	Environmentalism, NGO	Data, policy analysis	Policy, nature fragile	Prepare to adapt, work toward equality, assist the most affected, educate
	Athanasίου	Political modernization (4)	Environmentalism, NGO	Scientific lit	Policy, nature fragile	Develop technology, integrate climate change with other policy
All.3a	Benedick	Political modernization (4)	Policymaker, NGO	Anecdote, policy analysis	Modernization, policy	Develop technology, continue to negotiate
	IPCC WG2	Mitigation (6)	Scientists, NGO	Scientific lit, data	Economic, modernization, policy	Develop technology, integrate climate change with other policy, build sustainability, do more

						research
All.3b	Goulder & Nadreau	Political modernization (4)	Academic, university	Utilitarian, data	Modernization	Act-learn-act, continue to negotiate
	Worldwatch Institute	Political modernization (4)	Environmentalism, NGO	History, data	Modernization	Reduce emissions, adopt Kyoto Protocol
	Ausubel	Could be good (2)	Academic, university	Anecdote, data	Modernization	Develop technology, fund projects
	Council for Ag Science & Technology	Could be good (2)	Scientist, NGO	Scientific lit, case studies	Modernization	Prepare to adapt, build sustainability, do more research
	CA Nat'l Assessment Report	Mitigation plus adaptation (9)	Scientist & academic, government & university	Case studies, anecdote	Modernization	Prepare to adapt, build sustainability, no regrets
	Campaign for Nuclear Phaseout	Mitigation plus adaptation (9)	NGO	Scientific lit, data	Modernization	Reduce emissions
	Mid-Atlantic Regional Assessment	Mitigation plus adaptation (9)	Scientist, government	Data	Modernization	Integrate climate change with other policy, educate, revise govt incentives, improve models
	Kirby	Energy modernization (5)	Environmentalism, research org	Data, pictures	Modernization	Develop technology
	Global Environmental Facility and UNDP	Energy modernization (5)	Government	Case studies, data	Modernization	Reduce emissions, develop technology
	Porritt	Energy modernization (5)	Environmentalism, NGO	Data	Modernization	Reduce emissions, adopt Kyoto Protocol
	US Energy Agency & AID	Energy modernization (5)	Policymaker & member of trade ass'n, government & industry	Data	Modernization	Educate, no regrets
	Lovins	Energy modernization (5)	Environmentalism, NGO	Data, theory	Modernization	Develop technology

	US DOE Fossil Energy	Energy modernization (5)	Government	Scientific lit, policy analysis	Modernization	Develop technology
	Hoffert, Caldeira, Benford, et al.	Energy modernization (5)	Scientist, research org	Scientific lit, data	Modernization	Develop technology, do more research, continue to negotiate
	Inovent	Economics (8)	Member of trade org, industry	Data, policy analysis	Modernization	Emissions trading, do more research, revise govt incentives
	Shackelton	Economics (8)	Scientist, government	Scientific lit	Modernization	Work toward equality, no regrets
	Browne	Mitigation (6)	Industry	Case studies, data, metaphor	Modernization	Reduce emissions, build sustainability, no regrets, do more research
	Minnesotans for an Energy-Efficient Economy	Mitigation (6)	NGO	Case studies, data	Modernization	Reduce emissions, no regrets
	Hansen, Sato, Ruedy, Lacis & Oinas	Mitigation (6)	Scientist, research org	Scientific lit, data	Modernization	Reduce emissions, develop technology
	IPCC WG3	Adaptation (7)	Scientist, NGO	Scientific lit, data	Modernization	Prepare to adapt, monitor, do more research, improve models
	Stakhiv & Schilling	Adaptation (7)	Scientist, government	Scientific lit	Modernization	Develop technology, integrate climate change with other policy
	UK Climate Impacts Programme	Adaptation (7)	Scientist, government	Policy analysis	Modernization	No regrets, act-learn-act
	Cohen	Science solutions (3)	Scientist, government	Scientific lit	Modernization	Educate, monitor, no regrets
	Parks	Science solutions (3)		Expert testimony	Modernization	Monitor, do more research
	Huq	Reduce inequality (10)	Scientist, NGO	Policy analysis	Modernization	Prepare to adapt, continue to negotiate
	Unfair Burden?	Reduce inequality (10)	Policymaker, government	Rights	Modernization	Developed countries first, integrate climate change with

						other policy
	Greenwald, Roberts & Reomer	Reduce inequality (10)	Environmentalism, NGO	Case studies	Modernization	Assist most affected
	Adhikary	Rights of nature (11)	NGO	Data, expert testimony	Modernization	Fund projects
All.3c	Koteen, Bloomfield, Eichler, et al.	Mitigation plus adaptation (9)	Environmentalism, research org, NGO	Scientific lit, pictures	Modernization, ecological	Reduce emissions, prepare to adapt
All.4	Meyerson	Mitigation (6)	Scientist	Data	Modernization, nature fragile	Control population, reduce per capita emissions
	Sathaye & Ravindranath	Mitigation (6)	Scientist, research org	Scientific lit, data	Modernization, nature fragile	No regrets
	Ecimovic, Stuhler, Vezjak & Mulej	Science solutions (3)	Scientist, university	Data	Modernization, nature fragile	Build sustainability, continue to negotiate
	Rosenzweig & Hillel	Adaptation (7)	Scientist, government	Data	Modernization, nature fragile	Prepare to adapt, act-learn-act

I attribute this at least partially to a feature of the data. There are only 9 worldview values, contrasted to 12 values for author and organization (which were considered together as constituting the authority of the rhetor), 12 values for evidence, and 31 values for proposed actions. Furthermore, it is not unusual to have missing values in the author and/or organization types, if these were not given in the document – but every document expressed at least one worldview. Thus, it is easier to correlate documents by worldview than by any other type of variable.

However, the sub-networks formed have, in general, ties in addition to worldview ties. Group 1 has four subgroups. The first (9 members) contains documents from five different families, has five scientist-rhetors, seven rhetors from NGOs, five arguments using data as evidence, four proposals to develop new technologies – and all espouse an economic worldview. The second subgroup (10 members) is more diverse, linked most strongly by two worldviews, either morality or policy – and, in two cases, both worldviews, which is how members of this sub-network are linked.¹⁴ The third subgroup (11 members) all express the worldview that nature is socially constructed, ten are scientists or academics, and seven are affiliated with universities. The fourth subgroup (5 members) are linked by the worldview that nature is robust and (except for one) that the world should do nothing about the prospect of climate change.

¹⁴ That is, any member of the subgroup can link to another; a member who holds only a morality worldview can link to another member who holds only a policy worldview via one of the members who holds both worldviews.

Similarly, Groups 2 and 3, and their subgroups are linked most commonly by worldview: an ecological worldview (all 8 members of Group 2, first subgroup), the worldview that nature is fragile/unknowable/finite (all 19 members of Group 2, third subgroup) or that nature is fragile/unknowable/finite AND human actions are most importantly political (both members of Group 2, fourth subgroup), and the worldview that humans can manage their environment successfully (all members of Group 3, with additional worldviews demarcating small subgroups of 1 and 2 members).

The four members of Group 4 have four links in common: they are all scientists, all use data as evidence, and all hold two worldviews: that nature is fragile/unknowable/finite and that people can manage their environment so as not to damage it (modernization).

However, as important to this study as links is diversity. That is, I am interested in whether rhetors and arguments that appear to be closed and of little influence outside their own “families” have network ties that link them to other families. This appears to be the case, as indicated by the Ucinet-assisted analysis. Tables 6.4-6.6 show the results of the analysis for each factor separately (except for Worldview, which are almost identical to the All Factors results, as described above).

Table 6.4. Ucinet Groups for Authority of the Rhetor (followed by family number)

Group 1	Group 2	Group 3	Group 4
AGARWA 10	SUZUKI 11	PLUMWO 11	VANASS 3
DESSAI 9	CASTEC 2	CHATTE 10	KIRBYA 5
PORRIT 5	ASHFOR 3	GOULDE 4	HANSEN 6
GREENW 10	HUQSAL 10	CONWAY 11	BERGER 11
AHMEDQ 10	EDMOND 8	CALDER 1	MEYERS 6
KOTEEN 9	MCMICH 10	WORSTE 11	BOEHME 10
HAYESD 9	BURNET 6	JAMIES 10	HOFFER 5
ATHANA 4	SOKONA 10	MEYERA 11	TAUBES 3
WORLDW 4	IPCTHR 7	AUSUBE 2	RAYNER 10
AMORYL 5	IPCTWO 6	SCHARP 11	SATHAY 6
LAVINA 10	TOMANM 8	MEADOW 11	MARTEN 3
	CHANDL 10	HARRER 11	
COONCH 2			ECIMOV 3
BENEDI 4	BRAASC 9	RESPON 9	SINGER 1
			MCKIBB 11
WWFCCP 9	SANDAL 4	MULLER 10	EDWARD 4
CLEANW 6	RIBOTJ 10	USEAUS 5	LINDZE 1
NWFEDE 11		BROWNE 6	SHOVEE 9
IDSOCD 2	JOHANS 6	GLOBAL 2	
FOEINT 11		APIPOS 2	ROBINS 4
BLANCH 4		INOVES 8	GOREAL 11
ADHIKA 11			SLADEH 3
WHATAB 2		LINDEN 8	UNFAIR 10
NRDCOU 11		PARKSN 3	
MINNES 6		SOCIET 6	STAKHI 7V
CAMPAI 9		QUICKM 10	GEFUND 5
GERMAN 5			SHACKE 8
			GYAWAL 10
WORLDE 5			KAWASH 5
			UKCLIM 7
			GLANTZ 10
			DARWIN 3
			ROSENZ 7
			DOEFEN 5
			PREPAR 9
			USDOST 2
			WISCON 9
			COHENS 3

Table 6.5. Ucinet Groups for Evidence (followed by family number)

Group 1	Group 2	Group 3	Group 4
AGARWA 10	CAMPAI 9	CHANDL 10	AHMEDQ 10
QUICKM 10	WISCON 9	WORLDW 4	ECIMOV 3
PARKSN 3	FOEINT 11	KIRBYA 5	PREPAR 9
TAUBES 3	CASTEC 2	AUSUBE 2	SINGER 1
UNFAIR 10	KOTEEN 9	BLANCH 4	HAYESD 9
RIBOTJ 10	GLANTZ 10	EDMOND 8	MARTEN 3
ROBINS 4		GEFUND 5	APIPOS 2
HARRER 11	MEYERA 11	LINDEN 8	USEAUS 5
GREENW 10	DOEFEN 5	SHOVEE 9	ASHFOR 3
RESPON 9	SANDAL 4	WHATAB 2	MEYERS 6
		EDWARD 4	ROSENZ 7
SCHARP 11	SUZUKI 11	GOULDE 4	JOHANS 6
GOREAL 11	COHENS 3	MINNES 6	PORRIT 5
SLADEH 3	SOKONA 10	ADHIKA 11	VANASS 3
BERGER 11	BRAASC 9	AMORYL 5	USDOST 2
MEADOW 11	NWFEDE 11		GLOBAL 2
WORSTE 11	IDSOCD 2	CLEANW 6	DARWIN 3
RAYNER 10	GERMAN 5	INOVES 8	DESSAI 9
	STAKHI 7	LAVINA 10	
JAMIES 10	CALDER 1	MULLER 10	TOMANM 8
BOEHME 10	ATHANA 4	GYAWAL 10	BROWNE 6
BENEDI 4	LINDZE 1		
COONCH 2	SHACKE 8	SATHAY 6	CONWAY 11
UKCLIM 7	BURNET 6	WWFCCP 9	MCKIBB 11
KAWASH 5		IPCTHR 7	SOCIET 6
WORLDE 5	CHATTE 10	HANSEN 6	
HUQSAL 10		HOFFER 5	
		NRDCOU 11	
PLUMWO 11		MCMICH 10	
		IPCTWO 6	

Table 6.6. Ucinet Groups for Proposed Actions (followed by family number)

Group 1	Group 2	Group 3	Group 4
AGARWA 10	CLEANW 6	GYAWAL 10	RAYNER 10
PLUMWO 11	EDMOND 8	BENEDI 4	UNFAIR 10
RIBOTJ 10	WORLDE 5	HOFFER 5	CHATTE10
MEYERS 6	NRDCOU 11	COONCH 2	SLADEH 3
AHMEDQ 10	HANSEN 6	USDOST 2	PREPAR 9
JAMIES 10	WISCON 9	ATHANA 4	GOREAL11
LAVINA 10	WORLDW 4	LINDZE 1	
QUICKM 10	PORRIT 5	DOEFEN 5	MULLER 10
FOEINT 11	SUZUKI 11	AUSUBE 2	GREENW 10
	MINNES 6	ADHIKA 11	SHOVEE 9
HUQSAL 10	NWFEDE 11	APIPOS 2	
GOULDE 4	CAMPAI 9	STAKHI 7	RESPON 9
ROSENZ 7	JOHANS 6	GERMAN 5	UKCLIM 7
HARRER 11	BERGER 11	GLOBAL 2	USEAUS 5
BOEHME 10	KOTEEN 9	KIRBYA 5	BURNET 6
	GEFUND 5	IPCTWO 6	COHENS 3
MEADOW 11	SOCIET 6	AMORYL 5	
SCHARP 11			ASHFOR 3
	HAYESD 9	WHATAB 2	DARWIN 3
CONWAY 11	TOMANM 8	IDSOCD 2	SINGER 1
MEYERA 11	BLANCH 4	CALDER 1	VANASS 3
SHACKE 8	SOKONA 10		IPCTHR 7
SATHAY 6	CHANDL 10	TAUBES 3	EDWARD 4
KAWASH 5	WORSTE 11	INOVES 8	
	DESSAI 9	PARKSN 3	
	BRAASC 9	GLANTZ 10	
	MCMICH 10	MARTEN 3	
	BROWNE 6		
		ECIMOV 3	
	SANDAL 4	MCKIBB 11	
	WWFCCP 9	CASTEC 2	
	ROBINS 4		
	LINDEN 8		

For example, the actions proposed are potential ties among rhetors from different families. There are 31 actions proposed in this set of documents; many rhetors propose more than one action. Some of the proposed actions, such as reducing emissions and developing new technologies, span many families, many types of rhetors, and many types

of evidence. These links may be particularly potent bases for agreement, as is suggested by other global debates. For example, in the population debate, disparate actors joined forces because they, for different reasons, favored a certain course of action. (In the case of the population debate, feminists and neo-Malthusians both wanted female emancipation and education in the form of birth control programs.)

If rhetors can agree on one or more actions they wish to see taken, they may be able to put aside (or at least table) their different worldviews or evidence in order to mutually agree on a course of action to address climate change. For example, the recommendation to develop new technologies to address climate change is made by rhetors in 8 of 11 families – only the arguments “Science Provides Knowledge about Climate Change,” “More Modernization Is the Cure (Economics),” and “Rift with Nature” documents contain no pro-technology arguments. Similarly, proposals for new technologies span 6 of the 9 worldviews (all except moral/inequality, ecocentric, and social construction).

As expected, individual rhetors tend to have close ties with fellow members of their argument families, but they frequently have multiple ties outside their families. For example, Ashford is a member of Family 3, “Science Provides Knowledge about Climate Change,” which has a total of 9 members. Like many other family members, he is a scientist (6 members total), uses data and models as evidence (5 members total), and advocates education, monitoring, and research (7 members advocate one or more of these). However, there are 36 other scientists, spread out across all other families; 43 rhetors, again, spread out across all other families, use data and/or models as evidence;

and there are 20 instances of one or more proposed actions that Ashford also proposes, spread out across eight other families.

What are the practical implications of having so many social network ties? For a rhetor like Ashford, who advocates non-aggressive and relatively low-cost actions, the existence of these links could prompt him to

- Explicitly *associate* his arguments with those made in other families – for example, in pointing out the necessity for education, monitoring, and research to accomplish the more aggressive goals of the “More Modernization” arguments
- Demonstrate how his evidence and other types of evidence – and results from other models and data – can reinforce each other
- Provide additional arguments, at the first and second stases, about the need to study and monitor in order to establish whether or not something has happened and, if so, whether or not that something can be defined as climate change.

Conclusion

This study used multiple tools to study the question of whether or not there are bases for agreement in the arguments made in the global climate change debate.

Rhetorical analysis provided the framework for a two-step *content analysis* of 100 argumentative documents that make specific proposals for action with regard to climate change. Then *social network analysis* was used to show links among rhetors based upon rhetorical elements of their arguments. The social network analysis revealed multiple links within and across “families” of arguments, thus providing potential bases for agreements.

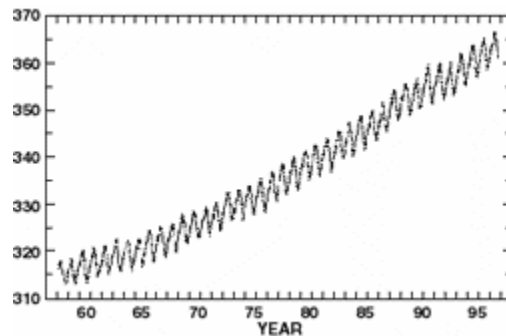
CHAPTER 7: PROSPECTS FOR THE DEBATE: ENDLESS RECYCLING OF ARGUMENTS OR MOVEMENT TOWARD AGREEMENT?

Even at the relatively heady time surrounding the Rio environmental agreements in 1992, dissident voices could be heard. Indeed all the arguments that have both promoted and retarded “coming to agreement” were present at that time: arguments about domination and inequality, the deep distrust of modernity and modern solutions as opposed to rethinking human relationships with nature, and cautions about the uncertainty of the science and other hypotheses about causes of climate change. A book published shortly after the Rio Summit collected the dissident voices from the so-called South.

However, since the Framework Convention on Climate Change (UNFCCC) was ratified, the debate has not remained static. Scientific advances in understanding and monitoring the climate, better understanding of international processes (and more experience with them, e.g., in the World Trade Commission), the proliferation of NGOs with expertise in climate change issues, and the continuing negotiations under the UNFCCC have all contributed to the evolution of the debate. Such evolutionary change has not been fast enough to satisfy people who fear the collapse of the climate system, nor slow enough to satisfy those who fear taking on a burden of costs when both problem and solutions remain highly uncertain.

If one element of the debate has received more emphasis than others, it is the scientific evidence. What is the nature of the evidence? Those looking for direct experience of “global warming” have been pulled up short again and again. The

excessively hot summer of 1988 seemed likely enough evidence that climate change was manifesting itself – likely enough to spark urgent calls for action from the U.S. Congress. National Aeronautics and Space Administration scientist James Hansen testified before Congress that he was almost certain that hot weather was part of a pattern of human-induced climate change. But it was easy for people, including governmental policymakers, to retreat from such calls for action when temperatures returned to more normal ranges – and perhaps to feel that scientists had “cried wolf.” Subsequent evidence about longer term warming trends have not generated enough support to establish widespread programs to reduce greenhouse gas emissions, either in highly industrialized or non-industrialized countries. The empirical evidence as manifested in charts such as the one in the figure below generally is not as convincing as people’s experience of seasonal weather.



The “Keeling curve,” showing rising carbon dioxide concentrations in the atmosphere.

If the evidence itself seems indirect, the methodologies used to gather and interpret data on current conditions, and to model future climatic changes are highly techno-scientific, difficult to explain to nonscientists, and easy to criticize. The

“greenhouse effect” itself (which is in important ways *not* like a greenhouse) is not well understood. Ways to measure the concentration of greenhouse gases and even to determine air temperature involve complex instrumentation, estimation, and modeling (Norton and Suppe 2001). Models of climate are routinely criticized for not including important variables, lacking the basis for verification, and needing large-scale tuning factors (“flux correction”). Scientific uncertainties are debated and acknowledged by scientists. For nonscientists to swallow the climate change hypothesis requires a generous helping of faith.

No wonder, then, that there is still lively discussion at the first and second stages of the argument: what is happening and is this a problem?

The primacy of the scientific arguments cannot be ignored by those who frame climate change as a *social* problem – of economics, governance, human and nature relationships, or technology. These various social problems may exist, but if they are not manifested in resulting problems – such as “killer smog” or nuclear “accidents” – the fact that we construct them as problems is not in itself a reason to try to solve them, except, perhaps, theoretically or as part of our university humanities classes.

There is no straight-line process from scientifically accepted evidence to widespread change in policies and behaviors. The need for scientific evidence and hypotheses to enter the realms of economics, politics, and what Habermas has called the public sphere make it at least advantageous and probably necessary to analyze the debate as a debate where science is an important rhetor but by no means the only or most decisive one.

In this study I have examined scientific and other types of arguments together. The debate as a whole must take cognizance of all arguments that have found at least partial adherence. And no type of argument can be ignored. Because both the scientific construction of climate change and the relationship issues that are tied inextricably to climate change are essentially social in nature, both these kinds of arguments can be examined on a more-or-less equal footing. Instead of taking the scientific arguments as logically first or as more important in the debate – i.e., the prospect of climate change must be proven before we can talk about how to address the issue – arguments at all stases may be examined together.

In this endeavor, research that appears to be helpful often is not. In Chapter 2, I examined three subdisciplines that offer some insights into areas of the debate but that finally fail to address all arguments in a theoretical space in which the arguments stand on their own terms rather than being weighed on political, scientific, or environmental scales. The subdisciplines comprise social movement theory, sociology of science, and environmental sociology.

Social movement theory provides useful tools for analyses of some types of arguments. Research on political opportunity and mobilization structures focuses on political power and interested rational actors, and, thus, along with international relations theory, helps to identify these dimensions of arguments about global climate change. However, the implicit assumptions that politics is at the base of all the arguments and that rational choice (maximization of self-interest) is the most important element in a debate – or even in choosing to act – do not serve the analysis of the climate change debate well. Many arguments are explicitly *not* political, but instead concern identity and solidarity

(perhaps through shared interests, but likely through shared kinship, ethnicity, experiences, and other elements), economic and cultural activities, and so on.

Also within the social movement subdiscipline are cultural arguments about framings and identity construction; these are useful concepts and constructs (and will be discussed again later in this chapter), but they emphasize the individuals and groups who make up a social movement. Moreover, although environmental social movement groups exist, relatively few have climate change as their primary focus; for climate change, important groups other than environmentalists include scientists, businesses, other cultural organizations such as churches, and government policymakers at all levels (not just the nation-state level). Again, social movement theory addresses only part of the debate.

Sociology of science is another subdiscipline that, again, provides only partial insights into the climate change debate. The examination of how scientists make truth and build scientific consensus is an invaluable element in areas of the debate that are about or rest on scientific evidence. The most important result from research into the workings of science is that, although science is indeed a particular brand of truth-making, with its own rules-of-the-game, scientists have no very special claim to ultimate truths that must be accepted unquestioningly by nonscientists. This result from sociologists of science creates the level playing field within which all arguments, both scientific and nonscientific, can be examined together. However, the tools of the subdiscipline are used to deconstruct scientific claims more than to discern bases for agreement among scientists and other groups. Typically, scientific discourse is exposed as metaphorical, rhetorical, political, or narrative instead of objective and rational. However, “science persistently

refuses to collapse into politics ... far from exposing science as just another ideological or marketing fraud, this understanding prompts us to protect and nurture ethical dispassion, acceptance of criticism, tolerance for dissent, and appeals to reason and evidence that are built and sustained by the norms and ideals of scientific communities” (Brown and Malone 2004:120). Scientific arguments have certain claims to truth that should be recognized, just as other arguments have other types of claims to other truths.

Environmental sociology would seem to have direct relevance to global climate change issues and the debate, but environmental sociologists have paid very little explicit attention to arguments made about global environmental changes. Instead, they focus on issues of the relationship between humans and nature. They *make* arguments but do not examine the debate. Those who identify themselves as environmental sociologists in the United States have tackled such issues as providing an alternative view to the classical sociological assumption that humans are superior to and can manage nature. European theorists such as Beck have adopted a critical theory stance, providing sharply detailed analyses of where modernity has gone wrong vis a vis the environment. Again, the questions of the right relationship with nature and the role of world inequalities (including colonialism) in damaging the environment are threads in the fabric of the debate, but by no means the whole debate. The climate change debate includes rhetors who believe that modern management of nature is necessary and desirable as well as those who believe that humans should get out of the nature-management business. Both views must be examined together, without judging which is better or which could “win.”

The difference in foci of these subdisciplines illustrates a difficulty in analyzing the debate. An assumption that, at bottom, the debate is really about one thing – about,

say, politically oriented rational action, OR about whose knowledge is legitimate, OR about the human-nature relationship – precludes an ability to see the debate whole, with its varying motivations, goals, and strategies.

Where to go from established subdisciplines? I turned to globalization theorists. Globalization issues in many respects parallel those of climate change; both include economic, political, and cultural dimensions of a world becoming both more the same and more different. Globalization theorists include topic areas that are, for many debaters about climate change, at the heart of the issue: inequality, development, the relationship of nations to one another and to the non-human environment. Global science and global environmental pollution and change are included in the purview of some globalization theorists as well.

The classification of both globalization and climate change theories and arguments into political, economic, and cultural emphases provides an initial mapping of the dimensions in the debate. Rhetors indeed argue from particular worldviews that reduce the issues to one dimension and then translate other messages into the language of that dimension. A good example is an economic argument that discusses cultural (i.e., non-priced) aspects of the climate change debate into economic terms, thus creating such problematic notions as a “willingness-to-pay” for protected environments and the “existence value” of, e.g., iconic locations (Mount Fuji, the Grand Canyon, etc.). Attempts to price the environment and to create, for example, water markets, have had only limited success. Indeed, it appears that many parks and wonders of the natural world are not very highly valued in monetary terms – although most people do indeed favor having parks and preserving natural beauties.

If the comparison with globalization theory illuminates a principal aspect of both debates, it also neglects another principal element of the climate change debate – the role of science. Globalization theorists tend to black-box science as an enabler of globalization (in modern transport and communication, for instance) or as one part of a culture whose more interesting aspects are the arts, fashion, folklore commodification, museumification, and so on.

With social movement theory, sociology of science, environmental sociology, and globalization providing theoretical grounding, an empirical study provided the necessary complement, correction, and spur to better theoretical constructs. A direct examination of actual arguments made in the climate change debate may validate/undermine/extend one or more of the theories reviewed and provide new ways of thinking about this debate and perhaps about other debates. For example, if I could extend the categorization matrix of climate change theories developed in Chapter 4 and use framing analysis from social movement theory, I could perhaps show how arguments in one domain can be reframed around similarities in rhetorical elements – a complex effort but, if achievable, it would build theory and provide practical help to rhetors wishing to come to agreement.

The 100 documents examined for this study represent a wide range of the argument space in the climate change debate (although not, as noted in Chapter 3, a representation of the *shares* of each argument in that space). Using the objective classification scheme provided by classical and modern theorists of rhetoric/ argumentation provided a framework that is not anchored in a single dimension (political, economic, cultural, scientific) of the debate. Nor does a rhetorical analysis valorize or

denigrate scientific arguments vis a vis other types of arguments. Thus, arguments are seen *as arguments*, and the focus is kept on the wide debate space.

To conduct a comparative rhetorical analysis, I identified the coherent arguments themselves and four principal rhetorical features of each argument: the authority of the rhetor (as given by his or her professional standing and affiliation), the type(s) of evidence used to support the claims made, the worldview(s) expressed, and the action(s) proposed. Using this framework allowed both comparison of the arguments and clustering of them into “families” of coherent arguments, ranging from denials of the hypotheses that the climate is changing and that humans are contributing to the changes to impassioned advocacy for making immediate changes in human activities to mitigate effects on the world’s climate.

Families cohere not only around statements of the arguments but also in terms of sources of authority, types of evidence, and worldview – especially worldview. The comparative analysis shows that different worldviews are strongly associated with families. The families also exhibit some basic agreements and numerous affiliations across families. Basic agreements include the following:

- All families take the question of climate change seriously, and none rules the prospect completely out. Even the skeptics treat the hypothesis as unproven rather than as false; they agree that there is evidence that atmospheric concentrations of carbon dioxide are rising, for example, although they dispute the meaning of the evidence.
- All agree that vast uncertainties exist, although again the implications of uncertainties are disputed. Some claim that uncertainty is a reason to wait and see,

- or to do further research and monitoring. Others view uncertainty as a reason to address the potential for climate change swiftly and effectively.
- All agree that climate change involves issues of societal well-being and lifestyle. Increased greenhouse gas emissions are principally the products of industrialization and modern farming methods, and of rising demands for food and goods by an increasing global population. Proposals for reducing emissions of greenhouse gases and adapting to climate change impacts such as sea level rise raise issues of societal development, inequality, the relationship between humans and the rest of nature, and the credibility of science in providing evidence of a problem and pathways toward solutions.
 - All argue from definition, although some families also include cause-and-effect arguments. That is, the rhetorical basis of the arguments concerns the definition of the issue as a scientific or political one, whether or not the evidence can be defined as climate change, whether or not climate change can be defined as problematic, whether climate change is a technical problem solvable by new technology or a systemic problem solvable by a retreat from technology, and so on.
 - Also, families share a commitment to science. There are scientists in every family, and scientists are the most prominent rhetors in all families except three.
 - Similarly, at least some members of all families use scientific literature as evidence for their argumentative claims. The predominant types of evidence used by all families except #10 and #11 are data and scientific literature.

These basic agreements at least keep members of different families talking to one another, although they may not provide enough of a foundation to come to agreement.

The social network analysis also explored rhetorical elements in common across family lines – members of different families who have the same claims to authority or use the same kinds of evidence or hold the same worldview or advance the same proposals for action.

The social network analysis explored these cross-family links, positing that any of the rhetorical elements of their arguments constituted network ties among rhetors. If families hold strong ties in common, with few links across families, there would be little basis for thinking that the overall debate contained pathways for coming to agreement. That is, if all coherent arguments are closed off from other arguments, voices in the debate are simply talking to themselves without the possibility of building agreement.

I analyzed each element separately, then all together. The results showed a dense network of ties, with the strongest correlation between worldview and overall linkages. The bases for coming to agreement as demonstrated by network ties include the following:

- Although the most common links are by worldview, these links are by no means purely identified with families. Even the rhetors in Families 1 and 2 (“No problem!” and “Climate change could be good for you”) span four different worldviews, and the rhetors in Families 4-9, who agree that “More modernization is the answer,” hold eight of the nine worldviews (all but the view that nature is robust and will survive anything humans could do).

- Similarly, links by worldview is a poor predictor of other links, which prove to be diverse. The nine members of one sub-network all espouse an economic worldview, but the group contains only five scientists, seven rhetors from NGOs, five arguments using data as evidence, and four proposals to develop new technologies. Another sub-network, whose eleven members hold the worldview that nature is socially constructed, are almost all scientists or academics and predominantly (seven members) at universities – but they differ in family membership (five families), type of evidence used (eight types), and actions proposed (18 different actions). People can hold a basic worldview in common and yet both disagree among themselves and agree with people who hold other worldviews about what argument to make, evidence to use, and actions to advocate.
- Looking at the ties other than worldview also indicates potential bases for coming to agreement. For example, if rhetors can agree on one or more actions they wish to see taken, they may be able to put aside (or at least table) other differences among them. For example, the recommendation to develop new technologies to address climate change is made by 21 rhetors in eight of eleven families, spanning six of the nine worldviews.
- Although rhetors tend to have close ties to other members of their families, they also frequently have multiple ties outside their families – to fellow members of a profession, employees of the same type of organization, a preference for certain types of evidence, a worldview, and/or proposed actions. Any of these ties can

link individuals and families, providing a basis for agreement on at least one aspect of the climate change issue.

Potential Pathways to Agreement

If there are *bases* for agreement, why do people persist in disagreeing? With this question we come back to theories of how people debate, change, come to some level of agreement, act to change a situation, then debate again. In Chapter 4 we approached this theoretical discussion by examining Habermas' ideas about the ideal speech act and the orientation of speakers toward coming to agreement. But Habermas is himself only one voice in a conversation about how people do this.

One non-Habermasian view of how people come to agreement is a co-evolution of modern functional systems, such as the political, economic, and scientific systems. Systems theory emphasizes difference and communication; "all information processing," says Luhmann (1995[1984]:240), "'takes off' not from identities (e.g., grounds) but from differences." When social systems form themselves, they do so by differences from their environments, differences that have "operative significance, informational value, and connective value" (Luhmann 1995[1984]:474). However, the complexity of modern functional systems and subsystems means that any attempt at intervention, any management plan, becomes one impulse among many, with effects that may or may not be intended but which are impossible to foresee. In the area of human love, for instance, Luhmann emphasizes the improbability of effective communication, given the proliferation of modern functional systems (Luhmann 1986[1982]). This line of reasoning seems to lead to despair; but, as Weingart (1990) points out, the empirical

evidence demonstrates that systems do change and have changed in the direction of environmental awareness and protection. Therefore, the focus of social science research should be on “the learning mechanism that connects the different social systems, and on the rules of translation which allow communication to be transformed from one system to the other” (Weingart 1990:58).

Eschewing with both the elaborated descriptions and pessimism of systems theory, other social scientists, providing the empirical evidence that Weingart refers to, have documented and mapped a gradual shift in values over the past several decades, as discussed in Chapter 2. There are both historical and future-oriented explanations for this shift. The former posits a return from the detour of modernity to the pre-modern direct human-nature relationship of mutual dependence and human respect for the rights of other elements of nature to exist in a state of well-being. The future-oriented explanation is that expressed by Inglehart (1977, 1990): people, when they are advanced materially, develop “postmaterial values” that include environmental ethics (see also Steger et al. 1989, Van Liere and Dunlap 1980). As the ethical shift (Thompson et al. 1998) proceeds, people will increasingly agree that the human species is grounded in its environment and that its environment must be accounted for. Having agreed on postmaterial values, people may then agree on actions to understand and live in harmony with the rest of nature. Cultural theorists (Thompson et al. 1990, Rayner 1995), who hypothesize the historical simultaneity of various views of nature, point to the “canaries” who raise the alarm about environmental issues and the increasing attention paid to these alarms by others. Thompson et al. (1998) explain the difference between “value shift” and “cultural theory” views in this way:

Instead of one homogeneous traditional blob, miraculously transformed into an equally homogeneous modern (or postmodern) blob, we need the idea that we always have been and always will be heterogeneous, with different social solidarities... The relative strengths of these solidarities will change over time, as will their patterns of interaction, and it is in these dynamic and structured contentions and transformations that we should seek to anchor our explanations.

Another view comes from political realists and neo-realists, who frame the issue of coming to agreement as a matter of competing interests among nation-states as rational actors. Thus, the desire of each nation for power relative to other states, coupled with a recognition of limits to power (transaction costs), will drive nations to agree about matters that tend toward their mutual benefit, such as protecting resources that are available to all – the global commons, including the oceans, atmosphere, and climate. Or nations may severally attempt to free-ride, i.e., not pay the costs of protecting environmental resources but enjoy the benefits of others doing so. In either case, nation-states are the principal actors, and environmental agreements depend upon national-level leadership and actions.

Institutionalists among political theorists hold that new ways of dealing with the environment – new international institutions – will arise as evidence emerges that there are needs to address, such as pollution, overfishing, and other issues, including climate change. These institutions will provide the impetus to action and the persistence to eventually effect change. However, these “international regimes” must ultimately work through governments, and governments may successfully resist if they feel their interests are threatened (Haas et al. 1993).

One of the best known concepts used to describe the process of institutional change that is not limited to states is epistemic communities. The term was first coined in the 1970s (see Antoniadis 2003 for a history of the phrase) and came to prominence in the 1990s to describe an alternative approach to studying international policy, along with neo-realism, neo-liberalism, dependency theory, and post-structuralism. Haas (1992:3) defines an epistemic community as “a network of professionals with recognized expertise and competence in a particular domain or issue-area.” Such a network has (a) shared normative and principled beliefs, (b) shared causal beliefs, (c) shared notions of validity, and (d) a common policy enterprise. The epistemic community concept thus joins knowledge and power, both scientists and policymakers; it is typically international and includes people within and outside of governmental structures.

Economists do not have a specifically economic theory about coming to agreement outside of agreements to buy and sell. Writ large, however, this theory becomes a universalist assumption that people are primarily motivated to increase their own (economic and material) well-being. Economists thus often seem paired with neo-realists in positing individual rational actors maximizing self-interests. These interests are focused on consumption of goods and services, and the well-being that results from consumption. Moreover, the utilitarian assumptions of most economic theory imply the greatest good for the greatest number as an invariant and universal goal. Earlier, this meant that the sum total of individual maximizing actions would produce societal well-being. But because markets are not perfect and economists have proved that general well-being could not result from the sum of self-interested actions (see Arrow 1972), management of the economy is seen to be necessary, although how this should be

accomplished is more a matter for experts, not for general coming-to-agreement. Coming to agreement is thus based on a demonstration that the costs of addressing climate change will be small, and well-being (or at least avoidance of damages) will be worth the costs.

Aside from these well-developed and –discussed theories, other views abound of how people may come to agreement in the contemporary world. Some examples follow:

- Delanty (2001) studying new forms of violence, carefully distinguishes the activities involved in political protest (which he locates in civil society) and those involved in conflict resolution through talk/negotiation, located in cosmopolitan public spheres. It is the cosmopolitan public spheres that provide a forum for debate and coming to agreement.
- Daly (2001), looking at the same situation but focusing on the economic dimension, distinguishes between globalization and internationalization, and strongly favors the latter. Globalization, he says, entails “national economic *disintegration* – parts are torn out of their national context (dis-integrated), in order to be re-integrated into the new whole, the globalized economy” (Daly 2001:17). But it is the national-level players who protect the identities and well-being of their citizens from the monolithic dictates of transnational corporations. That is to say, economic globalization silences the debate in the exclusive adoption of economic goals and rationales, whereas the disparate voices of nations keep the conversation/debate going.
- Rayner (2003), discussing the range of voices in the decision process, concludes that most efforts to engage the public in decision-making about issues such as pollution of the environment result in just another layer of technocracy, as

governments and firms set the agenda and provide the list of possible solutions.

He suggests a “discourse of mobilization” that “begins with social issues of identity and emergent solidarity rather than technocratic ideas of risk” (Rayner 2003:7), although he provides few clues about how this might be accomplished.

- Star and Griesemer (1989) develop the concept of “boundary objects” as a way of communicating between scientists and nonscientists. Boundary objects can contain both scientific definitions and specifications, and values for amateurs. For example, museum scientists placed conditions on specimens to be collected by amateurs who were acting from different motivations. Again the creation or development of a common communication space/object is important in a debate.
- Cultural analysts of social movements track framings and how they are re-framed over time to represent concepts and arguments defined by members of social movements.

In the end, there are as many theories about how people come to agreement as there are about how society is structured and changes. This is because rhetorical language is a principal nonviolent medium through which people understand themselves as social beings, and negotiate their daily and longer term interactions. Language, used in argumentative debates, is the common mechanism for the processes described by theorists of all stripes. Systems theory emphasizes that human societies need not respond to the environment but may do so through communication. Weingart, building on Luhmann, recommends focusing on how translations and communication work. Explanations, say cultural theorists, depend upon interactions, contentions, and transformations – not only in words, but certainly in words (as well as in eating,

shopping, etc.). Political scientists discuss interests and power as they are manifested in the “talk” of nations – agreements, policies, conferences, negotiations, and so on. Economists emphasize consumption choices as the principal market force, rather than language. Social systems, postmaterial values, new institutions, epistemic communities, cosmopolitan public spheres, a discourse of mobilization, boundary objects, framings – all conceptualize spaces and mechanisms for communication, argumentation, and coming to agreement.

But the social world is not a mush of free-floating arguments, a postmodern sea of equal-meaning rhetorical statements. Neither is the social world rigidly and almost solely determined by the privileged knowledge of elite policymakers, corporate boards, and scientists. Some arguments persuade more than others; some logically unassailable arguments are never taken up by those who could act in response to them. That is to say, the social world cannot be predicted exclusively by structure, nor by functional relationships, nor by random movements. The ideal speech act, systems theory, epistemic communities, and other frameworks and tools fall short of providing full explanation, much less predictive capability.

What do individuals, groups and societies do when confronted with new types of problems? At one end of a spectrum of possible responses, they throw up their hands and refuse to deal with the situation. They deny, rationalize, or despair. At the other end of the spectrum, they set to work to convince others to reduce energy use, develop technologies that do not emit greenhouse gases, and develop binding international agreements – and to do all these things simultaneously and immediately. Between these “nothing” and “everything” responses, individuals and groups and societies debate

whether or not the climate is changing, what if anything humans contribute to that change, and what might be done to ensure human well-being by mitigating or adapting to climate change.

But in all these responses, individuals, groups, and societies attempt, first, to connect new problems with their experience and, second, to develop solidarities based on shared trust and knowledge. A principal medium of these attempts is language. In discourse, in arguments, they make connections based on shared understandings, attempt to co-create further shared understandings, and work toward increasing their audiences' adherence to certain arguments.

Thus, the climate change issue has been fitted into many frames, as shown in the arguments and argument families. Perelman and Olbrechts-Tyteca (1971) call this association – that is, if a rhetor puts an argument into a frame acceptable to the audience, members of that audience will make sense of the argument in the way the rhetor wants them to. If, for example, the “Man versus Nature” argument makes sense to an audience, an interpretation made by a rhetor that climate change can be fitted to this frame will likely make sense to that audience. Economics, politics, culture, and science provide at least partial framings for arguments in the climate change debate space. But these framings are being continually reconstructed and re-imagined as new information enters the debate – new rhetors, new organizations, new evidence, new worldviews or new statements of worldviews, and new proposals. Debaters consciously react to other rhetors, moving closer to or farther away from agreement. Stable images, like the “big blue marble” or the greenhouse, may have multiple meanings, and users of those images select

meanings that they feel will increase the adherence of their audiences to the argument presented.

One of the central frameworks used in the climate change debate is that people can manage nature: extract resources, develop technologies, and exploit intangibles such as scenery and space. (The ability to manage nature can be also defined by its double: the ability to *not* manage nature.) Nature provides free and essentially inexhaustible gifts.¹⁵ Scientists, technology developers, and others may make mistakes that result in undesirable outcomes (pollution, disease, etc.), but these can be corrected through better technologies and institutional arrangements.

Most of the proposals about climate change mitigation and adaptation rest on this underlying belief and, thus, it provides a widely shared basis for agreement. By a process of association, rhetors characterize climate change as the same class of problem as many success stories: the ban on DDT (and development of other pesticides), Superfund-type cleanups, the agreement to eliminate ozone-depleting substances, and so on. Similarly, associating climate change with another kind of success story, rhetors may invoke the history of energy technology development, citing the need to transform the energy system to one that is environmentally benign. First there was small-scale biomass burning, then coal, then oil, then nuclear fission (with solar and hydropower becoming more used as

¹⁵ Although a theoretical limit may be acknowledged, past successes at bypassing forecasted limits may lead to the conclusion that no one knows what the limits are but that they are surely beyond current predictions.

technologies improve). The next transition can be simply another transformation, but this time mindfully harmless to the environment.

The history and achievements of science and technology provide the basis for devising science-and-technology-based strategies to address climate change. But, by the same token, the existence of scientific disciplines and professional specialties ensures that there will be plenty of disagreement about what actions to take and the priorities of any set of actions. These can be couched as disagreements, differences in orientation, i.e., whether it is more important to get political and policy agreements in place, get the economic markets right, jump-start new technologies and promote technology transfer, or change people's consumption expectations and habits. Or more specific disagreements emerge: nuclear versus renewable energy, energy conservation/efficiency versus big technology, mitigation versus adaptation.

Such arguments at the fifth stasis contain much common ground and many potential bases for agreement. Moreover, these arguments continue to be cognizant of arguments at the other stases – for example, acknowledgements of great uncertainties and advocacy of “no regrets” actions. The lively debate continues about global climate change, leading to the expertise and institutional capabilities that have resulted in an increasing orientation toward coming to agreement and an increase in links among rhetors that can provide bases for agreement.

APPENDIX 1: FIRST-STEP ANALYSES OF ARGUMENTS

#1: Agarwal, Anil and Sunita Narain 1996. The atmospheric rights of all people on Earth: Why is it necessary to move towards the ‘ultimate objective’ of the Framework Convention on Climate Change? Centre for Science and the Environment, http://www.cseindia.org/html/cmp/cmp31.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Agarwal and Narain are known for definitive statements of the developing country perspective on climate change (cf. <i>Global Warming in an Unequal World</i>)				
Secondary: the authority of CSE as a voice in the climate change issue, beginning before FCCC and continuing by NGO participation in further COPs				
Tertiary:				
Notes				
Type of argument				
Primary: The world is unequal; rich countries have caused global warming (“historical emissions”) and should pay the true costs of their consumption (“polluter pays”) and should set up time-bound targets for greenhouse gas emissions reduction.				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: historical recounting of events in negotiations; first, ozone, which “remains a weak treaty, then WRI vs. “Global Warming in an unequal world” CSE’s role in climate issues				
Secondary: facts about total emissions vs. per capita emissions				
Tertiary:				
Notes: what the developed countries say, but what we say				
Worldview/view of nature				
Primary: Economic orientation: atmosphere a global public good; rich countries who damage it should pay for the damage.				
Secondary: World system is unequal; environmental agreements perpetuate inequality.				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “rights-based approach in regulating climate change; treating the atmosphere as a limited common resource to be managed under an equity regime based on per capita entitlements (freezing the per capita entitlements on the basis of a population distribution index for a chosen year)”				
Secondary: “Surplus entitlements with less polluting countries can give way to an international emission trading regime. An international tax can be levied on countries exceeding the limits imposed by their permissible entitlement allocation” (using the polluter pays principle).				
Tertiary:				
Notes				

#2: Benedick, Richard E. 2001. Striking a new deal on climate change. <i>Issues in Science and Technology</i> Fall 2001, 71-76.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Benedick was the principal US architect of the Montreal Protocol and the senior State Department official in population programs in the 1980s				
Secondary: Member of the National Academy of Diplomacy (elected 2002)				
Tertiary:				
Notes				
Type of argument				
Primary: Rational actors must negotiate doable policies				
Secondary: Good diplomacy results in agreements that can trump “spoilers” (the US, in this case)				
Tertiary: Montreal Protocol can be used as a comparative model → technology provides an irresistible incentive for developing countries to accept commitments				
Notes				
Type of evidence				
Primary: Evaluation of policy/agreement options and likely outcomes				
Secondary: “Awards” for “diplomatic agility” (Japan, Australia, Canada), “flexibility” (EU), “suspense” (Russia), “outstanding consistency” (developing countries), and “politeness” (US)				
Tertiary: informal conversations with “well-placed officials”				
Notes: history of the Kyoto Protocol and Bonn COP				
Worldview/view of nature				
Primary: Humans can control the harms they do to the environment (e.g., Montreal Protocol) with the right technologies				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: US could renegotiate Kyoto Protocol commitments based on negotiations in Bonn; everything can be considered open for revision: base year, timetable, targets, sinks				
Secondary: US should abandon its unaccustomed outside role, if for no other reason than to improve its position for constructively influencing future climate negotiations				
Tertiary: (long-term) we develop a new generation of cost-effective technologies that dramatically reduce dependence on fossil fuels and/or that capture and sequester carbon (“start reducing emissions ... invest in a technological revolution ... adopt technology-based objectives ... accelerate technology transfer and joint implementation”) and key developing nations curtail their rapidly rising emissions				
Notes				

#3: Ausubel, Jesse H. 2001. Some ways to lessen worries about climate. <i>The Electricity Journal</i> (January-February), 24-33.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Ausubel is “director of the Program for the Human Environment at The Rockefeller University, New York. He was one of the main organizers of the first United Nations World Climate Conference, held in Geneva in 1979.”				
Secondary:				
Tertiary:				
Notes: “This article is adapted from the keynote address to the Business Roundtable’s National Summit on Technology and Climate Change,” August 31, 2000.				
Type of argument				
Primary: It is likely that human emissions of GHGs will change the climate but we do not know how and probably cannot know. “But gambling with the climate does not strike me as a good bet.”				
Secondary: “Societies are always trying to climate-proof themselves” (25) and many successful adaptations exist.				
Tertiary: Technological change is a continuing process that demonstrates our adaptability, potential to design offsets, and engage in prevention strategies such as the Zero-Emission Power Plant (ZEPP).				
Notes				
Type of evidence				
Primary: Graphics showing technological cycles and improvements (recording media, RAM, transportation modes, and power plant size), with accompanying text				
Secondary: long lists of ways we adapt to climate, e.g., “from antifreeze, air conditioning, and corn futures markets to windshield wipers, radar, and domed stadiums” (25).				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature is essentially unpredictable; people can control their behavior.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “So, I say, let us prepare, just in case. Purchase some insurance. ... Publish and private entities should research and invest in all three” forms of climate insurance: adaptation, offsets, and prevention (25).				
Secondary: “We should choose long-term solutions for emissions compatible with the evolution of the energy system. This means shift to methane, focus offsets on the carbon in methane, prepare the hydrogen economy, and anticipate the nuclear millennium that will follow our Methane Age” (33).				
Tertiary:				
Notes				

#4: Rayner, Steve and Elizabeth L. Malone 1998. Ten suggestions for policymakers. In <i>Human Choice & Climate Change, Vol. 4: What Have We Learned?</i> Battelle Press, Columbus, OH				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Steve Rayner, student of Mary Douglas, influential in institutional aspects of environmental, especially climatic, change				
Secondary: Elizabeth Malone, relatively unknown at the time of publication				
Tertiary: <i>Human Choice & Climate Change</i> has been widely cited in “soft science” journals and the IPCC 2001 assessment				
Notes				
Type of argument				
Primary: Narrative and pragmatic				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: Historical events, intellectual history, metaphors (including Escher)				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Social solidarity determines the view of nature; at least four different worldviews (hierarchy, egalitarian, market, fatalist) exist, each with a different worldview (nature is robust within limits, fragile, robust, unknowable)				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: See the problem in real-world context of (more important) development, other issues; act regionally and locally; design mitigation and adaptation strategies broadly; use a pluralistic approach (not just rational) to planning and decision-making; recognize institutional limits (just as important as environmental limits); direct resources toward the most vulnerable				
Secondary:				
Tertiary:				
Notes				

#5: Goulder, Lawrence H. and Brian M. Nadreau 2002. International approaches to reducing greenhouse gas emissions. Pages 115-149 in <i>Climate Change Policy: a Survey</i>, Stephen H. Schneider, Armin Rosencranz and John O. Niles, eds. Island Press, Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Lawrence H. Goulder: Well-known in economics and international environmental policy at Stanford				
Secondary: Brian M Nadreau: Master's student at Stanford				
Tertiary: Stephen H. Schneider, the 1 st editor, has been an outspoken advocate of policy to combat climate change				
Notes: Island Press is a publishing venue for environmentalists				
Type of argument				
Primary: Analytic assessment of options, with advantages and criticisms (emissions trading systems and carbon taxes; project-based emissions reductions [JI and CDM])				
Secondary: Combining features to address criticisms (e.g., equity concerns)				
Tertiary:				
Notes				
Type of evidence				
Primary: Modeling results and resultant cost and abatement curves				
Secondary: Economic rational choice theory, benefits of trade				
Tertiary:				
Notes: Presumption that climate change should be addressed; begins with "the centerpiece for recent international policy discussions ... the Kyoto Protocol" (115)				
Worldview/view of nature				
Primary: Nature can be managed by coordinated human efforts.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: "Climate change is a global problem, and dealing successfully with this problem will require the efforts of many nations. Although some climate policies can be implemented unilaterally, international coordination of national efforts is crucial to addressing climate change in the most effective & equitable manner." (115)				
Secondary: Engaging "less developed countries," even without near-term abatement requirements, is important to having a global system for GHG reductions				
Tertiary: Flexibility is important to reduce costs and to change policies as efforts continue.				
Notes: Assumption that international agreements are the mechanism for dealing with climate change				

#6: Jamieson, Dale 2001. Climate change and global environmental justice. Pages 287-307 in <i>Changing the Atmosphere: Expert Knowledge and Environmental Governance</i>, Clark A. Miller and Paul N. Edwards, eds. MIT Press, Cambridge, MA.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Dale Jamieson is a professor at Carleton College, has published widely in environmental philosophy.				
Secondary: The editors, Miller and Edwards, are sociologists.				
Tertiary:				
Notes				
Type of argument				
Primary: Analyzes competing definitions of global environmental justice “that lie at the heart of the North-South debate about climate change.” (289)				
Secondary: Philosophical (argument from cases)				
Tertiary:				
Notes				
Type of evidence				
Primary: Narrative of policy debates with many names of organizations and individuals				
Secondary: Philosophical cases of common property rights (analogy to emissions rights)				
Tertiary:				
Notes: Starts with Rio Summit and the FCCC, then Berlin Mandate (1995), then Kyoto				
Worldview/view of nature				
Primary: Everyone has an equal right to common property resources, including air				
Secondary: Justice is primarily concerned with people				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: distribute to every person “the same level of GHG emissions as every other person” in some index year (1990 or another)				
Secondary: Industrialized countries should pay much of the cost of poorer countries’ adaptation.				
Tertiary: “the post-Kyoto process must find ways of addressing contentious normative issues, including those bound in with scientific representations of nature, if we are going to be able to mobilize support among diverse and far-flung publics for the kinds of social and economic changes that will be needed” (289)				
Notes				

#7: Meyerson, Frederick A.B. 2002. Population and climate change policy. Pages 251-274 in <i>Climate Change Policy: a Survey</i>, Stephen H. Schneider, Armin Rosencranz and John O. Niles, eds. Island Press, Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Frederick A.B. Meyerson is described as “ PhD ecologist, demographer and former attorney.”				
Secondary: Stephen H. Schneider, the 1 st editor, has been an outspoken advocate of policy to combat climate change				
Tertiary:				
Notes				
Type of argument				
Primary: More people, more consumption, more “anthropogenic dominance of the biological assets of the planet” also “also decreased the ability of the global ecosystem to absorb and store carbon by ... ecosystem simplification” (253) of complex natural systems to agriculture				
Secondary: “two demographic factors – the initial per capita inequity established by the Kyoto Protocol and the greatly different population growth trajectories of the Annex B countries – put additional strain on an already problematic and politically besieged international environmental agreement.” (261)				
Tertiary: “Although there is an international consensus that improving reproductive health and family planning has positive economic, social, and environmental effects, a few fundamentalist countries, along with the Vatican, have been able to slow down progress toward many of the Cairo goals” (258) – a few in the US “have been able to block or weaken population-related legislation” (258)				
Notes				
Type of evidence				
Primary: Correlation between pop growth and emissions growth assumed to be causal				
Secondary: Model projections of both population and emissions (CDIAC and UN demographic projections)				
Tertiary:				
Notes: begins with pop/consumption/emissions growth (1900-) , projected effects on pop, then backs up to 1800				
Worldview/view of nature				
Primary: Humans are harming climate and must reduce their use of natural resources such as fossil fuels.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Agree on a global emissions cap based on population				
Secondary:				
Tertiary:				
Notes				

#8: Meadows, Donella H. 1997. "Mother Gaia reflects on the global climate conference." http://csf.colorado.edu/forums/ecofem/dec97/0009.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Meadows "is an adjunct professor of environmental studies at Dartmouth College."				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: "I may have made a mistake when I evolved that two-legged, large-brained life-form. ... Deciding the composition of the atmosphere by counting up money 'costs' makes as much sense as deciding whether a plane will fly by the position of a football on a field. Wrong measure. Wrong field. Wrong game."				
Secondary:				
Tertiary:				
Notes:				
Type of evidence				
Primary: An imaginative monologue by Gaia				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature is much larger and still in charge. Humans are arrogant if they think they can try to control climate and survive.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: "If they don't figure that out, I'm going to have to take a few million years and try to evolve a higher form of intelligence."				
Secondary: "Maybe that won't be necessary, though. ... The big-brains do have the capacity to see beyond power and money, see into the future, understand the fundamentals of my laws, distinguish between symbols and reality. Some of them know how many kinds of energy they can harness that don't put carbon back into the atmosphere. ...But they'd better hurry. ... I hope they do. I'm really quite fond of them."				
Tertiary:				
Notes				

#9: Martens, W.J.M., J. Rotmans and L.W. Niessen 1994. <i>Climate Change and Malaria Risk: An Integrated Modelling Approach</i>. GLOBO Report Series no. 3, Rijksinstituut voor Volksgezondheid en Milieuhygiene, Bilthoven, The Netherlands.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: RIVM is known for its ecologically based integrated assessment models.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Malaria is an important disease whose risk may rise because of increased temperature's effect on disease vectors.				
Secondary: "The process leading to the impact of a human-induced climate change on malaria incidence can be represented by a sequence of indicators representing the cause-effect chain." (17) increased temp → increase in vectorial capacity → increase in disease burden of malaria (mitigated by public health programs, which divert resources from other goods) → effects on sustainable development				
Tertiary:				
Notes				
Type of evidence				
Primary: Integrated Assessment Model design (with algorithms) and results				
Secondary: Information about malaria and its vectors				
Tertiary: Schematic diagram of the effect of "human-induced climate change" on "vector-borne disease incidence" (3)				
Notes: begins "Human activities have reached a level at which their impact on the environment is global." (1)				
Worldview/view of nature				
Primary: Nature includes humans in the disease cycle; humans affect climate, climate affects vectors of disease, disease increases.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Modeling "is feasible and can provide valuable insights into the interdependencies among climate change, vector population dynamics and human disease dynamics" but additional research is needed on biological, ecological and socio-economic factors.				
Secondary: "During all or part of the various simulation runs, there is a failure to meet targets for sustainability, defined in terms of temperature and human health. Given insufficient resources to deal with malaria adequately in the most affected regions, the anticipated risk of climate change tends to unacceptable levels." (29)				
Tertiary:				
Notes				

#10: USEA/USAID Handbook of Climate Change Mitigation Options for Developing Country Utilities and Regulatory Agencies 1999. Energy Resources International, Inc., Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Both the US Energy Agency and US Agency for International Development are hands-on organizations concerned in development				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Since the United Nations Framework Convention on Climate Change (UNFCCC) was signed in 1992, there has been a growing concern about the potential climate change implications of power sector activities, even those classified as ‘best practices’. ... Information on more than 70 climate change action areas is provided in the Handbook for developing country utilities and regulatory agencies to avoid, offset or reduce the impact of GHG emissions.” (ES-1)				
Secondary:				
Tertiary:				
Notes: Assumption is that providing information leads unproblematically to desired actions.				
Type of evidence				
Primary: “For each action area, available information on the characteristics, climate change impact, issues related to implementation and information resources/contacts is provided.” (1-5)				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Human-induced climate change is real; emissions can be managed/reduced.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Adoption of “best practices” that have climate change benefits will mitigate climate change.				
Secondary: Information on beneficial regulation, along with contacts and funding sources, will encourage implementation of these regulations.				
Tertiary:				
Notes				

#11: Ahmed, Qazi Kholiquzzaman and Ahsan Uddin Ahmed 2000. Social Sustainability, indicators and climate change. In <i>Climate change and its Linkages with Development, Equity and Sustainability: Proceedings of the IPCC Expert Meeting held in Colombo, Sri Lanka, 27-29 April 1999</i>. World Bank, Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The two authors are from the Bangladesh Unnayan Parishad.				
Secondary: Sponsorship of the meeting came from several major climate change-involved organizations: IPCC, WMO, RIVM, World Bank, LIFE (in Sri Lanka)				
Tertiary:				
Notes				
Type of argument				
Primary: Because climate impacts carry costs and developing countries will be most affected, climate change will exacerbate inequality, motivate migration, begin ‘a new vicious circle of socioeconomic vulnerability’ (99), and destabilize social relations.				
Secondary: “Under conditions of climate change, social sustainability is a reflection of the society’s ability to reduce social vulnerability caused by the induced changes. ... If a society is well prepared in terms of human, physical (infrastructural), and financial capacities; well positioned in terms of general awareness and institutional capabilities; and possesses a high resilience (moral, kinship and otherwise), then it should be able to effectively lower its vulnerability.” (100)				
Tertiary:				
Notes				
Type of evidence				
Primary: Enumeration of mostly negative impacts of climate change, referring to model-based studies				
Secondary:				
Tertiary:				
Notes: begins with human dependence on natural systems and threats of “climatic disasters”				
Worldview/view of nature				
Primary: “Human lives and economic progress are both dependent on natural systems – as sinks for carbon dioxide and sources of oxygen, and as the ultimate natural base of the economic activity.” (95)				
Secondary: “With the assault on the nature perpetrated largely by the now developed countries while increasing their wealth, and more recently by the developing countries seeking to improve their economic conditions, the climatic balance has been seriously destabilized.” (95)				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Overriding focus” on “empowerment of the people for participating in economic, social and political processes in an effective manner, for which ethics and morality must underpin the behavior of the people, particularly those who are in decision-making, program implementation, and leadership positions.” (102) also social equity must be a “guiding principle.”				
Secondary: Improve human capital, democratic governance, employment and opportunities, access to resources and social services; reduce poverty and population growth; improve health care; build environmental capacity				

Tertiary: Protect flood-vulnerable areas; provide irrigation; produce better seeds; alter crop calendar; prepare to cope with emergencies & disasters; manage land use; create social infrastructures to minimize losses

Notes

#12: Gore, Al 1992. <i>Earth in the Balance: Ecology and the Human Spirit</i>. Houghton Mifflin, New York.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: At the time of writing, Gore was a US Senator; he became Vice President and was the Democratic candidate for the presidency in 1999.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Humans are, by thinking of the earth as a storehouse of resources they have only to tap, are destroying the ecological balance; “the entire relationship between humankind and the earth has been transformed because our civilization is suddenly capable of affecting the entire global environment, not just a particular area.” (29-30)				
Secondary: Most scientists believe that humans are increasing the greenhouse effect; although there are uncertainties, the conservative approach would be to limit emissions.				
Tertiary:				
Notes				
Type of evidence				
Primary: Personal story – first, education by Roger Revell and Mauna Loa data; second, increasing involvement in hazardous waste and nuclear issues				
Secondary: Metaphors, folk sayings, and anecdotes (frog in hot water v. gradually warmed water, perspective from space looking at Earth, Yogi Berra sayings, borrowing on credit)				
Tertiary: Examples: burning in the Amazon, drying up of Aral Sea, ozone hole, thinning ice cap, historical examples of climate anomalies caused by, e.g., volcanic eruptions (1816) and consequent famine/political unrest/migration				
Notes				
Worldview/view of nature				
Primary: “The ecological perspective begins with a view of the whole, an understanding of how the various parts of nature interact in patterns that tend toward balance and persist over time. But this perspective cannot treat the earth as something separate from human civilization; we are part of the whole too, and looking at it ultimately means also looking at ourselves.” (2)				
Secondary: Humans are a natural force, one that threatens to push Earth out of balance				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “For civilization as a whole, the faith that is so essential to restore the balance now missing in our relationship to the earth is the faith that we do have a future.” (368) – ethical choice “to pay attention, resist distraction, be honest with one another and accept responsibility for what we do” (368) – and begin without delay.				
Secondary: Global Marshall Plan				
Tertiary:				
Notes				

#13: Edwards, Paul 1996. Models in the policy arena. In <i>Elements of Change, Session 2: Characterizing and Communicating Scientific Uncertainty</i>, Susan Joy Hassol and John Katzenberger (eds). Aspen Global Change Institute, Aspen, CO.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The author is in the Science, Technology, and Society Program at Stanford U				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Climate change would not exist as a political issue without models” (159), but “Models don’t and probably won’t ever control policy choices because there are other policy constraints that are too powerful” (159)				
Secondary: “One role of models for climate science has been to build an increasingly large community around the climate change issue in which many groups and elements have come to play a role.” (159)				
Tertiary:				
Notes				
Type of evidence				
Primary: History of models-for-policy: Club of Rome, Systems Dynamics Group at MIT, IIASA, IMAGE at RIVM (a direct descendant of the world dynamics models)				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Because models have important limitations, they have large uncertainties that are unlikely to be eliminated, i.e., that cannot represent the climate although the new scientific paradigm accepts a mathematical representation of the climate				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Models should play a heuristic role in policymaking, e.g., “for retrospective policy evaluation, helping to determine if a policy worked by comparing what actually happened to model results of what would have happened in the absence of the policy” (162)				
Secondary:				
Tertiary:				
Notes				

#14: Rosenzweig, Cynthia and Daniel Hillel 1995. Potential impacts of climate change on agriculture and food supply. <i>Consequences: The Nature & Implications of Environmental Change</i> 1(2), 22-32.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Rosenzweig is one of the authoritative researchers on this topic.				
Secondary: Funding is provided for this journal by NOAA, NASA, and NSF.				
Tertiary:				
Notes				
Type of argument				
Primary: “Computer models and other studies confirm that agriculture may not be much perturbed by a temperature increase of 1.5 degrees C (the lower limit of the IPCC projections for the mid-21 st century), but may be severely affected by an increase of 4.5 degrees.” (22)				
Secondary: Possible benefits include enhanced CO ₂ assimilation, longer growing seasons, and increased precipitation. Possible drawbacks include more frequent and severe droughts, heat stress, faster growth/shorter growing periods and lifecycle, increased pests and erosion, decreased soil fertility, and flooding and salinization from sea level rise.				
Tertiary: “the ability of any country to take advantage of the opportunities and to avoid the drawbacks as climate changes will depend on the availability of adequate resources as well as on the quality of the research base.” (28)				
Notes				
Type of evidence				
Primary: model-based results showing projected impacts of climate change on crops				
Secondary: analyses of uncertainty, thresholds, and surprises				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans are affecting the balance of nature, but can correct their actions through careful planning and actions.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Immediate action to prepare for global warming is needed.				
Secondary: Instead of “setting arbitrary levels for atmospheric trace gas concentrations, emissions rates, or temperatures to serve as upper limits of acceptability for policy response” is misleading; better to assume the “global warming and its manifestations will be in some manner proportionate to the increase of trace gas concentrations and that the eventual consequences of any significant human alteration of the Earth’s energy balance is potentially serious.” (31)				
Tertiary: A “blind faith in agriculture as a self-correcting process” is also misleading; “In all areas of the world the necessary adjustments (such as substituting crops, introducing or intensifying irrigation, and modifying field operations such as tillage or pest control) may be too costly for many farmers to implement.” (31-32)				
Notes: Not identified as a recommendation, but “The presently inadequate capacity of agricultural research systems in the tropics and semi-tropics will need to be rectified, and this task can best be achieved through international cooperation.” (28)				

#15: Edmonds, Jae and Michael J. Scott et al. 1999. <i>International Emissions Trading and Global Climate Change</i>. Pew Center on Global Climate Change, Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Jae Edmonds was one of the first modelers of emissions and energy related to global climate change and an early integrated assessment modeler.				
Secondary: The Pew Center is an advocacy group but strives for balance in its reports.				
Tertiary:				
Notes				
Type of argument				
Primary: Because emissions mitigation addresses a century-scale problem, costs must be low if action is to be undertaken (i.e., there is no immediate benefit resulting from costs).				
Secondary: Theory favors trading to lower costs, but actual costs depend on the design of the program.				
Tertiary:				
Notes				
Type of evidence				
Primary: discussion of the principles of trade				
Secondary: model results showing benefits of emissions trading relative to no trading				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans and human activities are the focus; nature is secondary				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Allow emissions trading in any scheme to reduce emissions.				
Secondary: “Programs must be carefully designed to assure that the potential gains from trade are realized.” (iv) Actual costs likely to be lower because “models do not include the various measurement, verification, trading, and enforcement costs that would characterize any real trading system.” (iv)				
Tertiary:				
Notes				

#16: Greenwald, Judith, Brandon Roberts and Andrew D. Reomer 2001. <i>Community Adjustment to Climate Change Policy</i>. Pew Center on Global Climate Change, Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary: The Pew Center is an advocacy group but strives for balance in its reports.				
Tertiary:				
Notes				
Type of argument				
Primary: Just as “the federal government has taken an active role in assisting communities facing economic loss” from global competition, defense downsizing, and recession, so too it should assist “communities that may face substantial economic loss due to climate change policies ... those with high reliance of jobs in energy-producing industries (e.g., coal mining in West Virginia, oil and gas production in Louisiana); energy-intensive industries (e.g., steel manufacturing in Pennsylvania); and industries that make energy-consuming products (e.g., auto manufacturing in Michigan).” (1-2)				
Secondary: Ability of communities to adjust to economic dislocation is a function of four factors: (1) strength and diversity of the economy, (2) nature of economic assets, (3) ability of community members to manage adjustment, and (4) effectiveness of economic development institutions in strategic planning and implementation.				
Tertiary:				
Notes				
Type of evidence				
Primary: “review of 26 community-based adjustment programs from around the nation and the world” (3) – examples, cases				
Secondary: “an examination of factors that influence the ability of communities to adjust to dislocation.” (3)				
Tertiary:				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Designate and fund the Economic Development Administration (E.D.A.) of the U.S. Department of Commerce to design and implement an economic adjustment program for communities.” (ii)				
Secondary: “Identify and assist communities that are particularly dependent on energy-producing and energy-intensive sectors before dislocations occur.” (ii)				
Tertiary: “Leverage and integrate additional resources by involving multiple federal agencies and state and local governments through federal and regional task forces.” (ii)				
Notes: Additional action proposed – “Be flexible in addressing community needs by supporting locally determined, comprehensive strategies for five to seven years after the implementation of new climate policies.” (ii)				

#17: “Response Strategies: Building Resilience in Systems” 2002. Chapter V in California Regional Assessment Report for the U.S. Global Change Research Program.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: This is one regional report, mandated by Congress to assess the potential impacts in the US of climate change and the potential to address climate change – it was widely criticized as alarmist and not good science				
Secondary: The lead author is Robert Wilkinson, Lecturer, Environmental Studies Program at UCSB				
Tertiary:				
Notes				
Type of argument				
Primary: “The goal of California decision-makers and stakeholders should therefore be to craft investment and policy strategies to maintain ecosystem health, productive capacity, and quality of life within the framework of the concerns and values of the region.”				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: Quotations from business leaders and strategists, researchers, one journalist from <i>WSJ</i>				
Secondary: Model programs, such as NOAA NWS Heat Index Program, Village Homes (Davis, CA), “Cool Roofs,” daylighting in a Lockheed building				
Tertiary:				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Stress “multiple benefits” and “no regrets” strategies: energy efficiency, waste reduction, providing better cost signals to consumers re resources, floodplain management, public education.				
Secondary: For ecosystems, limit the footprint of development, restore degraded habitats, manage water and pollution for minimal impact, limit bio-invasions, “take the long view.” Build resilience in the urban infrastructure in “livable” neighborhoods. Manage stormwater runoff to let water percolate into the soil. Build “green.” Plan coastal land use and for fire protection/management. Use water markets and plan for adaptation in water infrastructure.				
Tertiary:				
Notes				

#18: Glantz, Michael H. 2001. Editorial: Global warming yea-sayers & naysayers: time to bridge the gap? <i>Network Newsletter</i>, Climate-Related Impacts International Network (NCAR and NOAA).				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Glantz is a well-known social scientist in the Environmental & Societal Impacts Group at the national Center for Atmospheric Research in Boulder, CO				
Secondary:				
Tertiary:				
Notes:				
Type of argument				
Primary: “There are, however, solid facts that all can (or should) agree on: seventeen of the eighteen warmest years in the twentieth century occurred since 1980. The atmosphere has warmed. The amount of carbon dioxide in the atmosphere has increased during the twentieth century. Glaciers worldwide are noticeably retreating. And the scariest of all, large chunks of the Antarctic’s ice mass have broken away.”				
Secondary: “To stand by and do nothing just for the sake of undoing the policies of a former president would be folly.”				
Tertiary:				
Notes				
Type of evidence				
Primary: “Clearly, an increasing number of scientists have been joining the ranks of those concerned about the likelihood of human interference in the natural processes that produce the earth’s climate (i.e., the yea-sayers).”				
Secondary: “even though we do not think that our house will be struck by lightning, we all buy insurance against that likelihood. We just don’t want to take the chance. We buy the insurance and hope it never happens. Thus, policies to deal with global warming, regardless of the human contribution to it, are a good insurance policy.”				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: “I myself am not sure how a global warming, natural or human-induced, will play out in the real world (as opposed to how it plays out in highly sophisticated...models.”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “The Bush administration has the opportunity to take a fresh look at the global warming issue by holding its own ‘global warming court’ that brings together the yea-sayers, the naysayers, and those ‘in between’ in order to decide on appropriate tactical and strategic responses to this potential global threat.”				
Secondary: “There are enough pieces of the climate change puzzle on the table to prompt rational people (including incoming policy makers) to ponder the issue more carefully and with less hype, fanfare, and acrimony toward those with opposing views. This is not a call for more science, but a call for more common sense.”				
Tertiary:				

#19: Darwin, Roy, Marinow Tsigas, Janm Lewandrowski and Anton Raneses 1996. Land use and cover in ecological economics. <i>Ecological Economics</i> 17, 157-181.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The authors were at the Economic Research Service, U.S. Dept of Agriculture				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Land use/cover is a “integrating concept”: (1) “the main resource governing primary productivity can be defined in terms of land” (157); (2) “land remains the primary source of the energy and mass that compose our food and fiber” (158); (3) “the most important interaction between humans and other biological communities is the competition for land.” (158)				
Secondary:				
Tertiary:				
Notes: “A basic premise of ecological economics is that the world economy is embedded in and dependent upon Earth’s ecosystem. This dependency is captured by the concept of ‘throughput’ (Boulding, 1966) or ‘entropic flow’ (Georgescu-Roegen, 1971) – the one-way flow of energy and mass through an economy that begins with resources and ends with waste.” (157)				
Type of evidence				
Primary: “We present a model that integrates economic-ecological activities with land use and cover.” (157) – the Future Agricultural Resources Model (FARM), developed at USDA “to evaluate impacts of global climate change on the world’s agricultural system” (158), which includes a GIS and a CGE economic model (description 159-171)				
Secondary:				
Tertiary:				
Notes: full-page flowchart of the model, 3 tables and a map re land class endowments				
Worldview/view of nature				
Primary: “interactions between economic and ecological phenomena are complex” (180) – “Whether the correlation with a particular economic variable [and forest depletion in Southeast Asia] is positive or negative depends on the global change scenario” (180)				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Results from our scenarios [of global climate change, population growth, and deregulation of agricultural trade] indicate that such changes are likely to have adverse effects on the health and integrity of tropical forest ecosystems.” (180)				
Secondary: “Improved throughput analyses require better tracking of resource stocks (soil, water, forests, fossil fuels, etc.) coupled with waste emission coefficients for various economic sectors. Methods for simulating inter- and intraregional labor migration, investment in human and physical capital, and technological change are needed to conduct dynamic analyses.” (180)				
Tertiary:				

#20: Athanasiou, Tom 2003 (March). Two futures, and a choice. <i>Progressive Response</i>. http://www.fpif.org/commentary/2003/0303choice.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Foreign Policy in Focus (FPF) is a “Think Tank Without Walls,” an international network of analysts and activists dedicated to “making the U.S. a more responsible global leader and partner by advancing citizen movements and agendas.” It is a joint project of the Interhemispheric Resource Center and the Institute for Policy Studies.				
Secondary: The author (toma@ecoequity.org) is co-author of Dead Heat: Global Justice and Global Warming.				
Tertiary:				
Notes: Other articles in the same issue include “Women, HIV, and the global gag rule: the disintegration of U.S. global AIDS funding” and “The Mexican farmers’ movement: exposing the myths of free trade.”				
Type of argument				
Primary: Invading Iraq and refusing to act aggressively to prevent catastrophic climate change are the same decision: to pursue an oil-dependent future.				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: the Cheney Report of May 2001, which predicts oil imports to rise by more than 60% by 2020				
Secondary: DOE’s Clean Futures study, which shows that U.S. oil consumption can remain near 2000 levels through 2020 “without harming the economy,” and the Tellus Institute report “The American Way to the Kyoto Protocol,” which projects “even greater reductions in both energy use of greenhouse pollution at a net savings of \$50 billion per year”				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: “The climatic future, for its part, is still open, but it’s closing in significant ways” – “Let one fact stand for them all: The Arctic ice is melting, fast”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “policies and technologies available today can put us on a new path – a path to both a cleaner environment and real global cooperation. ... a future worth having”				
Secondary:				
Tertiary:				
Notes				

#21: Ribot, Jesse C. 1996. Introduction: climate variability, climate change and vulnerability: moving forward by looking back. In <i>Climate Variability, Climate Change and Social Vulnerability in the Semi-arid Tropics</i>, Jesse C. Ribot, Antonio Rocha Magalhães and Stahis S. Panagides (eds). Cambridge University Press, Cambridge, UK.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The authors are at Harvard U, Secretariat of Planning in Brazil, and the Esquel Group Foundation, respectively				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Social vulnerability is not a direct effect of climate impacts, which “attributes to nature causality that can be directly and more productively traced to social organization.” (2) – “the risk that the household’s entitlements will fail to buffer against hunger, famine, dislocation or other losses.” (2)				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: case studies (the chapters of the book)				
Secondary: entitlements theory, as first articulated by Amartya Sen				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature is not the primary determinant of human welfare.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Understanding vulnerability [through its historical antecedents] should thus be used to produce more durable and earlier, proactive responses.” (8)				
Secondary: Focus on enfranchisement and empowerment to increase material resources with which to buffer against contingencies, including climate variability/change.				
Tertiary: Understand the interdependence of households, rural communities, and the state in terms of security.				
Notes				

#22: Calder, Nigel 1999. The carbon dioxide thermometer and the cause of global warming. <i>Energy & Environment</i> 10(1), 1-18.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: ??				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Natural agents of climate change, and especially the cosmic rays, control the concentration of carbon dioxide in the Earth’s atmosphere. Man-made emissions of carbon dioxide have no perceptible effect.”				
Secondary: “The increases in carbon dioxide in the air from year to year are a result, not a cause, of climate change.”				
Tertiary:				
Notes				
Type of evidence				
Primary: “By calibrating the natural carbon dioxide thermometer to global temperature deviations, a carbon dioxide history is inferred, which intersects ice-core data showing elevated carbon dioxide concentrations before the 20 th Century. The variable year-by-year increments of carbon dioxide can also be accounted for, without reference to temperature, by the combined effects of cosmic rays, El Nino and volcanoes. The most durable effect is due to cosmic rays.”				
Secondary: “The aa index of the solar wind, used as a long-term proxy for the cosmic rays, gives a carbon dioxide history similar to that inferred from the global temperature deviations.”				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature operates independently of humankind.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: [none given, but clearly no actions to reduce greenhouse gases are needed]				
Secondary:				
Tertiary:				
Notes				

#23: Idso, C.D. and K.E. Idso 2002. Carbon dioxide and global warming: where we stand on the issue. Available at http://www.co2science.org/about/position/globalwarming.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: This is a position paper for the Center for the Study of Carbon Dioxide and Global Change, which, according to its mission statement “attempts to separate reality from rhetoric in the emotionally-charged debate that swirls around the subject of carbon dioxide and global change.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: CO2 concentrations have risen, attributable to human use of fossil fuels; but there is only a weak correlation between this and the slight warming of the Earth over the past century, not causal link.				
Secondary: Negative feedbacks, which are “not adequately represented in state-of-the-art climate models,” can counter any increased CO2 greenhouse effect.				
Tertiary: “Growth-enhancing effects of CO2 create an impetus for cooling.” And they are “a boon to the biosphere.”				
Notes: Another argument: “There is no evidence for warming-induced increases in extreme weather.” – although costs of damages have risen.				
Type of evidence				
Primary: Over the past half-million years, no causal relationship can be shown. During the “seven greatest temperature transitions...we note that increases and decreases in atmospheric CO2 concentration not only did not precede the changes in air temperature, they <i>followed</i> them, and by <i>hundreds to thousands of years!</i> There were also long periods of time when atmospheric CO2 remained unchanged, while air temperature dropped, as well as times when the air’s CO2 content dropped, while air temperature remained unchanged or actually rose.”				
Secondary: “the warming predicted to result from a doubling of the air’s CO2 content may be <i>totally countered</i> by (1) a mere 1% increase in the reflectivity of the planet, <i>or</i> (2) a 10% increase in the amount of the world’s low-level clouds, <i>or</i> (3) a 15 to 20% reduction in the mean droplet radius of earth’s boundary layer clouds, <i>or</i> (4) a 20 to 25% increase in cloud liquid water content.”				
Tertiary: Documented growth enhancements of CO2				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes: “References to the voluminous scientific literature that supports the many factual statements of this position paper may be found on our website, which we update weekly.”				
Action(s) proposed				
Primary: “Our policy prescription relative to anthropogenic CO2 emissions is thus to leave well enough alone and let nature and humanity take their inextricably intertwined course.”				
Secondary:				
Tertiary:				

Notes

#24: Hoffert, Martin I., Ken Caldeira, Gregory Benford, David R. Criswell, Christopher Green, Howard Herzog, Atul K. Jain, Haroon S. Kheshgi, Klaus S. Lackner, John S. Lewis, H. Douglas Lightfoot, Wallace Manheimer, John C. Mankins, Michael E. Mauel, L. John Perkins, Michael E. Schlesinger, Tyler Volk and Tom M.L. Wigley 2002. Advanced technology paths to global climate stability: energy for a greenhouse planet. <i>Science</i> 298(1 November), 981-987.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: A fairly large, interdisciplinary group of scientists				
Secondary: A prestigious scientific journal				
Tertiary:				
Notes				
Type of argument				
Primary: “Arguably, the most effective way to reduce CO2 emissions with economic growth and equity is to develop revolutionary changes in the technology of energy production, distribution, storage, and conversion.” (981)				
Secondary: The gap between energy that will be needed and the capacity of current technologies is larger than realized (including by the IPCC).				
Tertiary:				
Notes				
Type of evidence				
Primary: theoretical efficiency limits of current technologies, decarbonization, and sequestration; potential for renewables (including undemonstrated technologies), fission and fusion				
Secondary: data on population growth, energy-related emissions, and stabilization levels				
Tertiary:				
Notes: warrants of Arrhenius and of FCCC included (quote re “dangerous” level of concentrations)				
Worldview/view of nature				
Primary: Humans can control nature				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Stabilizing climate is not easy. At the very least, it requires political will, targeted research and development, and international cooperation.” (986)				
Secondary: “Most of all, [climate stabilization] requires the recognition that, although regulation can play a role, the fossil fuel greenhouse effect is an energy problem that cannot be simply regulated away.” (986)				
Tertiary:				
Notes				

#25: Berger, John J. 2000. <i>Beating the Heat: Why and How We Must Combat Global Warming</i>. Berkeley Hills Books, Berkeley, California.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Berger is “an independent energy and environmental consultant.” He holds a PhD in ecology from UC Davis and has authored seven books on climate, nuclear and renewable energy, environmental restoration, and forestry.				
Secondary: Jacket blurbs from John Adams at NRDC, Ernest Gallenbach, Lester Brown, and Stephen Schneider.				
Tertiary:				
Notes				
Type of argument				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: Ch. 1 (12-25) is an imaginative look at 2100; “you” travel in a personal transport device and survey the worldwide changes that have come from warming, SLR, wetlands loss, water siltation and pollution, and increased disease; Ch. 3 (41-57) depicts a U.S. Cabinet meeting in 2012, when no actions have been taken and now costs are much higher				
Secondary: Ch. 2 explains the greenhouse effect and increases in CO2 concentrations in the past century; Ch. 5 describes renewable energy sources and their potential.				
Tertiary: Ch. 4 names and tries to discredit climate skeptics, then argues against 9 “myths” of these skeptics.				
Notes				
Worldview/view of nature				
Primary: “If you are not sure why we should care if a few more species go extinct, remember that nature is an interconnected fabric. Poke enough holes in it, tear it, yank on it hard enough, and it will rip. Once in ruins, it is very difficult and costly to mend, and the services it was unobtrusively providing are suddenly in jeopardy or gone.” (10)				
Secondary: “If we destroy nature, we eventually destroy ourselves.” (11)				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Individual actions to reduce energy use, from buying a fuel-efficient car to eating locally grown food and less meat to buying from green companies and becoming politically active on this issue (17 in all).				
Secondary: Recommended government policies range from removing subsidies to fossil fuel and nuclear industries to providing incentives for renewables (firms and individuals) to reducing methane and nitrous oxide emissions from agriculture to participating in international emissions trading and non-emitting technology transfer.				
Tertiary:				
Notes				

#26: Kawashima, Yasuko 2000. Nuclear power and climate change: the current situation in Japan and a message to the United States. Resources for the Future, http://www.weathervane.rff.org/pop/pop9/kwashima.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The author is a researcher at the National Institute for Environmental Studies, Japan.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Japan is committed to reduce emissions, but lately support has shifted from expansion of nuclear power to renewable sources and “a shift towards less energy-consuming lifestyles.”				
Secondary: The U.S. “has already achieved more progress than Japan in the use of soft energy such as wind power, but this advantageous position has not been expanded much recently. ... On the other hand, efforts toward a less energy-consuming community seem unpopular in the United States.”				
Tertiary:				
Notes				
Type of evidence				
Primary: details of government policies at the national and community level				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Environmental issues/climate change are as important as economic issues/recession.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “I hope experts in the United States will come up with a recommendation for a win-win strategy, minimizing nuclear power while reducing CO2 emissions.”				
Secondary:				
Tertiary:				
Notes				

#27: Toman, Michael A. n.d. <i>Climate Change Economics and Policies: An Overview</i>. Retrieved from Resources for the Future website (www.rff.org) 03/12/03. (Last date in reference list is 2000.)				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Toman has written widely about economics and climate policy for the think tank Resources for the Future.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Each issue in climate change should be analyzed in terms of its costs and benefits.				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: Economic theory as embodied in climate policies.				
Secondary:				
Tertiary:				
Notes: cites “dangerous” quote of UNFCCC, Kyoto Protocol				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “basic points for evaluating climate change risks and response costs:” (1) “Think comprehensively about risks.” (2) “Address adaptation.” (3) “Consider the long term.” (4) “Make the focus international.” (5) “Keep in mind distributional issues.” (6) “Estimate costs comprehensively and realistically.”				
Secondary: “what constitutes effective and efficient climate policies:” (1) “Incorporate economic incentives into emissions-reduction policy.” (2) “Provide opportunities for emissions reductions wherever possible.” (3) “Allow flexibility in the timing of cumulative emissions reductions to reduce overall costs.” (4) “Encourage the development of the climate change knowledge base and improved technology for emissions reduction.” (5) “Increase the emphasis on adaptation.”				
Tertiary:				
Notes				

#28: Inovent Strategic Value Advisors 2002. COE Briefing from <i>Climate Change and the Financial Services Industry</i>. United Nations Environment Programme Finance Initiatives, http://www.unepfi.net				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “even small changes (<10%) in even severity can generate multiple increases in damage”; however, threats and opportunities exist in every financial sector.				
Secondary: “Market solutions will play a pivotal role in tackling climate change whatever the international policy framework. Financial institutions will therefore have a key role to play” in making an efficient market system and efficient emissions trading system; and providing products/services “that contribute towards adaptation and mitigation efforts,” “manage their own property risks,” “pursue environmental management leadership,” and “engage with stakeholders to work towards solutions.”				
Tertiary: “Strong government leadership on adaptation and mitigation measures is a prerequisite for market-based solutions in order to provide the financial services industry with the necessary regulatory architecture.”				
Notes				
Type of evidence				
Primary: review of attitudes towards climate change in insurance/reinsurance, banking, asset management, project finance, emissions trading, and professional services (mostly unaware and/or unprepared, little experience)				
Secondary: Graph on carbon finance at the project level (from the World Bank); graph on evolution of carbon as a driver of financial value (government role) (from Inovent)				
Tertiary:				
Notes: cites IPCC conclusions				
Worldview/view of nature				
Primary: Proactive strategies can help humans cope with climate change.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Long list of recommendations, from raising awareness and leading by example to adapting products; clarifying threats, opportunities and risk; developing tools and products; structure current markets in clean technologies, carbon credits, etc.; and develop harmonized GHG accounting methods.				
Secondary: Policymakers should establish a long-term policy framework, involve financial institutions, and establish emissions trading systems. Governments should sponsor research, encourage renewables, and provide support for less developed countries.				
Tertiary: The UNEP Finance Initiatives should sponsor three multidisciplinary task forces to raise awareness, developing a quantitative methodology that will capture the implications of climate change regulations, and developing a project finance method.				

#29: <i>Preparing for a Changing Climate: The Potential Consequences of Climate Variability and Change. Mid-Atlantic Overview. 2000. Mid-Atlantic Regional Assessment Team. Pennsylvania State University, University Park, Pennsylvania.</i>				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Sponsored by EPA and USGCRP, this report is one of 16 regional assessments of the U.S.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Results show that benefits are fewer and smaller than potential damages.” Large negative impacts of climate change for the coastal zones (most certain), biodiversity and ecological functioning (both uncertain); moderate negative impacts on temperature-related health stress (most certain) and fresh water quality (uncertain); other impacts are mixed or low.				
Secondary: “Economic analysis suggests that the MAR <i>economy</i> will be resilient to projected climate change. The region’s diversified, technologically advanced economy is highly integrated with the rest of the United States and the world and has relatively little dependence on climate-sensitive economic sectors.” (iv)				
Tertiary:				
Notes				
Type of evidence				
Primary: use of climate scenarios from two GCMs (Hadley and CCCM) and socioeconomic scenarios from USGCRP (population, income and employment growth)				
Secondary: integrated regional assessment approach (START graphic)				
Tertiary: extensive input from stakeholders				
Notes				
Worldview/view of nature				
Primary: climate as hazard and resource for people				
Secondary: people stress the environment				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Win-win actions: (1) “use a watershed perspective to reduce flood and drought damages and protect water quality”; (2) remove incentives for practices ... that place people, investments, and (especially coastal) ecosystems at greater risk to climate variability”; and (3) set up communication and learning tools and programs...” (v)				
Secondary: Information needs: improve projections of extreme weather and how it affects the environment/human health, how adaptation would help; improve models to evaluate benefits/costs; and improve methods for evaluating the effects of policies				
Tertiary:				
Notes				

#30: Singer, Dr. S. Fred 2000. Interview.				
http://www.pbs.org/wgbh/warming/debate/singer.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Singer “is an atmospheric physicist at George Mason University and... a leading skeptic of the scientific consensus on global warming.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “the scenarios are alarmist, computer models reflect real gaps in climate knowledge, and future warming will be inconsequential or modest at most.”				
Secondary: Climate does change, but humans adapt. The only way to know if climate is changing is observations/measurements, but these are ambiguous. Satellite data are better than surface data.				
Tertiary: Costs of buying climate change “insurance” are too high				
Notes				
Type of evidence				
Primary: critique of models: cannot reproduce clouds, do not agree with each other, are “tweaked” to produce current climate				
Secondary: Historical data: satellite data show slight cooling in the past 20 years; CO2 and temperature in the long time record are not correlated such that causation is possible				
Tertiary: climate scientists who are funded by USGCRP have a vested interest in producing claims about climate change				
Notes				
Worldview/view of nature				
Primary: People probably have little effect on climate but are very adaptable.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “If it warms, it will be good. So what is the concern, really?”				
Secondary: “Certainly we know that the models do not agree amongst themselves. So I think the first step is to find out why this is so, and work very hard to at least resolve the differences between [models], and then try to resolve differences between models and observations.”				
Tertiary:				
Notes				

#31: Boehmer-Christiansen, Sonja 1994. Global climate protection policy: the limits of scientific advice, Parts 1 and 2. <i>Global Environmental Change</i> 4(2), 140-159 and 4(3), 185-200.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The author is a sharp critic of the IPCC.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “energy politics rather than uncertain science have had the decisive impact on global warming policy and that this process has benefited the institutions of big science and the political North” (185) “The primary interest of research is the creation of concern in order to demonstrate policy relevance and attract funding. This policy relevance, and therefore the need for scientific advice, decline rapidly once a problem is actually dealt with by regulatory, technological or behavioural change.” (141)				
Secondary: “It is argued here that energy industries, their R&D sectors, and regulators in government who felt threatened by this advice, became major opponents of the alarmist interpretation of scientific evidence. They were, however, countered by similarly strong alliances of environmentalists and competing energy interests – that is, those who stood to gain from the economic impacts of carbon dioxide emission reductions or carbon taxes. This latter green alliance, however, grew weaker during the late 1980s.” (185)				
Tertiary:				
Notes				
Type of evidence				
Primary: history of international scientific programs re climate change and a map of their relationships (WMO, IGBP, ICSU, START, NASA EOS, etc.), history of IIASA’s system analysis and the IPCC (WGs and their findings)				
Secondary: Interest linkage between FCCC, which requires little more than “plan and publish” and IPCC, which provides “advice”				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: The environment and society are the losers when political interests hold sway (i.e., environment at the mercy of humans).				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “It is therefore concluded that the capacity and responsibility of government (not NGOs!) – as elected and accountable representatives of society – in environmental policy making need significant conceptual and institutional strengthening. For global climate policy, this requires including areas of knowledge that have not so far been tapped and advice which some governments may not like to hear.” (200)				
Secondary:				

Tertiary:
Notes

#32: Stakhiv, Eugene and Kyle Schilling 1998. What can water managers do about global warming? <i>Water Resources Update</i> 112, 33-40.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Both authors are at the Institute for Water Resources, US Army Corps of Engineers				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Engineers can design and operate their systems more efficiently to increase robustness and resiliency and reduce vulnerability, but institutional arrangements must be reconfigured to ensure that future water resources services can be provided in a sustainable and equitable manner under a wider range of circumstances.” (33)				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: cites IPCC report, Ausabel, Lettenmeier, Gleick				
Secondary: declining withdrawals, mostly because of the CWA, SDWA, Water Resources Development Act and other policy instruments				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Currently, water managers “are continuously adapting to new information and demand-driven changes” and “managed water systems and river basins ... can be effectively managed for all but the most severe climate change scenarios” (34)				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: explicitly include climate change concerns into planning for new investments for capacity expansion, operation of existing systems for optimal use, and maintenance and rehab of existing systems – especially using risk and uncertainty analysis				
Secondary: Corps managers should “play a more active role in transferring technologies associated with climate forecasting” (39)				
Tertiary:				
Notes				

#33: Quick, Martin. “Friends and climate change – contraction and convergence?” http://www.quakergreenconcern.org.uk/displayarticle.asp?artcleid . Downloaded March 2003.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: This statement is on the “Quaker Green Action” site and is linked to Aubrey Meyer’s site on “contraction and convergence,” which he advocates to combat climate change.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “The principle of Contraction and Convergence appears to be a reasonably fair way of setting greenhouse gas emissions targets” and “appears to fit well with Friends testimonies and concerns.”				
Secondary: “While technology can be expected to enable major reductions in greenhouse gas emission to be made, the very large cuts in greenhouse gas emissions needed are likely to require some changes in the rich countries to our profligate life style, particularly in use of cars and in flying. ... Here, Friend’s testimony to simplicity seems particularly relevant, showing that a simpler lifestyle can be a positive good for its own sake.”				
Tertiary:				
Notes: C&C sets up emissions trading based on per capita allowances and convergence, over time, to one “per head” standard for every country.				
Type of evidence				
Primary: Deals with equity arguments about emissions reductions – industrialized nations “negotiated for themselves at Kyoto” emissions levels based on current levels per country, not the fairer per capita levels; Russian “hot air” would allow the US to buy its way out of caps (if it agrees to join in mitigation)				
Secondary:				
Tertiary:				
Notes: Discusses the UNFCCC, Kyoto, and the IPCC				
Worldview/view of nature				
Primary: Equity and simplicity among humans must guide the path to needed actions to mitigate climate change (assumption that this is doable).				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: No recommendations, as Friends are free to decide for themselves				
Secondary:				
Tertiary:				
Notes				

#34: "API's Position." Downloaded March 2003 (but still refers to the Clinton Administration). http://www.api.org/globalclimate/apipos.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: No author given, since this is a trade group position. American Petroleum Institute has been a voice for skepticism, but has recently softened its hardline position because of views of some (former) members.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: "The oil and natural gas industry believes that the targets and timetables reducing greenhouse gases contained in the Kyoto Protocol would exact [too] heavy an economic price given our current understanding of the evolving science of climate change." – cites WEFA, Charles River Associates, federal government				
Secondary: The science is uncertain; "We know enough to take the threat seriously, but not enough to inflict the economic harm which would result from implementation of the Protocol."				
Tertiary:				
Notes				
Type of evidence				
Primary: "To achieve the Protocol's targets the U.S. would have to curb its energy production and use in ways that would cost millions of jobs and substantially raise the price of essential goods, including gasoline, electricity, heating oil and natural gas. Because developing nations are exempt from the Protocol, American businesses would lose out in the international marketplace."				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature is essentially unknown.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: "focused research on the causes and impacts of climate change and developing technologies needed to make reductions of greenhouse gases affordable and efficient."				
Secondary: "cumbersome government rules, which have discouraged technological development, should be streamlined or eliminated."				
Tertiary:				
Notes				

#35: Natural Resources Defense Council 2002. “Untangling the accounting gimmicks in White House Global Warming and Pollution Plans” wysiwyg://14/http://www.nrdc.org/globalwarming/agwcon.asp.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: NRDC is a prominent environmentalist organization.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Behind the rhetoric of progress, neither plan does anything to curb global warming or reduce dangers air pollution. This February 2002 NRDC analysis exposes the administration’s fuzzy math.” Furthermore, Bush cites uncertainty “to justify not reducing emissions” and reduces spending on research and technology.				
Secondary: Since emissions will rise, the plan constitutes “walking away from the Rio global warming treaty” signed by Bush’s father.				
Tertiary: The Voluntary Reporting Program (1605[b]) shows that voluntary programs don’t work. “Because the Bush global warming plan relies exclusively on voluntary programs, it won’t work either.”				
Notes				
Type of evidence				
Primary: Review of the “Enron-style accounting” to show that, even as emissions intensity improves, overall emissions rise – at a slightly higher rate than during 1990-2000 (14.1% v. 13.6% in the earlier decade).				
Secondary: The National Academy of Sciences, the IPCC, and the WMO reported that climate is changing.				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans are working against the environment and have a responsibility to reduce emissions of GHGs drastically. Adaptation is not discussed.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: In a 2001 open letter to President Bush, John H. Adams, Pres. of NRDC, says, “we respectfully urge you to reevaluate your positions on global warming pollution, and the Kyoto agreement” and take immediate actions to “reduce greenhouse gas pollution.”				
Secondary:				
Tertiary:				
Notes				

#36: Sokona, Youba, Adil Najam and Saleemul Huq 2002. "Climate Change and Sustainable Development: Views from the South." And Huq, Saleemul, Youba Sokona and Adil Najam 2002. "Climate Change and sustainable Development Beyond Kyoto." International Institute for Environment and Development (IIED). http://www.iied.org				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: IIED is a relatively new organization, "an independent, non-profit research institute working in the field of sustainable development. IIED aims to provide expertise and leadership in researching and achieving sustainable development at local, national, regional and global levels. In alliance with others we seek to help shape a future that ends global poverty and delivers and sustains efficient and equitable management of the world's natural resources."				
Secondary: Saleemul Huq is a noted spokesperson/researcher from Bangladesh in the area of climate change.				
Tertiary:				
Notes				
Type of argument				
Primary: The short-term focus has been on getting "industrialized countries to agree to some targets, no matter how meager. It is time now to refocus on the longer-term objectives of the UNFCCC, particularly on its stated goals regarding sustainable development."				
Secondary: Kyoto is flawed, focused on the interests of industrialized countries, "leaves much to be desired in terms of its implications for long-term policy" and "unlikely to produce many short-term benefits."				
Tertiary: "Combating climate change is vital to the pursuit of sustainable development; equally, the pursuit of sustainable development is integral to lasting climate change mitigation."				
Notes				
Type of evidence				
Primary: Many citations to Southern voices, including the authors, and to the UNFCCC principles; also citations to Northern social scientists				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: "The goal of the post-Kyoto phase should be clearly tied to atmospheric stabilization with a defined focus on emissions limitation and a clear sense of the rules for the future entry of developing countries into the regime. In all likelihood this will require moving to per capita emission targets and a 'contraction and convergence' policy scenario." – with WSSD, "build on the Kyoto promise by returning to UNFCCC basics."				
Secondary: Refocus on equity, helping vulnerable countries "at greatest risk and disadvantage," and stabilizing atmospheric greenhouse gas concentrations rather than "managing the global carbon trade."				

Tertiary: “In the past, the South has been routinely reactive in its environmental negotiations with the North. It is well past time that they change their strategy. The task of devising and putting forth proposals that match their interests lies squarely with negotiators from the South. They may not get a better opportunity than Johannesburg to do so.”

Notes

#37: Gyawali, Dipak 1996. "An Extreme Climate Event in Nepal and its Implications for a Climate Change Regime." In <i>Elements of Change 1995</i>. Aspen Global Change Institute, Aspen, CO.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Gyawali is a prominent Nepalese scientist, focusing on water resources and environmental change; he is also a cultural theorist (Douglas, Thompson, etc.)				
Secondary:				
Tertiary:				
Notes: The write-up is by Susan Hassol, the rapporteur at the conference.				
Type of argument				
Primary: Shifts in the "monsoon trough can signal drought or flood for particular localities," meaning that people are extremely vulnerable, living "at the precarious margins of existence."				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: Facts and figures about monsoon rainfall and the unusual cloudburst 8/93, which wiped out "much of the infrastructure in the central area of the country," killed 2000 people, destroyed 38 irrigation systems, etc.				
Secondary: Social limits to growth are more important than physical issues. "The last man will have eaten the last woman long before the last tree falls."				
Tertiary: People have loyalties "based on village, religion, ethnicity, region, language, etc." as well as national. "Especially if the state does not serve the interests of the people, their loyalty will be transferred ... and discourses based on the nation state unit may become totally irrelevant."				
Notes				
Worldview/view of nature				
Primary: Nature likely to change in ways that will be unmanageable by people.				
Secondary: Analysis of social systems such as bonded labor, loyalties to groups				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: "Important lessons for climate change include the fact that our scientific understanding of many natural processes, especially those that occur in non-temperate zones, is very poor and must be improved. ... it is very difficult to know whether events like this are being exacerbated by climate change or not."				
Secondary: Learn from the unusual events to build in large tolerances in infrastructure and consider how to store such water (local ponds, high dams at river valley gorges?)				
Tertiary:				
Notes				

#38: Cohen, Stewart J. 1993. Climate change and climate impacts: please don't confuse the two! <i>Global Environmental Change</i> 3(1), 2-6				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Cohen: known for his work on the MacKenzie Basin study, an early “integrated assessment”				
Secondary: <i>GEC</i> is a journal that focuses on social science contributions				
Tertiary:				
Notes				
Type of argument				
Primary: UNCED has focused on mitigation, but less attention has been given to adaptation. “Without knowledge of potential impacts of climate change, however, other possible adaptation strategies will be difficult to identify because governments and the private sector will not know what they might be adapting to.” (2) Because the required knowledge and methodologies are different, research on climate and research on impacts should be kept separate.				
Secondary: Climate research is grounded in climate modeling, impacts research in studies of natural hazards.				
Tertiary: The two are conflated is because the issue has become political; therefore, attacks that cite the uncertainty of climate models spills over to impacts research				
Notes				
Type of evidence				
Primary: mainstream scientific texts, including IPCC and WMO publications, and impact assessments				
Secondary: disciplinary differences between atmospheric scientists and oceanographers, and “physical, biological, and social scientists who often work at smaller scales of time and space than the specialists who build GCMs” (4)				
Tertiary:				
Notes: begins with scenarios and models, then UNFCCC				
Worldview/view of nature				
Primary: humans have various strategies for dealing with or managing responses to natural hazards, including climate-related hazards (nature cannot be controlled but responses can be managed)				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Despite the uncertainties, it would be prudent to generate, review and publish information about potential impacts of climate change <i>scenarios</i> so that interested parties could have access to it, caveats and all. For anyone who believes in reducing uncertainties about global warming and its implications for our planet, a continued interdisciplinary effort is really the only alternative available.” (6)				
Secondary: Do not wait for reductions in uncertainties of climate science; “long-term resources management and planning options are being considered by governments and industries now, with information that is available today, but information that is often incomplete.” (5) Consider “no-regrets” strategies.				

#39: Ecimovic, Timi, Elmar A. Stuhler, Marjan Vezjak and Matjaz Mulej 2002.				
Introduction to climate change – present experience related to sustainability and impact on society. InfoAndina. http://www.mtnforum.org/emaildiscuss/discuss02/040102377.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The authors are given honorifics (Drs. And Profs.) and university affiliations or Institutes (Climate Change, Sustainable Future)				
Secondary: This paper is part of the Bishkek Global Mountain Summit E-Consultation				
Tertiary:				
Notes				
Type of argument				
Primary: “Triggered by the development of our civilization, the consumption of natural resources, production of synthetic chemicals, life style, and run out from our nuclear technology laboratories represent the Number One threat to the existence of our civilization, the second threat being the climate change, reflecting a response by the very nature of our Earth, which is already evolving and seems to be capable of destroying our civilization.”				
Secondary: “The mountain environments around the earth are an integral part of the earth nature, and should keep initiative for nature, space and environment protection as well as protection against impact if the climate change.”				
Tertiary:				
Notes: discusses “Our common Future,” the Rio Earth summit, Agenda 21 for Change, and “10 Years after Rio”				
Type of evidence				
Primary: assertions about impacts, both physical (e.g., “if the mean land mass temperature changes by one Celsius centigrade within 12 months, the change will force extinction of up to 90% of known plants”) and social (“at all levels of society the change are at an early stage”)				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: “Scientifically it is possible to correct global warming by fostering phytoplankton reproduction ... But if it is used without scientific control, it may produce another Ice Age...” “Without appropriate human intervention in the future, the climate change system ultimately would change living conditions within the biosphere and geography of the Earth so much that our civilization will collapse.”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “It is necessary to work out an action plan for the better implementation of sustainability of our civilization worldwide. The platform offered by United Nations (UN) at ... Johannesburg ... could be an opportunity needed to workout plan and control system for sustainability.”				
Secondary:				
Tertiary:				

#40: Sathaye, Jayant A. and N.H. Ravindranath 1998. Climate change mitigation in the energy and forestry sectors of developing countries. <i>Annual Review of Energy and the Environment</i> 23, 287-437.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Sathaye is a prominent scientist at DOE's LBNL, specializing in energy efficiency.				
Secondary: Ravindranath, located in India, can be presumed to have in-country (i.e., more valid) information.				
Tertiary:				
Notes				
Type of argument				
Primary: "Mitigation studies indicate that if energy efficiency and forestry options are implemented judiciously, emissions can be reduced at a negative cost without affecting economic growth."				
Secondary: "The studies also suggest that this would increase significantly the worldwide demand for natural gas and renewable technologies."				
Tertiary: "Country studies show that the aggregate mitigation potential in the forestry sector is higher, and the costs per tonne of carbon are lower, than reported earlier by global studies."				
Notes: Many scientists feel that the bottom-up/engineering-type studies used by these scientists are overly optimistic.				
Type of evidence				
Primary: (showing overall knowledge): types the mitigation studies as inventories, mitigation, V&A; "Precursors to today's mitigation studies were led by research groups; the first effort was coordinated by the LBNL..." and brief history of other studies – many references to LBLN studies				
Secondary: tables and data of emissions, baseline projections (from IPCC, top-down); then methodologies, technology options, data and models for bottom-up analysis – for both energy efficiency and forestry				
Tertiary: brief discussion of barriers, mostly governmental				
Notes: Invokes the FCCC, ratified by >160 nations, both OECD and developing, "much debate," Kyoto				
Worldview/view of nature				
Primary: "the earth's fragile atmosphere is changing with the continuing release of greenhouse gases (GHGs) around the world" – but we can control GHGs				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary:				
Secondary:				
Tertiary:				
Notes				

#41: Van Asselt, Marjolein B.A. and Jan Rotmans 2002. Uncertainty in integrated assessment modeling: from positivism to pluralism. <i>Climatic Change</i> 54, 75-105.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Rotmans is a well-known integrated assessment modeler.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “It is argued that a pluralistic approach to uncertainty is needed to comply with the social scientific evidence that different interpretations of uncertainty and different risk perceptions are legitimate,” (76) i.e., different perspectives/worldviews/mgmt style				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: Description of the model, parameters, and calibration				
Secondary: IA model uncertainty: “Are all relevant processes considered? Are the system boundaries legitimate? Does the model reproduce actual behaviour of the mirrored system? Is the conceptualization used inline with established theories?” (82) – but these cannot be addressed by current methods				
Tertiary: brief historical discussion of science as bringing certainty, not uncertainty + a taxonomy of sources of uncertainty and definitions				
Notes				
Worldview/view of nature				
Primary: Constructivist/culturalist view of nature – different attributes depending upon the worldviews of different people				
Secondary: The future is unknowable and will depend upon dominant worldview(s).				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Use the theoretical ideas “to think systematically about uncertainty treatment in relation to scenarios, qualitative assessment and participatory IA.” (100)				
Secondary: “Systematic uncertainty research is still needed to advance uncertainty management in Integrated Assessment, but major improvements are already within any modeller’s/analyst’s reach.” (100)				
Tertiary:				
Notes				

#42: Scharper, Stephen Bede 2002. Green dreams: religious cosmologies and environmental commitments. <i>Bulletin of Science, Technology & Society</i> 22(1), 42-44.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The author is “an assistant professor in the Department for the Study of Religion and an associate of the Institute for Environmental Studies at the University of Toronto, where he teaches courses on religious ethics and ecology.” (44)				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “We are, as a human community, facing what many see as a ‘global environmental crisis.’” (42) “What is happening in our times is not just another historical transition or simply another cultural change. The devastation of the planet that we are bringing about is negating some hundreds of million, even billions of years of past development on the earth” (quote from Thomas Berry)				
Secondary: Religions “around the world” are becoming more ecology-minded, especially through their cosmologies; instead of a “communion of subjects,” a consumerist cosmology sees the universe as a “collection of objects.” (43)				
Tertiary:				
Notes				
Type of evidence				
Primary: Imaginative reconstruction of early settlers’ experience of a forest now gone, then “think of the place in nature that was special to you growing up ... Does it still exist?”				
Secondary: Invokes science, the evidence of pollution, “We are destroying these cornucopias of life and oxygen at the rate of one football field per second, an area the size of Austria each year” (42)				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans have lost the wonder of nature and are destroying it				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Recover “the awesome delight of a magnificent sunset or the sense of wonder we feel when gazing at an array of stars on a soft summer night” (44)				
Secondary: “extricate ourselves from our pathological quest to consume and deface the natural world” (44)				
Tertiary:				
Notes				

#43: Koteen, Laurie, Janine Bloomfield, Timothy Eichler, Cathryn Tonne, Rebecca Young, Helene Poulshock and Andree Sosler 2001. <i>Hot Prospects: The Potential Impacts of Global Warming on Los Angeles and the Southland</i>. Exec Sum, Intro, first two chapters. Environmental Defense, Washington, DC. Also at http://www.environmentaldefense.org				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Environmental Defense (formerly Environmental Defense Fund) is a major environmentalist group.				
Secondary: ED supported research at Columbia U and NASA/Goddard; support was acknowledged from the Mary Livingston Griggs and Mary Griggs Burke Foundation, John D. and Catherine T. MacArthur Foundation, Public Welfare Foundation.				
Tertiary:				
Notes				
Type of argument				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: Photo on front cover is smog over LA; inside, picture of child with asthma, a pier destroyed by storm, fire near homes – in recommendations, a wind farm; graph of increasing temp in LA 1910-2000, bar charts of projected change (temp, precip, 4 GCMs), scientific figures on El Nino.				
Secondary: Data on climate change during 20 th c., scientific evidence of anthropogenic causes (including quotes from IPCC), and projections: more storms, winter rainfall, hot summer days, smog, respiratory illness, hantavirus, erosion of beaches and hillsides, destruction of wetlands, decline of marine species, uncertainty re water, fires				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans have caused climate change and should mend their ways by using less and renewable energy.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Extend short-term strategies for CA's "energy woes" to long term: "conservation, increased energy efficiency and renewable energy" (vi) – ee appliances and vehicles, less cooling and driving,				
Secondary: 10 adaptation strategies, including education, health care, urban environment, emissions controls, protection of marine species, shoreline/beach mgmt, flexible water resource planning, pre-fire mgmt (limiting development, etc.)				
Tertiary:				
Notes				

#44: La Vina, Antonio G.M. 2002. From Kyoto to Marrakech: global climate politics and local communities. Working Paper. World Resources Institute, Washington, DC. (NYC?)				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The author is a Senior Fellow at the WRI				
Secondary: WRI is an environmentalist organization, but well respected for the quality of its data and analyses (many such org's are seen as biased).				
Tertiary:				
Notes: "This briefing paper provides a background on the threat posed by climate change, particularly on the Global South & on poor and impoverished communities." (i)				
Type of argument				
Primary: "Climate change, expected to result in global warming, is probably the most serious environmental problem that the world faces. ... the burden will fall disproportionately on local and impoverished communities," which "depend greatly on climate conditions and natural resources for their daily survival and sustenance and they do not have the resources to adapt to the changes global warming will bring" (i)				
Secondary: "The progress that has been made on fashioning a global response to climate change is actually remarkable given the complexity of the politics of climate." (ii) – not just a North/South question				
Tertiary: "Almost from its inception, there has been a high level of participation by civil society organizations as well as by industry": Climate Action Network, environmental orgs, Global Climate Coalition, ICLEI/CCP, women, religious and youth orgs – but not local and impoverished communities				
Notes; words such as "threat," "peril" and "combat"; discussion of UNFCCC and stabilization, Kyoto, Bonn, Marrakech, and WSSD. "Consequently, there is high expectation that the Kyoto Protocol will come into force by late 2002." (ii) – even with US "abandoning"				
Type of evidence				
Primary: catalogue of effects: desertification, coastal and low-lying areas, extreme weather events, public health/diseases (greatest on countries least responsible, ironically); intro invokes IPCC, list of GHGs, emitting activities				
Secondary: analysis of interests: North EU and Eur "call for accelerated action by the North"; US and Aus "equivocation in the face of lingering scientific and economic uncertainties; Global South all think that tech/\$\$ transfers are necessary, but debate about level of participation; diffs between OPEC and AOSIS; wariness re commitments (Brazil, China, India) v. eagerness to have projects supported (SE Asia, etc.)				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: nature fragile, susceptible to climate change				
Secondary:				
Tertiary:				
Notes: words such as "threat," "peril"				
Action(s) proposed				
Primary: Participation of local and impoverished communities must be enhanced: supporting info/ed campaigns, promoting their participation in UNFCCC and coalition building to national and global levels, supporting local adaptation and efforts to provide compensation mechanisms				

(CDM)
Secondary:
Tertiary:
Notes

#45: Climate Change Programme 2003. World Wide Fund.				
http://www.panda.org/about_wwf/what_we_do/climate_change/problems/index.cfm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: WWF is a major environmentalist organization				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “The impacts of global warming are evident from the equator to the poles.”				
Secondary: “There’s no shortage of solutions – we must act NOW, and we can!”				
Tertiary:				
Notes				
Type of evidence				
Primary: lists: of impacts (coral reefs bleached, alpine forest struggling, polar bears under pressure, glaciers melting, economic damage (insurance); and actions (wind and solar power, technologies to reduce CO2 emissions), simple things like better windows/insulation/lighting/appliances/cars, reducing energy use				
Secondary: stats on CO2 emissions				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: nature at the mercy of humans; “It is humans who create the heat trap: every bit of coal, every litre of oil or gas that humans burn adds to the load of gases in the atmosphere that wraps around the planet like an every thicker, brown blanket, trapping heat, smothering people and nature.”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “fighting CO2 pollution” – education, push to ratify Kyoto, partnerships with businesses, cooperation with scientists and technical experts (5 bullets on mitigation, one on adaptation)				
Secondary:				
Tertiary:				
Notes				

#46: Lindzen, Richard S. n.d. (downloaded March 2003). <i>Global Warming: The Origin and Nature of the Alleged Scientific Consensus</i>. Cato Institute, Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Lindzen is a prominent skeptic, well respected as a scientist (MIT) but also affiliated with Cato, which is seen as ideological				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “as a scientist, I can find no substantive basis for the warming scenarios being popularly described.”				
Secondary: “Moreover, according to many studies I have read by economists, agronomists, and hydrologists, there would be little difficulty adapting to such warming if it were to occur.”				
Tertiary: “present hysteria formally began in the summer of 1988” with a hot summer and James Hansen’s meaningless statement, and quickly became a “global warming circus” – scientific debate OK, politicization dreadful – warming does fit with other agendas, such as ee, reduced oil from the MidEast, dissatisfaction with industrialization, international competition, enhanced revenue from C taxes, and enhanced power				
Notes				
Type of evidence				
Primary: “Such was also the conclusion of the recent National Research Council’s report of adapting to global change. Many aspects of the catastrophic scenario have already been largely discounted by the scientific community.”				
Secondary: examines the arguments: agrees that CO2 in the atmosphere has been increasing, but says an inaccurate model was used to predict a doubling of preindustrial levels by 2030 – “The simple picture of the greenhouse mechanism is seriously oversimplified.” – water vapor and clouds account for most of the effect, convection must be taken into account, models cannot duplicate the motions of the atmosphere, feedbacks are highly uncertain and not understood – predictions are exaggerated				
Tertiary: history of the political process; Al Gore, environmental advocacy groups, Claudine Schneider (“scientists may disagree, but we can hear Mother Earth, and she is crying”), refusal of Science to print Lindzen’s critique, various actors, Michael Openheimer/EDF, Greenpeace, etc.				
Notes: puts “greenhouse theory” in quotes, refers to “popular presentation” and “crude idea” of this theory				
Worldview/view of nature				
Primary: “improved technology and increased societal wealth are what allow society to deal with environmental threats most effectively.”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Allow science to take its course, admitting the flaws of the models – get politics out of the picture.				
Secondary: Focus on the control of societal instability, rather than insufficient claims to global				

warming catastrophe.
Tertiary:
Notes

#47: Browne, John 1997. Climate change speech. Given at Stanford University. Available at http://icc370.igc.org/bp.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Browne is the CEO of BP, perhaps the world's largest petroleum company				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: "The passing of some of the old divisions reminds us we are all citizens of one world, and we must take shared responsibility for its future, and for its sustainable development." – people who work at BP have these convictions, so do consumers				
Secondary: "The time to consider the policy dimensions of climate change is not when the link between greenhouse gases and climate change is conclusively proven – but when the possibility cannot be discounted and is taken seriously by the society of which we are part. We in BP have reached that point."				
Tertiary:				
Notes				
Type of evidence				
Primary: the science is uncertain, but scientists and others take the possibility seriously (i.e., we are all in this together) – metaphor of a journey, with partnerships and accommodations to the interests of all who are on the journey				
Secondary: factual evidence – CO2 like a small weight that overbalances, and only a small fraction comes from transport, and only a fraction of that from BP (~95 Mt)				
Tertiary: catalogue of actions that show BP is proactive: reduced oil discharges to the North Sea, investing \$100M to eliminate VOCs, reduced flaring in Norway; example of project in Bolivia to conserve 1.5 m ha of forests; example of investment in solar				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: First, do the low-hanging fruit: control own emissions, fund research, initiatives for JI, develop alternative fuels, contribute to public policy debate				
Secondary: strive toward sustainability, "simultaneously being profitable and responding to the reality and the concerns of the world in which you operate."				
Tertiary:				
Notes				

#48: Summary for Policymakers 2001. Pp. 1-17 in <i>Climate Change 2001: Impacts, Adaptation, and Vulnerability. A report of Working Group II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge.</i>				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The IPCC scientists are an inclusive and large group; the summary for policymakers is adopted word for word by member countries of the IPCC.				
Secondary: “This report builds upon the past assessment reports of the IPCC, reexamining key conclusions of the earlier assessments and incorporating results from more recent research.” – “Further details can be found in the underlying report.” (3)				
Tertiary:				
Notes: Although the IPCC reports do not explicitly make policy recommendations, the selection and arrangement of topics and conclusions of course makes arguments.				
Type of argument				
Primary: Nine “emergent findings”: (1) Recent regional climate changes have already affected many physical and biological systems. (2) Some human systems have been affected by recent increases in floods & droughts (preliminary indications). (3) Natural systems are vulnerable to cc, and some will be irreversibly damaged, (4) Many human systems are sensitive to cc, and some are vulnerable. (5) Projected changes in climate extremes could have major consequences. (6) The potential for large-scale and possibly irreversible impacts poses risks that have yet to be reliably quantified. (7) Adaptation is a necessary strategy at all scales to complement cc mitigation efforts. (8) Those with the least resources have the least capacity to adapt and are the most vulnerable. (9) Adaptation, sustainable development, and enhancement of equity can be mutually reinforcing. (3-8).				
Secondary: Effects on and vulnerability of natural and human systems: hydrology and water resources, agriculture and food security, terrestrial and freshwater ecosystems, coastal zones and marine ecosystems, human health, human settlements/energy/ industry, and insurance/financial services. (9-13) Specific adaptive capacity, vulnerability and key concerns for five world regions. (14-17)				
Tertiary:				
Notes				
Type of evidence				
Primary: No references to research studies, but to chapters in the TAR where the summary items are covered.				
Secondary: Declarative sentences, technical diction and syntax, details, and confidence levels are given.				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature is essentially knowable and can be managed. For example, “the greatest vulnerabilities are likely to be in unmanaged water systems and systems that are currently stressed or poorly and unsustainably managed due to policies that discourage efficient water use and protection of water quality, inadequate watershed management, failure to manage variable water supply and demand, or lack of sound professional guidance.” (9)				
Secondary:				

Tertiary:				
Notes:				
Action(s) proposed				
<p>Primary: High priorities for assessment and research: quantitative assessment of sensitivity, adaptive capacity, and vulnerability to climate change and variability; assessment of thresholds; study of dynamic responses of ecosystems to multiple stresses at multiple scales; development of approaches to adaptation responses; assessment of full range of cc impacts; improving tools for IA, including risk assessment; assessment of opportunities to include scientific info on impacts, etc. in decisionmaking processes, risk mgmt, and SD initiatives; improvement of systems and methods for long-term monitoring. (14-17)</p>				
<p>Secondary: Water is obviously a, if not the, major focus (3 of 7 sectors, plus water implications for agriculture/food security and human health).</p>				
Tertiary:				
<p>Notes: The emphasis on vulnerability, adaptation and sustainable development marks a departure from the SAR, which emphasized only impacts.</p>				

#49: Summary for Policymakers 2001. Pp. 1-13 in <i>Climate Change 2001: Mitigation. A report of Working Group III of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge.</i>				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The IPCC scientists are an inclusive and large group; the summary for policymakers is adopted word for word by member countries of the IPCC.				
Secondary: “Research in cc mitigation has continued since the publication of the IPCC Second Assessment Report (SAR), taking into account political changes such as the agreement on the Kyoto Protocol to the UNFCCC in 1997, and is reported on here. The Report also draws on a number of IPCC Special Reports ...” (3)				
Tertiary:				
Notes: Although the IPCC reports do not explicitly make policy recommendations, the selection and arrangement of topics and conclusions of course makes arguments.				
Type of argument				
Primary: Mitigation challenges: Global/long-term problem. Different development paths → different emissions paths. Relation to broader SE policies and trends. Different resources among and within nations and regions, and between generations. “Lower emissions scenarios require different patterns of energy resource development” (4). “Significant technical progress relevant to greenhouse gas emissions reduction has been made since the SAR in 1995 and has been faster than anticipated” (5). Terrestrial ecosystems offer carbon mitigation potential. “No single path to a low emission future” (8). “Social learning and innovation, and changes in institutional structure could contribute to cc mitigation” (8). Estimates of costs and benefits differ because of how welfare is measured, the scope and methodology of the analysis, and the underlying assumptions. There are “no regrets” opportunities to reduce GHGs. Cost estimates for Annex B countries differ, in addition to the considerations above, also because they “depend strongly upon the assumptions regarding the use of the Kyoto mechanisms, and their interactions with domestic measures.” (10) “Cost-effectiveness studies with a century timescale estimate that the costs of stabilizing CO2 concentrations in the atmosphere increase as the concentration stabilization level declines. Different baselines have a strong influence on absolute costs.” (10) Uneven distribution of costs & benefits. Spillover effects, e.g., oil, trade, carbon leakage. “Needs to overcome many technical, economic, political, cultural, social, behavioural and/or institutional barriers which prevent the full exploitation of the technological, economic and social opportunities of these mitigation options.” (11) Portfolio of policy instruments will be more effective. “The effectiveness of climate change mitigation can be enhanced when climate policies are integrated with the non-climate objectives of national and sectorial policy development ...” Coordinated actions can reduce costs. CC decision-making is a sequential process under general uncertainty. “The desired mix of options varies with time and place.” (12) “There is an inter-relationship between the environmental effectiveness of an international regime, the cost-effectiveness of climate policies and the equity of the agreement.” (13)				
Secondary: Re “significant technical progress,” “Half of these potential emissions reductions may be achieved by 2020 with direct benefits “energy saved” exceeding direct costs (net capital, operating, and maintenance costs) and the other half at a net direct cost of up to US\$100tCequivalent (at 1998 prices).” (6) “At least up to 2020, energy supply and conversion will remain dominated by relatively cheap and abundant fossil fuels.” (5) Other reductions can be achieved through use of biomass, landfill methane, wind and hydro energy, extension of nuclear				

power plants (to 2010). Carbon removal and storage can reduce net emissions after 2010. Other gases can be reduced.				
Tertiary:				
Notes				
Type of evidence				
Primary:				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature is malleable, robust, and should be managed effectively and efficiently.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “high priorities for further narrowing gaps between current knowledge and policy making needs:” further exploration of technical potentials; economic, social and institutional issues; “methodologies for analysis of the potential of mitigation options and their costs”; “evaluating climate mitigation options in the context of development, sustainability and equity.” (13)				
Secondary: Continue to use CBA as a sufficient yardstick of options.				
Tertiary:				
Notes				

#50: Meyer-Abich, Klaus M. 1993. Winners and losers in climate change. Pp. 68-87 in <i>Global Ecology: A New Arena of Political Conflict</i>, Wolfgang Sachs (ed). Zed Books, London.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: We should believe in climate change, in the same way that Pascal argues it is prudent to believe in God (to avoid being damned, should God really exist) – but, since it is not in the interest of industrialized countries, we should expect that “ <i>everything will be done to do nothing at present</i> ” (85)				
Secondary: “With respect to climate change, it is often emphasized that we are all in the same boat, but this is exactly what one must expect to hear from those who are looking forward to being the winners.” “Instead, <i>risks</i> can be assessed; even if the economic data were available, <i>vulnerabilities</i> need also to be taken into account.” (71) – most vulnerable depend heavily on agriculture, cannot help themselves easily, already suffer from droughts, etc., and will suffer from flooding with SLR → Third World. Industrialized countries will be better off; “Climate policies of the industrialized countries then will have to balance uncertain but possible long-term advantages against fairly certain short-term disadvantages.” (78)				
Tertiary: “The foregoing analysis shows that those who cause about three-quarters of the cc will be least affected by the implications or will even have absolute advantages. Those who will suffer from it most, share the responsibility only to the extent of about one-quarter.” (81)				
Notes				
Type of evidence				
Primary: “draws mainly on the IPCC report, particularly on the impact assessment” (69), also on studies by IIASA (Parry et al. 1988), EPA				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans are harming nature and should desist.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Increasing awareness of the issue, short-term interest in avoiding negative impacts, and going back to the man-nature relationship under which our present political institutions were founded may prompt actions.				
Secondary:				
Tertiary:				
Notes				

#51: Linden, Eugene 2003. Who's going to pay for climate change? <i>Time</i> (February 7).				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: "The Bush administration, so warlike in response to terrorism, has revealed a pacifist streak in its approach to the threat of climate change. ... By leaving moot the question of cause, and by implying that no one could have done anything about it, the administration also implies that no one is responsible. ... Nice try, but don't be surprised if there are few takers for this line of reasoning."				
Secondary: Weather-related loss of revenues and insurance losses/policy cancellations will prompt businesses to act in spite of Bush's "no fault" approach.				
Tertiary:				
Notes				
Type of evidence				
Primary: Penn State estimate of weather-related loss of revenue, example of insurer exits from NC Outer Banks and the Hamptons (no coastal storm coverage).				
Secondary: Scenario from Swiss Re: insurer will refuse cc coverage to companies that say they don't think it's a problem. (Swiss Re has sent customers a questionnaire.)				
Tertiary: States (NJ, MA, NY, CA) are imposing their own limits on GHGs.				
Notes				
Worldview/view of nature				
Primary: Human indifference will bring large impacts from climate change.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Business execs should rethink their position on climate change.				
Secondary:				
Tertiary:				
Notes				

#52: National Wildlife Federation 2000. Climate change. In <i>The Toll from Coal: How Emissions from the Nation's Coal-Fired Power Plants Devastate Wildlife and Threaten Human Health</i>. National Wildlife Foundation. See http://www.nwf.org				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The acknowledgements include “a generous grant by the W. Alton Jones Foundation” and “the tireless effort of numerous individuals.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “The burning of carbon-based fuels such as coal has sent tremendous quantities of carbon dioxide and other greenhouse gases into the atmosphere and has caused the average global surface temperature to rise.” (16) – “Current efforts to curb global climate change are not sufficient.” (18) Coal must be reduced, there must be an international strategy, and the US must play a major role (e.g., controlling CO2 emissions in the electricity sector).				
Secondary: “This warming is disrupting the planet’s climate system, threatening people and wildlife around the world. ... For wildlife and ecosystems already weakened by acid rain, mercury, ozone, and other forms of pollution, global warming – and resulting climate change – may deal the final blow.” (16)				
Tertiary:				
Notes				
Type of evidence				
Primary: IPCC’s “exhaustive review of the subject. Using sophisticated computer models, direct observation, and data gather from ice core samples – and drawing on the work of more than 2,000 of the world’s leading climate researchers...” (16) – correlation between temperature rise and GHG emissions				
Secondary: “scientists expect” “scientists predict” impacts on forest, mammals, sea birds, waterfowl, songbirds, fish, amphibians, and corals and other marine life. (17-18)				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Wildlife is victimized by pollution generally and by climate change specifically.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Stop favoring aged power plants....Toughen restrictions on sulfur dioxide and nitrogen oxides from power plants. ... Cap emissions of mercury and carbon dioxide. ... Promote energy efficiency and renewable energy resources.... Make environmental protection part of utility restructuring. ... Implement a meaningful international strategy to reduce greenhouse gas emissions. ... Provide an effective transition for coal-dependent economies.”				
Secondary: Speak up! Think of “our children and grandchildren.” Pay now or later. Your actions make a big difference. Join the activist team at the National Wildlife Foundation.				
Tertiary: Coal mining “has been a story of denuded landscapes, contaminated waters, destroyed				

wildlife habitat, eroded mountain sides, collapsed land surfaces, and homes that are crushed or damaged from blasting, mudslides, waste dam breeches, and other reckless mining practices.” Mountain top removal permanently changes the landscape. Coal washing pollutes water. Coal combustion produces massive wastes that “cause serious problems for mammals, birds, fish, and amphibians.”

Notes

#53: Parks, Noreen 2002. Measuring climate change. <i>BioScience</i> 52(8), 652.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The author is “a science writer based in Hawaii.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Assessing and forecasting climate change is hampered by a lack of accurate and long-term observational data.				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: Expert testimony: Kevin Trenberth (NCAR), and Thomas Karl (NOAA), Edward Sarachik (UW), Eric Barron (Penn State), well-known atmospheric scientists; NRC report <i>Climate Change Science</i> , Sherwood Boehlert (R-NY) at hearings				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Knowable in principle, with only enough scientific systems				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Given the potential social, environmental, and economic consequences of global cc, further delay in establishing a scientifically strong observation system could drive costs much higher. As Sarachik ruefully noted, ‘In a hundred years, people will look back and ask, why didn’t those guys who could have done it put in a climate observation system?’”				
Secondary:				
Tertiary:				
Notes				

#54: Taubes, Gary 1997. Apocalypse not. <i>Science</i> 278 (7 November), 1004-1006.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: <i>Science</i> is one of the premier general science journals.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Henderson, Gubler, and other argue that breakdowns in public health rather than climate shifts are to blame for the recent disease outbreaks – and that public health measures will be far more important than climate in future disease patterns.” (1004)				
Secondary: But the future may be different.				
Tertiary:				
Notes				
Type of evidence				
Primary: Brief history of the controversy, including names and quotations of scientists who have said cc “may” bring increased death and disease, and those who downplay such scenarios. The former include Paul Epstein (Harvard), Rita Colwell (UMD), Anthony McMichael (London School of Hygiene), and Jonathan Patz (Johns Hopkins). The latter include Duane Gubler (CDC), D.A. Henderson (Johns Hopkins), Mark L. Wilson (UMich).				
Secondary: Review of current changes in climate that have brought no epidemics and outbreaks (e.g., cholera) that can be explained by breakdowns in public health.				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Many unknowns about how climate affects disease vectors.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: More investment in public health and in research on the disease vectors.				
Secondary:				
Tertiary:				
Notes				

#55: Suzuki, David 2002. Waiting to fight climate change is not a viable option. http://production.enn.com/extras/printer-friendly.asp?storyid+47610				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: This text is linked to the David Suzuki Foundation; “Since 1990, the David Suzuki Foundation has worked to find ways for society to live in balance with the nature world that sustains us. Focusing on four program areas – oceans and sustainable fishing, forests and wild lands, climate change and clean energy, and the web of life, the Foundation uses science and education to promote solutions that help conserve nature.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Some climate change is inevitable, according to scientists; the goal is to avoid “dangerous anthropogenic interference” with the climate.				
Secondary: We need to start mitigation actions by any means to hand.				
Tertiary:				
Notes				
Type of evidence				
Primary: Based on an unnamed article in <i>Science</i> and unnamed authors “from Brown and Princeton universities” – defining “dangerous, examining coral reefs as possibly close to their “upper thermal limits,” the merits of adopting a carbon dioxide concentration goal of 450 ppm to “prevent whole-scale disruption of the climate system, which could result from the disintegration of the West Antarctic Ice Sheet (this alone would raise sea levels by an astonishing four to six meters) or the shut-down of density-driven ocean currents such as the Gulf Stream.”				
Secondary: “The point is that the immediate goal is not to completely stop or reverse climate change. That may prove impossible. Instead, the goal ...” cites the FCCC goal.				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: nature at the brink of disaster caused by people				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Kyoto, it seems, is more than just one choice in an array of possibilities to ‘prevent dangerous anthropogenic interference’ with our climate. Given the length of time it takes to create these complex international treaties and the speed with which emissions continue to increase, it is actually our only realistic option.”				
Secondary:				
Tertiary:				
Notes				

#56: Friends of the Earth International 2000. <i>Gathering Storm: The Human Cost of Climate Change.</i>				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: FoEI is based in Amsterdam and London, but is obviously trying to appeal to a much wider audience, with a cover picture of Asian people walking through flood waters with a few belongings and French and Spanish translations of its name (Les Amis de la Terre and Amigos de la Tierra)				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “People will be exposed to unacceptable risks for as long as governments ignore the immediacy of the dangers posed by human-induced climate change. Negligence at the national level is mirrored by complacency at the international level with the failure of the world’s historical polluters to reduce their carbon emissions.” (5)				
Secondary: [Current climate events], “overlain on a more gradual change in environmental conditions, would have serious knock-on effects for ecosystems, fires, pest outbreaks, human health, our settlements and food security.” (15, Part 3)				
Tertiary:				
Notes: “the world’s historical polluters” is an obvious reference to the work of Agarwal and Narain in India				
Type of evidence				
Primary: Narrative of “a trail of climate disasters [that] have wreaked havoc with people’s lives and livelihoods around the world.” (5 and Parts 1 and 2) (although acknowledgement that no single event can be attributed to cc)				
Secondary: personal testimonies from survivors of these “climate disasters” (Part 2) e.g., “The weather is getting crazier and crazier.... My guess: global warming. Maybe this was just a freak occurrence? I have no idea, I am not a scientist. But people are worried about it recurring.” (14)				
Tertiary: Citations from IPCC and related research as a catalogue of impacts (Part 3) – 31 in 6 pages				
Notes				
Worldview/view of nature				
Primary: nature fragile; humans are tipping the balance on the way to catastrophe – all that can be done is to “keep cc within tolerable bounds” (22)				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Ensure that the Kyoto Protocol results in real and permanent emissions reductions through the development of renewable energy sources and energy efficiency measures” (5)				
Secondary: “Commit industrialized countries to achieving 80% of their Kyoto objective through emissions reductions at home” (5)				
Tertiary: “Enshrine the principles of equity in the framework for emissions reductions in the next and future commitment periods based on an equal per capita approach and ecological limits” (5)				

Notes: All actions proposed in the context of the Hague conference (COP6)

#57: Hayes, Denis 2000. <i>The Official Earth Day Guide to Planet Repair</i>. Island Press, Washington, DC.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: “Earth Day” evokes environmental activism, particularly at the local level; in 2000 the focus was on climate change – “a particularly clear example of a problem that involves thresholds and that requires international cooperation.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “no other issue intersects with a wider variety of environmental problems than what kind of energy we employ to power society, where we get it, and how efficiently we use it. The wasteful use of outdated energy sources is producing climate change, oil spills, strip mines, nuclear waste, plutonium proliferation, smog, sulfate particulates, acid rain, childhood asthma, and myriad other environmental ills.” (“Limited Warranty”)				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: estimates of savings for various mitigation strategies				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: “Once we no longer live beneath our mother’s heart, it is the earth with which we form the same dependent relationship, relying ... on its cycles and elements, helpless without its protective embrace” – quote from Louise Erdrich				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Take control of your own life”				
Secondary: “Pressure politicians to change how they run the world.”				
Tertiary: On Kyoto: “Make More Efficient Cars: 22 percent. ... “Create a National Utility Trust Fund: 20.5 percent.... Create Incentives to Reduce Industrial Energy Use: 14 percent.... Establish a Federal Renewable Portfolio Standard: 11 percent. ... Encourage Combined Heat and Power: 10 percent. ... Close the Power Plant Emissions Loophole: 9 percent. ... Build Better Buildings: 4.5 percent. ... Manufacture Efficient Appliances: 4.5 percent. ... Set Greenhouse Gas Standards for Vehicle Fuels: 4.5 percent. ... Overlapping All Categories: Establish Tax Incentives for Smart Energy.”				
Notes				

#58: Adhikary, Pushpa 2002. Climate change on the roof of the world. Taken from <i>Tough Terrain: Media Reports of Mountain Issues</i>. Asia Pacific Mountain Network and Panos Institute South Asia.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: No identifying information is given about the author.				
Secondary: This paper is part of the Bishkek Global Mountain Summit E-Consultation.				
Tertiary:				
Notes				
Type of argument				
Primary: “What happens to the water towers of the Tibetan plateau has a bearing on about three billion people in China, Southeast Asia, and South Asia” – and there are signs of thinning ozone and warming, resulting in low water flows				
Secondary: The cause could be a warming cycle, but Professor Zhang “from the Chinese Academy of Social Sciences in Beijing believes that global buildups in the levels of carbon dioxide and other greenhouse gases are accelerating the current natural warming cycle in Tibet.”				
Tertiary:				
Notes				
Type of evidence				
Primary: Naming the rivers and identifying their paths to the sea, then giving stats about less runoff in recent years.				
Secondary: Quotations from Profs. Ying and Zhang				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans are affecting the environment negatively but could act to protect it.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “it is important to protect the Tibetan watershed since it has such a large impact on regions downstream.”				
Secondary:				
Tertiary:				
Notes				

#59: Council for Agricultural Science and Technology (CAST) 1992. <i>Preparing U.S. Agriculture for Global Climate Change</i>. Report 119. CAST, Ames IO.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: CAST “is a nonprofit organization comprised of 29 member scientific societies and many individual, company, nonprofit, and associate society members.” It considers itself educational and “takes no advocacy positions on issues.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Autonomously, without outside encouragement, farmers will adapt to ease the impact of climate change” (2) – changing crops, animals, and management; water may be a limitation				
Secondary: Farmers can emit less (use less fuels, reduce methane from livestock) and “stash away” carbon in soil and trees				
Tertiary: “Leaders must, therefore, prepare the nation by encouraging adaptations that cut the costs of climate change to acceptable levels” (4) – diversity/flexibility, free trade				
Notes				
Type of evidence				
Primary: comparison of no-climate scenario, Dust Bowl climate, and projected climate change				
Secondary: numerous scholarly publications on climate change, agricultural production, etc.				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: We (farmers) can manage nature – reduce climate change and adapt too				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “A prudent way to hedge the risk of those costs is to hold a diverse portfolio of agricultural climate change assets and assure the flexibility to use them” (86)				
Secondary: continue to support trade and research to enable autonomous adaptation				
Tertiary:				
Notes				

#60: Sandalow, David B. and Ian A. Bowles 2001. Fundamental of treaty-making on climate change. <i>Science</i> 292 (8 June), 1839-1840.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Sandalow is with WRI, Bowles with the Kennedy School of Government at Harvard and the Center for Applied Biodiversity Science, Conservation International				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Climate change is “an especially challenging public policy issue both for nations and for the international community as a whole” (1839)				
Secondary: “A treaty response in the short to medium term should accomplish at least three basic objectives. It should (i) create strong incentives to start to reduce GHG emissions, (ii) provide a cost-effective framework for international cooperation, and (iii) maintain options and flexibility as an international regime is built over the coming years and decades” (1839)				
Tertiary:				
Notes: 1992 FCCC and provisions				
Type of evidence				
Primary: IPCC citations about “scientific and political time scales are mismatched,” “responses to climate change involve modifications in energy and transportation infrastructure” (“enormous investments already sunk in the status quo”), “widely varying national circumstances complicate policy responses,” and “defining the relative responsibilities of industrialized and developing countries in a manner acceptable to each is particularly challenging.” (1839)				
Secondary: theoretical discussion of Kyoto provisions, with reference to the Montreal Protocol				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: nature is secondary to the agreements humans make about it				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Adopt the Kyoto Protocol as possessing the “seven key elements we present for an effective treaty.” Policymakers “should be guided by a clear understanding of the urgency of the challenge and the basic elements that will contribute to a successful treaty response.” (1840)				
Secondary:				
Tertiary:				
Notes				

#61: Chandler, William 1997. <i>The Economic Rewards of ‘No Regrets’ Climate Policies.</i> Conference on Strengthening the Russian Economy through Climate Change Policies, Moscow, UNEP.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Chandler has led energy efficiency/climate mitigation efforts in Asia for 20+ years				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Cooperation between Russia and the developed nations such as the United States to reduce greenhouse gas emissions would benefit both parties” (3) – Russia trading its cheap emissions reductions				
Secondary: Current economic tools (both macro & micro models) are inadequate for economies in transition – micro doesn’t account for economic restructuring costs; macro assumes equilibrium; both overestimate				
Tertiary:				
Notes: Discusses Joint Implementation under the FCCC				
Type of evidence				
Primary: Begins with a White House Conference on CC at which Clinton warned it would be a “grave mistake” to ignore global warming – ends with a quotation from Russian historian Nicholas Riasanovsky (ideas quickly give way to interests in a democracy)				
Secondary: Reality of poor Russian economy, which is still 1/7 of GDP and 3 Russian advantages: one of the world’s most energy-inefficient economies, possesses over half the world’s natural gas reserves, high level of technical sophistication could enable it to utilize advanced energy tech (data on all points)				
Tertiary: Model results and critique, along with Russian data & case study				
Notes: Uses IPCC data and scenarios				
Worldview/view of nature				
Primary: Focused on human economies, nature as natural resources for use by people				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “A set of measures to share the burden of emissions reduction and to share resources for achieving those reductions may be the best one can expect in a less-than-perfect world. That means the [JI], offsets, and financing of projects would be desirable. A system of monitoring and verification would be necessary, but should be practicable” (10)				
Secondary: Russia must “show leadership in the negotiations” (10) (at Kyoto).				
Tertiary:				
Notes				

#62: Shackleton, Robert G. 2003. <i>The Economics of Climate Change: A Primer</i>. Congress of the United States, Congressional Budget Office, Washington, DC. Also available at http://www.cbo.gov				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Shackleton has written on the economics of climate change at EPA				
Secondary: The study was prepared at the request of the “Ranking Member of the House Committee on Science” and so may give a good summary of current thinking available to the federal government				
Tertiary:				
Notes				
Type of argument				
Primary: “Over the next century, human activities will produce large quantities of greenhouse gases, and their accumulation in the atmosphere is expected to affect regional climates throughout the world. Those effects are very uncertain yet could prove serious and costly in at least some regions. However, restraints on emissions would also be costly and could be difficult to achieve in an efficient manner” (summary).				
Secondary: “The atmosphere is freely available to all, and greenhouse gases spread around the world no matter where they are emitted. Those characteristics make it very difficult to create property rights and markets for use of the atmosphere – and they make the climate issue international in scope. It may therefore fall to governments to develop alternative policies for addressing the risks posed by climate change” (summary).				
Tertiary:				
Notes				
Type of evidence				
Primary: many lit references to major journals, from known cc researchers, and from other government documents				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature = natural resources for human uses				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “The challenge will be to develop policies that take advantage of low-cost opportunities to reduce emissions throughout the world, and to find an acceptable way to distribute costs and benefit among countries and regions with dramatically different circumstances and interests” (summary).				
Secondary:				
Tertiary:				
Notes: assumption that economic policies can accommodate the challenges of the atmosphere as a public good, equity among nations, etc.				

#63: Chatterjee, Pratap and Matthias Finger 1994. “The Framework Convention on Climate Change” and “Conclusions.” In <i>The Earth Brokers: Power, Politics and World Development</i>. Routledge, London.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Chatterjee is “Global Environmental Editor of the Inter Press Service, Washington, DC”; Finger is “Associate Professor at Teachers College, Columbia U”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Global ecology” brings into question the assumptions that industrial development will lead to “a rational society of free and responsible citizens” (3) – the means has become the end in the “development myth” – global ecology also undermines the nation-state and the military				
Secondary: “The negotiations for the climate convention are a good example of what happens if a global environmental problem cannot be turned – unlike the case of biodiversity – into the promotion of further industrial development. Therefore, the climate negotiations are probably best characterized as an ‘effort to avoid conflicting positions through vagueness and ambiguity’” (44) and the Convention is careful to state that the process should “enable economic development to proceed...”				
Tertiary: “Rather than facing up to the challenge of the limits to growth and the prospect of deindustrialization, UNCED has raised the promotion of economic growth to a planetary imperative” (172-3).				
Notes				
Type of evidence				
Primary: Mostly assertion/theory about power relations and the development myth – calls the FCCC “this toothless framework” (45) and says it reinforces the notion that development will stop the poor from degrading the environment				
Secondary: Uses IPCC conclusions (“which stated in 1990 that unless emissions of greenhouse gases such as carbon dioxide were cut significantly, the world could face unprecedented global warming” and impacts (44)				
Tertiary: Quote from a representative of youth, Wagaki Mwangi (Kenya), who spoke on the day before Bush’s speech “Multinational corporations, the United States, Japan, the World Bank, The International Monetary Fund have got away with what they always wanted, carving out a better and more comfortable future for themselves...” (167).				
Notes: brief history of the Rio process leading to the FCCC				
Worldview/view of nature				
Primary: (Club of Rome) – Earth is a finite system with limits to growth, which people are violating				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Question The development process in its entirety ... we must think and collectively behave in terms of the sustainability of a closed and finite system of local and regional resources, as well as of socially and culturally rooted users ... we have no choice but to focus on the local,				

its people, and its communities ... and collectively un-learn the development paradigm of which modern society is both the product and the victim" (173).
Secondary:
Tertiary:
Notes

#64: Plumwood, Val 1993. <i>Feminism and the Mastery of Nature</i> . Routledge, London.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: We need a common, integrated framework for the critique of both human domination and the domination of nature – integrating nature as a fourth category of analysis into the framework of an extended feminist theory which employs a race, class and gender analysis” (1-2).				
Secondary: The man-nature dualism provides a basis to construct a “master story” that links the domination of humans and the domination of nature.				
Tertiary: Most attempted revisions of the master story (e.g., deep ecology) succeed only in reversing the terms.				
Notes				
Type of evidence				
Primary: philosophical/theoretical discussion with literary quotations (poems, LeGuin...)				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: “The category of nature is a field of multiple exclusion and control, not only of non-humans, but of various groups of humans and aspects of human life which are cast as nature ... passive, as non-agent and non-subject, as the ‘environment’ of invisible background conditions against which the ‘foreground’ achievements of reason or culture (provided typically by the white, western, male expert or entrepreneur) take place” (4).				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “creating a democratic culture beyond dualism, ending colonizing relationships and finding a mutual, ethical basis for enriching coexistence with earth others” (196).				
Secondary: “If we are to survive into a livable future, we must take into our own hands the power to create, restore and explore different stories, with new main characters, better plots, and at least the possibility of some happy endings” (196).				
Tertiary:				
Notes				

#65: Porritt, Jonathan 2003. "Take action or Climate Change Programme will fail to deliver. Press Notice (12 February). http://www.sd-commission.gov.uk/events/news/pressrel/030212.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Porritt is a known advocate of green politics. He is chairman of the Sustainable Development Commission, which conducted an audit of the programme.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: "The Government's Climate Change Programme is in danger of failing to deliver on its key goal ... for reducing emissions of carbon dioxide." "However, we believe the UK is likely to achieve its Kyoto target for reductions in greenhouse gases as a whole."				
Secondary: "The emissions reductions from the 10 year transport plan are particularly at risk. And international air travel, not even included in the calculations or the goal, threatens to blow away all the good work in industry and other sectors."				
Tertiary:				
Notes				
Type of evidence				
Primary: data, trends, projections				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: People can control the emissions that lead to climate change.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Do not "abandon the goal" but "redouble efforts to achieve it. There is still time to do so."				
Secondary: The Government must now seize the opportunity of using the energy White Paper to bring us back on track for 2010, and set us on a low-carbon path into the longer term."				
Tertiary:				
Notes				

#66: McMichael, A.J. 1993. <i>Planetary Overload: Global Environmental change and the Health of the Human Species</i>. Cambridge University Press, Cambridge. Especially “Introduction,” “Greenhouse Warming and Climate Change,” and “The Way Ahead.”				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: McMichael is a demographer who has written extensively on health and population issues related to environmental change.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Humans may be an “endangered species”; “the risk arises from the disruption of natural systems because we are exceeding the biosphere’s carrying capacity – i.e. we are overloading the planet’s ‘metabolic’ capacity to absorb, replenish and restore” (1).				
Secondary: “If I had to reduce my argument...” (a) “the <i>one</i> underlying problem is the entrenched inequality between rich and poor countries, which predominantly reflects recent imperial history, power relationships and the global dominance of Western industrial technology and economic values” (b) “the <i>two</i> central manifestations of this inequality are: (1) rapid, poverty-related, population growth and land degradation in poor countries, and (2) excessive consumption of energy and materials, with high production of wastes, in rich countries” (c) three possible outcomes: (1) exhausting various non-renewable materials, (2) toxic contamination of localized environments, and (3) impairment of the stability and productivity of the biosphere’s natural systems” (7).				
Tertiary: “it is likely ... that the indirect effects [of climate change] will, in aggregate, outweigh the direct effects. Alterations in patterns of vector-borne infectious diseases, reductions in agricultural productivity and the social disruption caused by sea-level rise and associated disasters could all become major public health problems. Regional declines in agriculture will accelerate the flight to the cities by impoverished rural dwellers” (169-170).				
Notes				
Type of evidence				
Primary: Statistics about climate, the greenhouse effect (with diagram), carbon cycle (Earth’s “metabolism”) (with diagram), emissions of GHGs (with table and graph), and cc projections (with graph) – all bolstered by references; same treatment of direct and indirect effects of cc				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: The Earth has a finite “carrying capacity” that humans are exceeding; “planetary overload” will destroy the Earth’s ability to support life.				
Secondary:				
Tertiary:				
Notes: Cc included in a list of global changes: cc, ozone layer depletion, land degradation and loss of biodiversity				
Action(s) proposed				
Primary: “The solution lies in controlling world population growth, weaning societies off cheap fossil-fuel energy and redistributing international wealth to obviate the need for inefficient				

industrialization and the destruction of rain forests” (169-170).
Secondary:
Tertiary:
Notes

#67: UK Climate Impacts Programme, Department for Environment Food and Rural Affairs, and Environment Agency 2003. <i>Climate Adaptation: Risk, Uncertainty and Decision-Making</i>. UKCIP, Oxford, UK. Also at http://www.ukcip.org.uk				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The UK CIP has been actively engaging stakeholders in projecting climate impacts for various regions of the UK and in proposing adaptation strategies and actions.				
Secondary: The booklet is targeted specifically at decision-makers, to help them if they “manage the consequences of present-day variability in weather or climate; make decisions with long-term consequences (decades or longer) for land-use, built assets or population groups; are responsible for infrastructure and business areas that are sensitive to changes in climate” (2).				
Tertiary:				
Notes				
Type of argument				
Primary: “We now have convincing evidence that our climate is changing and that these changes are not part of a natural cycle. However,” both the nature of the change and its effects are uncertain (1).				
Secondary: Climate change scenarios can provide “a basis for assessing some aspects of climate risk” (1).				
Tertiary:				
Notes				
Type of evidence				
Primary:				
Secondary:				
Tertiary:				
Notes: assumption that readers agree with the arguments made				
Worldview/view of nature				
Primary: Climate is uncertain, but humans can adapt				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Use an eight-stage decision-making framework: identify problem and objectives, establish decision-making criteria, assess risk, identify options, appraise options, make decision, implement decision, monitor (then return to identify problem and objectives – start over) (4)				
Secondary: “Try to keep your options open and flexible ... avoid making decisions that will make it more difficult to cope with future climate ... try to find ‘no regret’ options, which will deliver benefits whatever the extent of climate change” (6)				
Tertiary:				
Notes				

#68: <i>The World Energy Modernization Plan.</i> http://www.heatisonline.org/contentserve				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: This is a report of an ad hoc group that met during the summer of 1998 at the Center for Health and Global Environment at Harvard Medical School. Conveners were Dr. Paul Epstein, Associate Director of the Center; and Ross Gelbspan, author of “The Heat Is On.”				
Secondary: Twelve other participants are named, some academics, some from environmental NGOs, some independents.				
Tertiary:				
Notes				
Type of argument				
Primary: [See five proposals in “Secondary” below.]				
Secondary:				
Tertiary:				
Notes: Text begins with the Kyoto Protocol and the “dangerous” quote from the FCCC.				
Type of evidence				
Primary: more detail about how each proposal could work, bolstered by some statistics				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: implicit – focuses on human choices about which resources from nature to use (fossil fuels OR renewable and energy-efficient fuels)				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “We propose a worldwide project to modernize the global energy infrastructure over the next 15-25 years. ... We believe a set of interactive and mutually reinforcing strategies based on an international fund combined with fossil fuel efficiency and renewable energy standards can help accelerate a global energy transition, the benefits of which would reverberate through our social and economic systems.”				
Secondary: Five specifics: (1) “The elimination of national subsidies in industrial countries for fossil fuels and the provision of equivalent subsidies to develop and deploy renewable and highly efficient energy techs and job retraining for displaces workers in the fossil fuel industries.” (2) “The adoption internationally of progressively more stringent Fossil Fuel and Renewable Content Standards as a complement to the emissions ‘cap and trade’ system embodies in the Kyoto Protocol.” (3) “The elimination of regulatory barriers which impede competition and support wasteful, inefficient high-carbon techs in order to create freer competition in energy according to the criteria of cost, efficiency and low-carbon content.” (4) “The creation of a World Energy Modernization Fund using the revenues from a tax on international currency transactions or other comparable revenue sources to finance the development and transfer of climate-friendly (renewable, high-efficiency and low-carbon) techs to developing nations.” (6) “The creation of a new agency or the authorization of an existing agency under the Kyoto Protocol to facilitate a rapid transition to climate-friendly ... energy facilities worldwide through transfer of techs and expertise according to principles of equity, sustainability and competitive energy markets.”				

Tertiary:
Notes

#69: Burnett, H. Sterling 2002. "Ask the Expert." Global Warming Hotline. National Center for Policy Analysis. http://globalwarming.ncpa.org/askthex/				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The NCPA "is a 501 (c)(3) nonprofit public policy organization" that believes in private sector solutions to public policy problems.				
Secondary: Dr. Burnett is identified as the "environmental expert" from NCPA.				
Tertiary:				
Notes: This is a series of questions from students and answers from Burnett about climate change.				
Type of argument				
Primary: Although there is correlation between current warming and rise in greenhouse gas emissions, there is no proof of causation.				
Secondary: However, we should attempt to mitigate greenhouse gas emissions because global warming may be occurring and we can benefit from doing so.				
Tertiary:				
Notes				
Type of evidence				
Primary: summaries of scientific findings, although not attributed				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: nature is largely unknown to us				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: The "key to preventing tragedy from human caused global warming" is a strong economic "which will grow the worlds [sic] wealth" so that we can "prepare for and mitigate the negative impacts of climate change.				
Secondary: "Knowledge is the key, i.e., learn more about the issue.				
Tertiary:				
Notes				

#70: Harré, Rom, Jens Brockmeier and Peter Mühlhäusler 1999. <i>Greenspeak: A Study of Environmental Discourse</i>, especially pp. 22-3, 61-8, 115-116, 173-188. Sage, Thousand Oaks, CA.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Harré “has long been a preeminent and influential voice whose work is recognized in many disciplines. In the last 20 years he has been a pioneer in developing the theory and practice of discursive psychology. ... His interests range from the analyses of emotions to social theories and linguistics.”				
Secondary: Brockmeier “teaches psychology and philosophy at the Free University of Berlin,” has a recent book <i>The Literate Mind: Literacy and the Relation Between Language and Culture</i> .				
Tertiary: Mühlhäusler has a background in linguistics; “from 1979 to 1992 [he] was University Lecturer in General Linguistics and a Fellow of Linacre College at the University of Oxford, where jointly with Rom Harré he began to offer classes on language and environment.”				
Notes				
Type of argument				
Primary: Make room for all the voices in the debate; in particular, the public should “be charged to apply the standard: ‘How do we wish to live?’ to scientific plans, results and hazards” (Beck, quoted on 188).				
Secondary: The metaphors of Gaia and the greenhouse are opposed because Gaia is self-regulating and humans have no effect, whereas in the greenhouse humans control nature. A third model, cycles and balances, pictures humans as affecting the environment much faster than earlier “photobionts.”				
Tertiary: Other metaphors include “buying insurance,” the “carbon budget” and the “memory of the atmosphere.” No one agreed-on metaphor describes global warming.				
Notes				
Type of evidence				
Primary: material from the Linacre Lectures 1992-1994, reports of and contributions to the Rio Summit (where the FCCC was adopted), manifesto of the British Green Party, Statement on the use of nuclear energy by British Nuclear Fuels, C.C.W. Taylor’s 1992 collection of essays on environmental topics, examples collected by Mühlhäusler 1976-1996, and scientific papers from journals such as <i>Scientific American</i>				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Partially or wholly constructed through language, principally metaphor				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Keep the conversation going; build on the prevalent rights-based arguments and enlarge “the scope of morally protected beings” (182). “The ultimate value that we believe we can see running through the centuries of ever-changing Greenspeak is aesthetic, the conception of a certain rightness in the way human life must fit in as part of nature” (187) – also “the moral center, namely, that we do have moral responsibility and rights and duties with respect to the				

planetary ecology as much as to our own neighborhood” (187).
Secondary:
Tertiary:

#71: Conway, Jill Ker, Kenneth Keniston and Leo Marx 1999. The New Environmentalisms. Pp. 1-29 in <i>Earth, Air, Fire, Water: Humanistic Studies of the Environment</i>, Jill Ker Conway, Kenneth Keniston and Leo Marx (eds). University of Massachusetts Press, Amherst.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The authors are professors at MIT.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: Environmentalism is not one thing, but a “diffuse collection of ideas and groups” (7) including the National Rifle Association, deep ecologists, tree huggers, etc. They can be classified on different axes: ecocentrism versus anthropocentrism, apocalypticism versus gradualism, materialism versus idealism, primitivism versus presentism, worldview versus issue, global versus local perspective, ecofeminists versus material feminists, North versus South, wise use versus forever wild, government intervention versus market changes.				
Secondary: Many positions are not incompatible but must be matched to the problem; for example, apocalyptic views were appropriate for the ozone problem.				
Tertiary: “the well-being of the environment seems to involve importantly <i>both</i> changes in the values that issue in rampant consumerism ... and, at the same time, changes in technology that will permit them to do so and will permit other nations to realize their aspirations for a more adequate standard of life without overloading the planet’s fragile environmental balance.” (25)				
Notes				
Type of evidence				
Primary: discussion of positions, not many citations but many names and concepts				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: nature as fragile in some ways (e.g., ozone) but not in others				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Humanists have two tasks: “to study the ways that human beings actually interact with – not merely talk about – nonhuman nature ... contribute to an understanding of environmental discourse” and “to study the precise ways that culturally and psychologically patterned behavior contributes to the despoliation of the environment and the possibility or impossibility of alleviating it” – e.g., why people over-consume, pursue endless growth, are not mobilized against environmental problems (7)				
Secondary: “In contrast, there are other issues where a prudent gradualism makes sense: for example, issues involving the causes and remedies of global warming. In this case, present knowledge is limited, and existing models do not enable us to predict catastrophe if we fail to take immediate, costly action, even though prudence would nonetheless seem to justify a serious international effort to reduce the emission of greenhouse gases” (24).				

Tertiary:
Notes

#72: Worster, Donald 1999. Climate and History: Lessons from the Great Plains. Pp. 51-77 in Earth, Air, Fire, Water: Humanistic Studies of the Environment, Jill Ker Conway, Kenneth Keniston and Leo Marx (eds). University of Massachusetts Press, Amherst.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Worster “is Hall Distinguished Professor of American History at the University of Kansas. He has published nine books on environmental history, the history of ecology, and the history of the American West. His book on the Dust Bowl of the 1930s (Oxford U Press, 1979) won the Bancroft Prize in American History.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: The rosy views of the climate of the American West and the ease of adjustment to its climatic shifts are both unrealistic (“naïve” and “wildly misinformed”). The climate is not so salubrious, and “the road from 1900 to the present has required massive demographic dislocations and great human and ecological costs and has produced a sharp-toothed anxiety gnawing at our national self-confidence” (55).				
Secondary: “It is hard to adapt to a climate that you do not fully understand or do not fully want to accept” (56).				
Tertiary: Three lessons: “Climate, we are now beginning to acknowledge, is so complicated a series of events that we may never be able to make predictions that a farmer can rely on” (59). “Trying to control nature through technology is never a fully adequate or long-term approach to successful adaptation. ... Adaptation to the environment, if it is to be lasting, must be cultural and social as well as technological” (61). “the best adaptation to a volatile climate can never be achieved merely by a system of private property and marketplace economics. Nor can it be achieved by supplementing that system with expensive, endless government relief or subsidies” (71-2).				
Notes				
Type of evidence				
Primary: historical evidence about the climate and its impacts				
Secondary: cultural history – pioneers wanted the unlimited prosperity the West seemed to offer, so constructed the Great Plains as a “garden”; Frederick Clements, convinced of the regularity of all natural things, posited a “climax” plant community				
Tertiary: history of adaptations, especially facts about deep-well irrigation				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “The best hope for avoiding another Dust Bowl lies in restoring more of the plains to their natural, preagricultural condition” (65) through “state or federal <i>purchase of land title</i> or the purchase of conservation easements in perpetuity” (71) to revert to grassland.				

Secondary: Reverse the policies that reward risky behavior vis a vis the environment – don't bail farmers out. "What happens when we remove risk from the physical environment? Does it lead to an overextension of agriculture that cannot be sustained? I think it does" (68).

Tertiary:

Notes

#73: U.S. Department of State 2003. United States Global Climate Change Policy. Fact Sheet, February 27. http://www.state.gov/g/oes/rls/fs/2003/18055.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The State Department should presumably speak for the Administration.				
Secondary: The Fact Sheet begins, “On February 14, 2002, President Bush ...”				
Tertiary:				
Notes				
Type of argument				
Primary: The strategy of reducing greenhouse gas intensity “will set America on a path to slow the growth of greenhouse gas emissions, and – as the science justifies – to stop, and then reverse that growth.”				
Secondary: “The President’s policy also continue the United States’ leadership role in supporting vital climate change research, laying the groundwork for future action by investing in science, technology, and institutions.”				
Tertiary: The strategy “emphasizes international cooperation and promotes working with other nations to develop an efficient and coordinated response to global climate change.”				
Notes				
Type of evidence				
Primary: Details of how much \$\$ will be spent in developing nations, multilateral partnerships, and bilateral partnerships				
Secondary: No real attempt to defend the policy				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: We can go slowly in mitigation until the science is more certain.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Support “significant funding for climate change-related science and technology research, development, and transfer in the developing world.”				
Secondary: Support DOE multilateral climate change-related technology research and development				
Tertiary: Commit to “working with other nations, especially developing countries, to build future prosperity along a cleaner and better path.”				
Notes				

#74: Coon, Charli E. March 6, 2002. President Bush’s Climate Change Proposal. WebMemo #83, The Heritage Foundation.				
http://www.heritage.org/Research/EnergyandEnvironment/WM83.cfm?renderforprint=1				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Coon is listed as a senior analyst who has a law degree and is working on a masters in environmental science.				
Secondary: The Heritage Foundation is a notable conservative think tank.				
Tertiary:				
Notes				
Type of argument				
Primary: After President Bush “courageously rejected the Kyoto Protocol ... it is disconcerting then, that [he] endorses an initiative to reduce these emissions.” I.e., the policy to cut greenhouse gas intensity is inconsistent with his former, correct stance.				
Secondary: Parts of the plan that are good are support for more basic scientific research, and advanced energy and sequestration technologies.				
Tertiary: “Likewise the President’s resolve to sustain economic growth while conducting further research on global warming is vital” but the structure for voluntary reductions “sends a mixed message to businesses and investors as to the President’s commitment to economic growth and prosperity.”				
Notes				
Type of evidence				
Primary: Assertions, e.g., “As the President noted in rejecting the Kyoto Protocol, such mandatory reductions would hurt American workers and the U.S. economy.”				
Secondary: Details of the policy, e.g., the 1605(b) voluntary reporting program for ghg emissions, \$1.7 billion for basic research, \$1.3 billion to advanced energy and sequestration technologies				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: The proper focus is human prosperity, not damage to nature until proven.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Committing federal funds to sound research and innovative technologies is the sensible approach to unlocking the mysteries of climate change.”				
Secondary:				
Tertiary:				
Notes				

#75: Robinson, Dan. February 15, 2002. Environmentalists Criticize Bush Climate Change Policy. VOA News. http://greennature.com/article839.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: No further info is given about Robinson other than that he writes for the VOA News				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: President Bush's "Clear Skies" initiative has been criticized as inadequate and likely to increase greenhouse gas emissions.				
Secondary: Voluntary programs will lead to increased U.S. greenhouse gas emissions.				
Tertiary:				
Notes				
Type of evidence				
Primary: Quotations from Jennifer Morgan (WWF), Gregg Easterbrook (Brookings Institution), Jane Morgan (WWF), Debbie Boger (Sierra Club), alternating with quotations from Bush.				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Politics, not nature, is the issue.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: The United States needs to join other nations (Japan, European nations, Russia) in ratifying the Kyoto Protocol.				
Secondary:				
Tertiary:				
Notes				

#76: Dessai, Suraje 2002. The Special Climate Change Fund: Origins and Prioritisation. The Tyndall Centre for Climate Change Research and EURONATURA Centre for Environmental Law and Sustainable Development, Lisbon.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Dessai is “currently supported by a grant from a Portuguese foundation. An article and a coauthored article by Dessai are listed in the references.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Prioritising measures to reduce adverse effects (adaptation) would be better since the possibility for regret is less.”				
Secondary: “it seems clear that adaptation should be prioritized over mitigation because a market mechanism already exists for the latter.”				
Tertiary:				
Notes				
Type of evidence				
Primary: Meticulous history of the fund, to explain why so many activities are included. “principles suggested in this paper, all based on the Convention”				
Secondary: Model results. Adverse effects are more certain because “scientific knowledge” based on models (uncertain both for impacts of response measures and adverse effects) and non-modeling lit (“There is no supplementary non-model based evidence for impacts of response measures ... no reliable counterpart information”). Some models say mitigation is more expensive, some say adaptation.				
Tertiary: 1.5 pages of references and notes out of a 6-page paper				
Notes				
Worldview/view of nature				
Primary: “the fact that the Marrakesh Accords have commodified the atmospheric commons” – i.e., nature to be manipulated by humans				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: The Special Climate Change Fund should give priority in its activities to adaptation first, followed by mitigation and finally economic diversification.				
Secondary: “Projects that tackle mitigation and adaptation together could be given priority within this fund.”				
Tertiary:				
Notes: “The application of these principles could facilitate the negotiation of the process within the Group and the other Parties to reach a successful and equitable outcome by COP-9.”				

#77: Braasch, Gary 2003. World View of Global Warming. http://www.worldviewofglobalwarming.org/				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: “This project is featured in the Nieman Reports, Harvard University, Winter 2002, in a special section on Environmental Reporting.”				
Secondary: “is a project of the Blue Earth Alliance, Seattle, WA, a 501(c)(3) tax-exempt organization. The project is supported entirely by donations, grants, and license fees for the photographs.”				
Tertiary:				
Notes: The main graphic is a globe with thermometers that one can click on for views of parts of the world where warming is occurring.				
Type of argument				
Primary: “Science photography” shows how climate is changing “from the Arctic to Antarctica.”				
Secondary: “It is real, it is accelerating across the globe, and as it combines with overpopulation and weather crises, it will affect more people than does war.” “This is a story of frightening scale and great urgency that is just beginning to be told.”				
Tertiary:				
Notes				
Type of evidence				
Primary: Photographs.				
Secondary: Graphs showing global average temperature from 1000 to 2000 and global air temperature from 1856 to 2001.				
Tertiary: Discussions of the “peer-reviewed” science.				
Notes				
Worldview/view of nature				
Primary: Nature as victim of humans: “The plants and animals with whom we share the planet are adapting and moving because they have no choice.”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “We six billion humans are being affected, too, but we have choices to make to help correct and ameliorate global warming.”				
Secondary: list of actions (a link), including many ways to reduce energy use, electing “responsible leaders,” “Reduce sprawl and the paving of the landscape,” “Build for efficiency and solar power,” “Support sustainable farming and forestry,” and “Start doing these things today.”				
Tertiary:				
Notes				

#78: Huq, Saleemul 2001. Climate Change Conference in Bonn: What Does It Mean for Bangladesh? Retrieved May 29, 2003 from the internet.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Huq is a well-known scientist from the Bangladesh Centre for Advanced Studies.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: The Bonn agreement (COP6 in Bonn, July 2001) to ratify the Kyoto Protocol “shows the will of the world to carry out the ratification of the Kyoto Protocol even without the US (which is the world’s greatest emitter to greenhouse gases) ... opens up a sizable new market for carbon trading across the world ... puts in place several new special funds ... from Bangladesh’s perspective it opens the door to possibly substantial levels of additional funding.”				
Secondary: Bangladesh, as a country facing severe impacts from global warming, must work hard and make “early applications in the correct format” to gain new funding “DCM, adaptation capacity building, etc.)				
Tertiary:				
Notes				
Type of evidence				
Primary: association between the consequences of climate change for Bangladesh and the opportunities from the agreements at Bonn in 2001				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: “if we move with foresight and skill we may be able to discover the silver lining hiding in the dark clouds of climate change looming on the horizon” – i.e., economic gain can come from environmental destruction				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “in order for Bangladesh to take advantage of the new development in the climate change arena it is necessary for it to make a timely and well thought out push for additional funding in the very short term and in the longer term to develop its own capacity to both cope with climate change impacts (i.e., to build adaptive capacity) and also engage in the ongoing negotiations on climate change to ensure that its interest are looked after adequately in future.”				
Secondary:				
Tertiary:				
Notes				

#79: Blanchard, Odile, Patrick Criqui, Michel Trommetter and Laurent Viguier 2001. <i>Equity and Efficiency in Climate Change Negotiations: A Scenario for World Emission Entitlements by 2030</i>. Cahier de recherche No. 26, Institute d'économie et de politique de l'énergie, Grenoble. http://www.upmf-grenoble.fr/iepe				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “no differentiation rule and no single principle of justice have been found that might receive a consensus among all the countries”				
Secondary: “we show that the reimplementation of an international emission trading system would re-establish <i>ex post</i> the efficiency which <i>a priori</i> does not exist in the initial allocation of rights. The utilitarian concept of justice would therefore also be respected.”				
Tertiary:				
Notes				
Type of evidence				
Primary: theoretical discussion of six equity principles: equality of rights, utilitarian equality, democratic equality, causal responsibility, merit, proportional equality.				
Secondary: model results, both general from IPCC and the authors' own model, POLES				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: nature not considered; the important factor is what humans negotiate among themselves				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Institute differentiated responsibilities to reduce emissions, based on countries' historical emissions and ability to pay for reductions – the sooner both rise, the sooner they have to reduce emissions. Therefore, emissions per capita will converge over time.				
Secondary: Allow emissions trading to keep overall costs down.				
Tertiary:				
Notes				

#80: Unfair Burden? “December 9, 1997. Newshour” transcript. http://www.pbs.org/newshour/bb/environment/july-dec97/india_12-9.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Naresh Chandra, the person interviewed, was at the time India’s ambassador to the United States.				
Secondary: Margaret Warner is the interviewer on PBS.				
Tertiary:				
Notes: This is part of the run-up to the Kyoto Conference of the Parties (COP-3), that produced the Kyoto Protocol.				
Type of argument				
Primary: “Well, at the moment we have a much higher and urgent priority, and that is eradication of poverty, removal of backwardness, and improving the level of living of our people. That is a much great, urgent necessity than the long-term aim of controlling greenhouse gas emissions.”				
Secondary: “developed countries have to take the fastest steps” because “the level of energy generation and consumption in very high in the developed industrialized nations,” “have the resources and the technical competence,” and “poverty is by itself a great polluter”				
Tertiary: Developing countries are different – some, unlike India, have natural gas resources, which will produce little carbon.				
Notes				
Type of evidence				
Primary: argument from differences among countries, including natural resources, responsibility for the problem, and ability to pay for emissions reductions				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Nature is the source for resources needed to develop economically, especially for energy production.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Developed, industrialized countries must take the first steps.				
Secondary: India will develop “consistently with the requirements of environment.”				
Tertiary:				
Notes				

#81: Global Warming – A Corporate Perspective. December 5, 1997. “Newshour” transcript. http://www.pbs.org/newshour/bb/environment/july-dec97/air_12-5.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Fredrick Palmer “is CEO of Western Fuels Association, an energy cooperative that supplies coal to electrical power plants in the Western U.S.”				
Secondary: Margaret Warner is the interviewer from PBS.				
Tertiary:				
Notes: This is part of the run-up to the Kyoto Conference of the Parties (COP-3), that produced the Kyoto Protocol.				
Type of argument				
Primary: “There is concern over global warming. There are computer models that project catastrophic global warming fifty or a hundred years from now, but observations from satellites and weather balloons over the last twenty to forty years suggest that there is not human-induced global warming.” The models are flawed. The 1-degree increase in temperature over the past century is the result of coming out of a little ice age.				
Secondary: Cheap energy from fossil fuels is needed for our way of life.				
Tertiary: “CO2 is a benign limiting nutrient that for plants, agriculture, and forests, a buildup of greenhouse gases of CO2 in the atmosphere is something that should be welcomed and not feared. The impact will be benign in that we will have more productivity in agriculture...warm is good; ice ages are bad.”				
Notes				
Type of evidence				
Primary: Satellite data show cooling and “satellites are the best measurement of temperature for the globe.”				
Secondary: Ground-based data come from cities and reflect the urban heat island effect.				
Tertiary: Estimates of the costs of mitigation.				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “We want to use more of them [fossil fuels]. We want to use them cleanly and efficiently, but more of them.”				
Secondary:				
Tertiary:				
Notes: Suggests that to prevent another ice age we should “put more CO2 in the air.”				

#82: Global Environmental Facility and the United Nations Development Programme. 1997. Capacity Building for the Rapid Commercialization of Renewable Energy. Project description.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The GEF “is a financial mechanism that provides grants and concessional funds to developing countries for projects and activities designed to protect the global environment.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: China should implement “an aggressive program to develop renewable energy, including solar and wind power, biogas, and bagasse cogeneration.”				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: The increasing need for energy in China, the potential of various sources, and a list of the barriers (“limited capacity to disseminate renewable energy through market mechanisms, institutional fragmentation, lack of business skills, incomplete assessment of renewable resources, lack of facilities for testing and certifying equipment, high cost of renewable energy systems, and lack of suitable funding mechanisms.”				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: China is the second-largest contributor to climate change, but can develop renewable energy to reduce emissions				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: First objective is “to develop national capacity for the rapid commercialization of renewable energy in China” through “operationalizing market-oriented renewable energy dissemination, strengthening China’s center for renewable energy development, training policymakers, renewable energy professionals, and businesspeople... and developing standards, codes of practice, and certification procedures for the ... industry.”				
Secondary: Second objective is to “begin removing barriers to the widespread dissemination of promising alternative energy technologies” through “electrification through solar and hybrid systems, wind farm development, large-scale anaerobic biogas production, and bagasse cogeneration.”				
Tertiary:				
Notes: Benefits include reduced emissions and pollution.				

#83: Johansen, Bruce E. 1999. Review of <i>Global Warming: The Essential Facts</i>. http://nativeamericas.aip.cornell.edu/fall99/fall99r.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Johansen, “Robert T. Reilly Professor of Communication and Native American Studies at the University of Nebraska at Omaha, is author of <i>Debating Democracy: The Iroquois Legacy of Freedom</i> .”				
Secondary: John Houghton is the atmospheric scientist who has headed the IPCC’s Working Group I through all three global assessments.				
Tertiary:				
Notes				
Type of argument				
Primary: “While a lively debate in political circles and the press questions whether human activity is significantly warming the Earth, scientific evidence has been accumulating in support of the idea.”				
Secondary: Global warming will likely increase the number of violent storms and associated deaths and damage, deaths from extreme heat, and diseases.				
Tertiary:				
Notes				
Type of evidence				
Primary: Data about the rise of carbon dioxide and other GHGs in the atmosphere and the acceleration since 1950, with large annual variations.				
Secondary: Data about increases in temperature and increased energy use during the same periods (Houghton, NASA, articles in <i>Nature</i>).				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans are responsible for climate change.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Actively plan to reduce emissions, e.g., Denmark’s plans for wind farms and hydroelectricity.				
Secondary:				
Tertiary:				
Notes				

#84: Shove, Elizabeth 1996. <i>Working Back from the Future</i>. Unpublished paper, Centre for the Study of Environmental Change, Lancaster University, UK.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Shove is a social scientist who studies energy use and lifestyle.				
Secondary:				
Tertiary:				
Notes: This was one output of a workshop on choice, culture, and technology – a working group on Sustainable Consumption and “Individual Travel Behavior”				
Type of argument				
Primary: The policy relevance of modeling techniques can be improved “by incorporating social factors or, more ambitiously, by drawing in ‘new’ theoretical approaches from the social sciences” (2)				
Secondary: The mechanism of choice is how models account for differences in transportation modes, but producers and consumers alike often claim they have “no choice.”				
Tertiary:				
Notes				
Type of evidence				
Primary: Typical model projections of the future “have been concerned with the modeling (both forecasting and developing scenarios) of demand for energy”; policy=national policy (2).				
Secondary: Theoretical arguments about framing problems and thinking about future scenarios.				
Tertiary:				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Think about a future desirable state, e.g., “what else would the social and organizational world be like if energy consumption were to be reduced?” or even “What would the world be like if 60% of journeys were made by bicycle..?” (7)				
Secondary: For global warming, instead of specifying a future that can be avoided by policy and technology, it should be useful to specify a desirable future and explore how the varying time horizons of the natural world, technologies, social-cultural practices, economic conditions, and personal careers would intersect in such a future.				
Tertiary:				
Notes				

#85: Slade, H.E. Ambassador Tuiloma Neroni 2000. Linking Science and Climate Change Policy. Overview Address at the Pacific Islands Climate Change Conference, Rarotonga, Cook Islands, 3-7 April.				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Slade is the Permanent Representative of Samoa to the United Nations and Chairman of the Alliance of Small Island States (AOSIS)				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “We would see science as providing an essential component in the search for feasible pathways towards the management of the environment and towards sustainable development.”				
Secondary: “Equally, we have maintained that the precautionary approach provides a sensible and essential basis for policies relating to complex systems that are not yet fully understood and whose consequences of disturbances cannot yet be predicted.”				
Tertiary:				
Notes				
Type of evidence				
Primary: History of the processes and meetings: meeting in Apia in 1996 on Science and Impacts of Climate Change in the Pacific, Third Climate Change meeting in New Caledonia, 22 nd UN General Assembly special session in November 1999 & the priority areas closely related to climate change identified there, successive reports to the Commission on Sustainable Development pertaining to Small island States				
Secondary: FCCC and its principles, the Kyoto Protocol, established AOSIS objectives deriving from these agreements, Clean Development, GEF				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: both nature and the small island States as victims of industrialized countries				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: For science: “enhance scientific understanding; improve long-term scientific assessments; strengthen scientific capacities in all countries, especially developing countries and, in the context of our conference, small island States in particular; and ensure that the sciences are responsive to changing needs.”				
Secondary: For “effective policy implementation that links global environmental issues and sustainable development”: “scientific understanding of the nature of the links among environmental issues and their relationship to meeting human needs...,” identification of innovative combinations of policies that are effective and cost efficient and that encourage the public and private sectors to work together; political and public commitment... and improved coordination among the national, regional and international institutions charged with developing and encouraging adoption of policies and measures to meet human needs, without undermining the environmental foundation for development.”				

Tertiary:
Notes

#86: Ashford, Graham and Jennifer Castleden 2001. <i>Inuit Observations on Climate Change: Final Report</i>. Institute for Sustainable Development. http://www.iisd.org/casl/projects/inuitobs.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Support for the project came from the Government of Canada's Climate Change Action Fund, the Walter & Duncan Gordon Foundation, Indian and Northern Affairs Canada, and the Government of the Northwest Territories, with much in-kind support from the community and government agencies				
Secondary:				
Tertiary:				
Notes: The project team visited the community four times, to videotape scenes from the Inuit way of life and to audiotape interviews about the changes local people had observed.				
Type of argument				
Primary: "This community's [Inuvialuit of Sachs Harbour] way of life is at risk, an urgent warning of the negative impacts of climate change predicted to occur elsewhere in the world." (Exec Sum)				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: data on later autumn freeze-up, spring thaw earlier, smaller sea ice and thinner winter ice, melting permafrost, changes in animal populations, etc. – all based on observations of the local people				
Secondary:				
Tertiary:				
Notes: assumption that observations of local people are scientific data				
Worldview/view of nature				
Primary: "Residents have a close relationship with the Arctic environment. They still harvest fish from the sea and animals from the tundra to support themselves."				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Continue and expand efforts to communicate the changes in climate being seen in Sachs Harbour, especially to policymakers				
Secondary: scale up the research and extend to the opposite side of the world (Siberia) and the southern pole region; incorporate findings into education curricula; monitor the health of local wildlife, arrival of new species of animals, permafrost melting, and riverbank erosion				
Tertiary:				
Notes				

#87: What about the Effects of Coal Burning on Climate? The Greening Earth Society. http://www.bydesign.com/fossilfuels/crisis/html/climate_change.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The Greening Earth Society has a “green” name but is considered anti-environment.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “CO2 is the stuff of life, so how can CO2 be bad?”				
Secondary: CO2 from U.S. coal burning is “just a tiny fraction of all the burning of stuff done by the 6 billion people on the planet, perhaps one quarter of one percent of the total” and “just a tiny fraction of the CO2 that comes from other, ‘natural’ sources.”				
Tertiary:				
Notes				
Type of evidence				
Primary: use of down-to-earth language to make “simple” arguments, e.g., “CO2 is what plants eat” (so CO2 is good and maybe we should have more of it, not less) and “First of all, the whole issue of climate change being due to human activity is, literally, up in the air.”				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: CO2 is natural, what plants eat, and coal “is nothing but the remains of the billions and billions of plants that ... were buried before they could return their life giving carbon dioxide to the atmosphere.”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “So right off the bat there are no clear or simple answers regarding climate change or global warming. So there is also no clear, simple reason to do anything about it at this time. At this point it is just a big argument.”				
Secondary:				
Tertiary:				
Notes				

#88: Minnesotans for an Energy-Efficient Economy (ME3) 2002. Policies for a Clean Future: Greening Our Electricity Industry. http://www.me3.org/issues/climate/withfire2002.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: No author is listed; the “royal we” is used.				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Electricity generation is the single largest source of pollution and greenhouse gas emissions in Minnesota.”				
Secondary: “We cannot fight climate change without moving to cleaner sources of electricity.”				
Tertiary:				
Notes				
Type of evidence				
Primary: stats about coal use, pie graph				
Secondary: projections of savings, feasibility of increasing the percentage of renewable use to 10% or 20%				
Tertiary: examples of states, cities and companies who have adopted “clean” policies				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “consideration should be given to tax reforms that promote environmental improvements while expanding Minnesota’s economy.”				
Secondary: “We need to make public transit more accessible and reliable by increasing the frequency, regularity, and coverage of our transit system,” and government should lead by example by “purchasing clean vehicles for their fleets.”				
Tertiary: “Research by ME3 and its colleagues at the Center for Energy and Environment and 1000 Friends of Minnesota shows how metro Minnesota can grow smart, and protect its environment.”				
Notes				

#89: Kirby, Alex 1999 (June 4). Nuking Climate Change. BBC News. http://news.bbc.co.uk/1/hi/sci/tech/368584.stm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Kirby is identified as an “environment correspondent.”				
Secondary: The report the article is drawn from was issued by the Royal Society and the Royal Academy of Engineering.				
Tertiary:				
Notes: This is a news article about a report, <i>Nuclear Energy – the Future Climate</i> .				
Type of argument				
Primary: “The report says: ‘There is a strong case for acting to mitigate the threat of drastic climate change associated with the unrestrained continuation of this trend [toward higher levels of atmospheric carbon dioxide].’”				
Secondary: Use of renewables, energy conservation, and efficiency may not be enough; nuclear may be needed.				
Tertiary: “Public confidence is central to the future of the nuclear enterprise.”				
Notes: The final section of the report says that Friends of the Earth responded, “More radioactive waste is not the answer to climate change” and Forum for the Future said, “We do not accept the report’s arguments.”				
Type of evidence				
Primary: stats and projections about the rise of carbon dioxide in the atmosphere				
Secondary: photo of construction site for a nuclear energy plant and another plant identified in the caption as Chernobyl				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: climate is being affected by CO2 emissions; people should manage the climate by reducing their emissions				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “planners should now assume that new nuclear plants may be required in the course of the next 20 years.”				
Secondary:				
Tertiary:				
Notes				

#90: Campaign for Nuclear Phaseout 1997 (November 28). Nuclear Power Is Not the Solution to Climate Change. http://www.ccnr.org/no_nukes_cnp.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: No author is given.				
Secondary: The article is on the website of the Canadian Coalition for Nuclear Responsibility (CCNR).				
Tertiary:				
Notes: The first paragraph states that Cretien, boosted by the Canadian Nuclear Association, “has suggested that nuclear energy may be part of his platform at the climate change negotiations in Kyoto.”				
Type of argument				
Primary: “Exporting nuclear reactors just adds more problems to those that already exist” (Dr. Gordon Edwards of CCNR), seconded by Krene Kock of the Nuclear awareness Project				
Secondary: “Every dollar invested in energy efficiency displaces seven times as much CO2 emissions as the same dollar invested in nuclear power” – investing in nuclear just diverts money that would be better spent.				
Tertiary: The nuclear industry is just trying to save itself, and Cretien should not be its salesman.				
Notes				
Type of evidence				
Primary: several studies cited in text, but not fully; statistics with no attribution				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: climate change is real, but nuclear is not a solution because it causes many other environmental problems				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Canada shouldn’t get greenhouse gas credits for selling or using nuclear power, environmental activists said today.”				
Secondary:				
Tertiary:				
Notes				

#91: Clean Water Action. No date, but internal evidence that it was written post-January 29, 2003. Renewable Energy/Climate Change.				
http://www.cleanwateraction.org/ct/energy.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: No author given.				
Secondary: This is the site of a group, part of a “coalition of over 100 environmental, health, religious, and science-based groups throughout New England” that supports the Climate Change Action Plan adopted by the New England Governors and Eastern Canadian Premiers in August 2001 and wishes to go beyond it.				
Tertiary:				
Notes				
Type of argument				
Primary: Climate is changing (temp, precip and SLR) and will have effects in health, ag, forests, water resources, coastal areas, species and natural areas.				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: Data from US National Climatic Data Center and EPA				
Secondary: Details and side-by-side comparison of the Connecticut Climate Action Project and the New English Climate Action Project.				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: “We can choose to pollute the air which aggravates asthma and other respiratory problems, contributes to climate change, and increases our dependence on foreign oil OR we can chose [sic] to be part of the vibrant living planet, making sustainable choices that apply human wisdom in ways that are life enhancing.”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: (1) “By 2010, reduce state GHG emissions to levels 10% below 1990 levels.” (2) “Establish a schedule and process for developing timelines to meeting the long-term reduction goals of 75-85%.” (3) “...establish a system of mandatory reporting of CO2 and other GHG emissions by 2005.” (4) “The states should lead by example by reducing state government’s use by 25% overall by 2010.”				
Secondary: “A clear step is to develop a strong consumer demand for clean, renewable energy.”				
Tertiary:				
Notes				

#92: McKibben, Bill 2001. Where Do We Go from Here? <i>Daedalus</i> special issue, <i>Religion and Ecology: Can the Climate Change?</i> http://www.daedalus.amacad.org/issues/fall2001/mckibben.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: McKibben is the author of <i>The End of History</i> .				
Secondary: <i>Daedalus</i> is the journal of the American Academy of Arts and Sciences.				
Tertiary:				
Notes				
Type of argument				
Primary: “Now, responding to the urgent alarms of scientists, historians of religion and theologians have pored over old texts and traditions, seeking to find in them sources for a new environmental ethics – a repair guide for what suddenly seems our most broken relationship of all, namely our human relationship to the natural habitat.”				
Secondary: However, “few religious leaders have stepped forward to make these new understandings central parts of their work.”				
Tertiary: “We need to build on the work begun by this project to bring together ideas and action.”				
Notes				
Type of evidence				
Primary: results from “a series of Harvard conferences and books on world religions and ecology”				
Secondary: civil rights movement in the U.S. and liberation theology in Latin America, Asia, and Africa “could bring important perspectives to the question of religious understanding of the human-Earth relationship”				
Tertiary: visions of “what would happen” if religious leaders joined environmental activist causes – might change the political dynamic but would certainly make people think seriously “about what their traditions demand. They would have no choice but to begin viewing the facts about global warming, laid out with understated power by Michael McElroy, as the story of human beings grown too large in relation to their planet, a position that almost requires reference to the Book of Job or Psalm 148.”				
Notes				
Worldview/view of nature				
Primary: “Ecology may rescue religion at least as much as the other way around. By offering a persuasive practical reason to resist the endless obliterating spread of consumerism, it makes of Creation a flag round which to rally. And it is a flag planted not in the past, but in the present and the future. It is the keystone issue for our moment, the one that makes eco-theology urgent.”				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Political activists within the churches, synagogues, mosques, and temples doubtless fear marginalization if they get too far outside the mainstream, but in fact they are marginalized now, invisible within the smothering consensus of our society. It is only by getting far enough out to risk seeming extreme that they have any real change of challenging our consumerist complacency.”				

Secondary: “Imagine gatherings where theologians and scholars and activists came together – and did not leave until they had worked out plans for closing down a polluting power plant, opening up new funding for alternative energy, or any of a hundred other tasks: specific actions, which they would help to carry out in the days and weeks ahead.” E.g., Episcopal Power and Light (markets green energy), Coalition for Environmentally Responsible Economics (CERES), new declarations that “sport utility vehicles are morally problematic, that the Kyoto treaty needs moral support.”

Tertiary:

Notes

#93: Society, Religion and Technology Project 1998. International Petition to Governments of Industrialised Countries. Church of Scotland. http://www.srtp.org.uk/climpet2.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: The petition was initiated by the World Council of Churches (which has a reputation for being “liberal”) and has the imprimatur of the Church of Scotland.				
Secondary: When the petition was presented to the chair of the UN negotiating meeting held in Bonn in March 1998, “Former German President Richard von Weizsaecker made a strong address in support of the aims of the petition...”				
Tertiary:				
Notes				
Type of argument				
Primary: Series of statements: “Climate change is a serious threat to the well-being of God’s creation.” International consensus, problem of burning fossil fuels, industrialized countries the cause, most impacts on developing countries.				
Secondary: “Despite this situation, the UK government has shown reluctance to act for the long term...”				
Tertiary:				
Notes				
Type of evidence				
Primary:				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary:				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “The signatories of this petition call on HM Government “(1) to set specific targets for reducing CO2 levels in the UK beyond 2000; (2) to implement appropriate measures to incorporate the environmental costs of burning fossil fuel in the price of coal, oil, gas and their products; (3) to increase energy efficiency by providing greater incentives and assistance to domestic and commercial users; (4) to pursue a rigorous policy of replacing fossil fuels by renewable energy, making full use of Scotland’s abundant renewable potential; (5) to provide assistance in environmentally-friendly technologies to developing countries as they industrialise and to countries of Eastern Europe.”				
Secondary: “For our part: we declare our readiness to accept the consequences of such reductions on our society, economy and personal lives; we are prepared to take steps in our way of life to reduce our energy consumption and greenhouse gas emissions; we believe such changes would improve the long-term quality of life for all.”				
Tertiary:				
Notes				

#94: Müller, Benito 2002. <i>Equity in Climate Change: The Great Divide</i>. Oxford Institute for Energy Studies. http://www.ejcc.org/resources_tech.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: This paper was also “scheduled to be published as a Viewpoint ‘A New Delhi Mandate?’ in <i>Climate Policy</i> 79(2002), 1-3.				
Secondary: The support of the Shell Foundation is acknowledged.				
Tertiary:				
Notes				
Type of argument				
Primary: North-South Divide: North concerned with setting emissions targets, South with “the discrepancy between the responsibility for, and the sharing of climate impact burdens.” (1) The North has set the agenda, ignoring the concerns of the South.				
Secondary: Need to “put much greater effort into thinking of innovative ways in which these human impact burdens could be distributed.” (2) “The reduction – avoidance and limitation – of unacceptable climate impacts on individuals and societies can be achieved both by <i>reducing the hazards</i> associated with climatic change (‘climate hazards’) and by <i>lowering the vulnerability</i> of the individuals and societies in question.” (3)				
Tertiary: “over the past three decades, the proportion of the global population affected by weather-related disasters has doubled...In absolute numbers, these trend figures have almost quadrupled over this period.”				
Notes				
Type of evidence				
Primary: References to the FCCC, IPCC, Marrakech Accords, Kyoto Protocol, Bonn Agreement, and their provisions for burden sharing. Also UNEP (Klaus Töpfer).				
Secondary: statistics about rising number of disasters that are weather-related				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: For the North, the problem is human degradation of Nature, which is the victim; for the South, the victims are people (unsustainable development, “in the non-technical sense of failing to survive”).				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “Given the existing threat, particular urgency is attached to a proposal for reform of the relevant disaster <i>relief</i> funding mechanism by creating an FCCC <i>Climate Impact Relief (CIR) Fund</i> to achieve an international relief system adequate to the challenge. Because this is to involve merely a more efficient funding mode, such a reform could be carried out with little or no additional costs (no ‘new money’), yet with significant benefits to the international community.” (1)				
Secondary:				
Tertiary:				
Notes				

#95: German Advisory Council on Global Change (WBGU) 2003. <i>World in Transition – Towards Sustainable Energy Systems</i>. Executive Summary. http://www.wbgu.de/wbgu_jg2003_kurz_engl.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “Nothing less than a fundamental transformation of energy systems will be needed to return development trajectories to sustainable corridors.”				
Secondary:				
Tertiary:				
Notes				
Type of evidence				
Primary: IPCC findings , WHO				
Secondary: WBGU scenario showing achievement of 450 ppmv concentrations with “major reduction in the use of fossil energy sources; phase-out of the use of nuclear energy; substantial development and expansion of new renewable energy sources, notably solar; improvement of energy productivity far beyond historical rates.” (graph) – with highly articulated roles for international organizations and mechanisms				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans are interfering with global life systems through greenhouse gas emissions; but, also, people are entitled to have some level of energy resources.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Milestones: Protect natural support systems (global reduction of 30% by 2050 – 80% from industrialized countries, no more than 30% rise in developing countries); eradicate energy poverty (ensure everyone has at least 500 kWh by 2020); mobilize financial resources for the global transformation of energy systems; use model projects for strategic leverage and engage in energy partnerships; advance research; and draw together and strengthen global energy policy institutions.				
Secondary:				
Tertiary:				
Notes				

#96: Department of Energy, Office of Fossil Energy. No date, but after May 1999. Carbon Sequestration. http://www.fe.doe.gov/coal power/sequestration/index.shtml				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: No author is given.				
Secondary: DOE-FE is focused on the continued use of fossil energy, so it may be expected to have an interest in ways to reduce emissions from coal, oil, etc.				
Tertiary:				
Notes				
Type of argument				
Primary: “Availability of [fossil] fuels to provide clean, affordable energy is essential for the prosperity and security of the United States,” but “To stabilize and ultimately reduce concentrations of this greenhouse gas [CO ₂], it will be necessary to employ carbon sequestration – carbon capture, separation and storage or reuse.”				
Secondary: Achieving a goal of reducing the cost of carbon sequestration to \$10 or less per net ton of carbon emissions avoided by 2015 would save the U.S. trillions of dollars.				
Tertiary:				
Notes				
Type of evidence				
Primary: references and quotations from PCAST report “Federal Energy Research and Development for the Challenges of the Twenty First Century” and the SC-FE report (draft at the time) <i>Carbon Sequestration: State of the Science</i>				
Secondary:				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: nature is not resilient to increasing concentrations of greenhouse gases, but will be resilient to sequestration technology schemes				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Develop carbon sequestration approaches, pilot test options for direct and indirect sequestration, and look for “more revolutionary” technologies that will “rely less on site-specific or application factors to ensure economic viability.”				
Secondary:				
Tertiary:				
Notes				

#97: Worldwatch Institute. 2002. Global War on Global Warming Heats Up. Press Release. http://www.worldwatch.org/press/news/2002/08/01				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Worldwatch Institute is a well-known environmentalist group that produces an annual <i>State of the World</i> report. In the press release, it describes itself as “a Washington, D.C.-based research organization.”				
Secondary:				
Tertiary:				
Notes: This is a review of <i>Reading the Weathervane: Climate Policy from Rio to Johannesburg</i> by Seth Dunn.				
Type of argument				
Primary: “The scientific case for action continued to strengthen” 1990-2001 but most policies “have been too weak, only partially implemented, or discontinued”; governments have “failed to develop ‘diversified portfolios’ of policies”; and “the existence of ‘perverse practices’—including subsidies for fossil fuel production and consumption ... has been a major impediment to climate policymaking.” Emissions have generally risen since 1990 (e.g., EU, Japan, US, Australia, Canada), except in Germany (-17.1%), the UK (-4.1%), and Russia (-30.5%).				
Secondary: India, China and Brazil are not “rogue emitters” but have been slowing emissions growth, China because of lower coal use and energy efficiency				
Tertiary: Lowering emissions will not be costly, as conventional model results indicate.				
Notes				
Type of evidence				
Primary: stats about emissions, energy intensity, etc.				
Secondary: history of the FCCC and international actions based on it				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: Humans have an obligation to reduce GHG emissions.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Bring the Kyoto Protocol into force				
Secondary: Leave the era of voluntary commitments behind				
Tertiary: Deal with the transportation sector				
Notes				

#98: Hansen, James, Makiko Sato, Reto Ruedy, Andrew Lacis and Valdar Oinas 2000. Global warming in the twenty-first century: an alternative scenario. <i>Proceedings of the National Academy of Sciences</i> 97, 9875-9880. Also available at http://www.giss.nasa.gov/gpol/abstracts/2000/HansenSatoR.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: James Hansen is a prominent researcher at NASA’s Goddard Institute of Space Sciences. Hansen testified to the US Congress in 1988 that global warming was upon us, using in his presentation data from only the first and last ten years of the century; a critic from the Cato Institute commented that “throwing out 80% of the data to make a striking pronouncement hardly seems to be normal scientific procedure.”				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: “We argue that rapid warming in recent decades has been driven mainly by non-CO2 greenhouse gases such as chlorofluorocarbons, CH4, and N2O, not by the products of fossil fuel burning, CO2 and aerosols.”				
Secondary: Focusing on CH4 and O3 precursors, reducing black carbon emissions, and slowing CO2 emissions “could lead to a decline in the rate of global warming.”				
Tertiary:				
Notes				
Type of evidence				
Primary: model results of separate greenhouse gas emissions and forcings				
Secondary: 71 endnote references to the literature				
Tertiary:				
Notes: references to IPCC scenarios				
Worldview/view of nature				
Primary: Humans are causing climate change but can manage emissions so as to mitigate change.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Reduce non-CO2 GHGs and black carbon (soot) aerosols, which will have other benefits such as economic use of now-wasted CH4 and reduction of air pollution.				
Secondary: “require policies that encourage technological developments to accelerate energy efficiency and decarbonization trends” to slow CO2 emissions.				
Tertiary:				
Notes				

#99: Department of Natural Resources, Wisconsin. No date; retrieved June 8, 2003. Global warming is hot stuff! http://www.dnr.state.wi.us/org/caer/ce/ee/earth/air/global.htm				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary:				
Secondary:				
Tertiary:				
Notes: This is a Q&A format for “kids.”				
Type of argument				
Primary: “The increase in greenhouse gases is expected to raise the average global temperature of the planet by 2 to 9 degrees Fahrenheit over the next 50 to 100 years. Most of the increase is due to human activities...”				
Secondary: Impacts would include sea level rise, “temperate places ... might become hotter and drier, plants and animals may become extinct, severe storms “might occur more frequently and be more intense.”				
Tertiary: “Just because we’re not absolutely certain of how more greenhouse gases will affect the Earth doesn’t mean we should sit back and do nothing.” And our actions will lower pollution and conserve energy.				
Notes				
Type of evidence				
Primary: Mostly assertion or “scientists say”				
Secondary: “Who wants to breathe bad air, or always look up at a dirty sky?”				
Tertiary:				
Notes				
Worldview/view of nature				
Primary: The natural greenhouse effect keeps the planet warm, but humans are probably causing increased global warming.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: “You can help slow global warming by Walking, riding a bike, or taking the bus instead of always going by car. Not wasting electricity (turn off the lights, the radio, the TV and the computer when you’re not using them). Reducing, reusing or recycling all kinds of items, from soda pop cans to clothes, to save energy and raw materials. Planting trees to help absorb excess CO2, and to provide shade and windbreaks to keep buildings at more even temperatures so they will require less energy for heating or cooling.”				
Secondary:				
Tertiary:				
Notes				

#100: Amory Lovins sees the future and it is hydrogen. May 4, 1999. Donella Meadows' <i>The Global Citizen</i>. http://iisd.ca/pcdf/meadows/hydrogen.html				
	Primary	Secondary	Tertiary	Notes
Authority of speaker/writer				
Primary: Lovins and his wife are noted for making large claims about energy efficiency; the article also discusses his advocacy of the Hypercar, which gets 100-200 mpg				
Secondary:				
Tertiary:				
Notes				
Type of argument				
Primary: "It would be better, many people have realized, to run our cars on hydrogen...The best part of this scheme is, when you use the hydrogen to run your car, out of your tailpipe comes nothing but water vapor."				
Secondary: Fuel cells are best – quiet, essentially battery driven				
Tertiary: A hydrogen energy system is expensive. "But factor in the avoided costs of air pollution, global warming, defense of the Middle East, central power plants, and long-distance electric wires and they don't look so bad."				
Notes				
Type of evidence				
Primary: description of how hydrogen fuel cells work				
Secondary: "picture this" scenario of having your house, car, an workplace powered by hydrogen				
Tertiary: "Says Lovins: 'This approach offers several strategic advantages. It uses idle off-peak capacity in the nature-gas and electricity distribution systems that have already been installed and paid for. It is build-as-you-need and pay-as-you-go, requiring investment only in step with incremental demand. It is one or two orders of magnitude cheaper than building a dedicated, centralized hydrogen production and delivery system from scratch....And vibrant competition between gas- and electricity-derived hydrogen, ... will exert downward pressure on the prices of hardware and hydrogen.'"				
Notes				
Worldview/view of nature				
Primary: Humans as engineers can address pollution and global warming.				
Secondary:				
Tertiary:				
Notes:				
Action(s) proposed				
Primary: Start with stationary sources: workplaces, houses.				
Secondary: The hydrogen Hypercar can be plugged in at work and sell electricity back to the grid.				
Tertiary:				
Notes				

APPENDIX 2: DOCUMENTS LISTED BY ARGUMENT

Climate Change Is Not a Problem

#23: Calder, Nigel. 1999. "The carbon dioxide thermometer and the cause of global warming." *Energy & Environment* 10(1):1-18.

#30: Singer, Dr. S. Fred. 2000. Interview.
<http://www.pbs.org/wgbh/warming/debate/singer.html>

#46: Lindzen, Richard S. n.d. (downloaded March 2003). *Global Warming: The Origin and Nature of the Alleged Scientific Consensus*. Washington, DC: Cato Institute.

Climate Change Could Be Good for You

#3: Ausubel, Jesse H. 2001. "Some ways to lessen worries about climate." *The Electricity Journal* (January-February):24-33.

#23: Idso, C.D. and K.E. Idso. 2002. "Carbon dioxide and global warming: where we stand on the issue." Available at
<http://www.co2science.org/about/position/globalwarming.htm>

#34: "API's position." Downloaded March 2003 (but still refers to the Clinton Administration). <http://www.api.org/globalclimate/apipos.htm>

#59: Council for Agricultural Science and Technology (CAST). 1992. *Preparing U.S. Agriculture for Global Climate Change*. Report 119. Ames IO: CAST.

#73: U.S. Department of State. 2003. "United States global climate change policy." Fact Sheet, February 27. <http://www.state.gov/g/oes/rls/fs/2003/18055.htm>

#74: Coon, Charli E. March 6, 2002. "President Bush's climate change proposal." WebMemo #83, The Heritage Foundation.
<http://www.heritage.org/Research/EnergyandEnvironment/WM83.cfm?renderforprint=1>

#81: "Global warming – a corporate perspective. December 5, 1997. "Newshour" transcript. http://www.pbs.org/newshour/bb/environment/july-dec97/air_12-5.html

#87: "What about the effects of coal burning on climate?" The Greening Earth Society.
http://www.bydesign.com/fossilfuels/crisis/html/climate_change.html

Science Can Solve This Problem

#9: Martens, W.J.M., J. Rotmans, and L.W. Niessen. 1994. *Climate Change and Malaria Risk: An Integrated Modelling Approach*. GLOBO Report Series no. 3. Bilthoven, The Netherlands: Rijksinstituut voor Volksgezondheid en Milieuhygiene.

#19: Darwin, Roy, Marinow Tsigas, Janm Lewandrowski, and Anton Raneses. 1996. "Land use and cover in ecological economics." *Ecological Economics* 17:157-181.

#38: Cohen, Stewart J. 1993. "Climate change and climate impacts: please don't confuse the two!" *Global Environmental Change* 3(1):2-6

#39: Ecimovic, Timi, Elmar A. Stuhler, Marjan Vezjak, and Matjaz Mulej. 2002. "Introduction to climate change – present experience related to sustainability and impact on society." InfoAndina.

<http://www.mtnforum.org/emailldiscuss/discuss02/040102377.htm>

#41: Van Asselt, Marjolein B.A., and Jan Rotmans. 2002. "Uncertainty in integrated assessment modeling: from positivism to pluralism." *Climatic Change* 54:75-105.

#53: Parks, Noreen. 2002. "Measuring climate change." *BioScience* 52(8):652.

#54: Taubes, Gary. 1997. "Apocalypse not." *Science* 278:1004-1006.

#85: Slade, H.E. Ambassador Tuiloma Neroni. 2000. "Linking science and climate change policy." Overview Address at the Pacific Islands Climate Change Conference, Rarotonga, Cook Islands, 3-7 April.

#86: Ashford, Graham and Jennifer Castleden. 2001. *Inuit Observations on Climate Change: Final Report*. Institute for Sustainable Development.

<http://www.iisd.org/casl/projects/inuitobs.htm>

More Modernization Is the Answer – Policy

#2: Benedick, Richard E. 2001. "Striking a new deal on climate change." *Issues in Science and Technology* Fall 2001:71-76.

#5: Goulder, Lawrence H., and Brian M. Nadreau. 2002. "International approaches to reducing greenhouse gas emissions." Pp. 115-149 in *Climate Change Policy: a Survey*, edited by Stephen H. Schneider, Armin Rosencranz, and John O. Niles. Washington, DC: Island Press.

#13: Edwards, Paul. 1996. "Models in the policy arena." In *Elements of Change, Session 2: Characterizing and Communicating Scientific Uncertainty*, edited by Susan Joy Hassol and John Katzenberger. Aspen, CO: Aspen Global Change Institute.

#20: Athanasiou, Tom. 2003 (March). “Two futures, and a choice.” *Progressive Response*. <http://www.fpif.org/commentary/2003/0303choice.html>

#60: Sandalow, David B., and Ian A. Bowles. 2001. “Fundamental of treaty-making on climate change.” *Science* 292 (8 June):1839-1840.

#75: Robinson, Dan. February 15, 2002. “Environmentalists criticize bush climate change policy.” *VOA News*. <http://greennature.com/article839.html>

#79: Blanchard, Odile, Patrick Criqui, Michel Trommetter, and Laurent Viguiet. 2001. *Equity and Efficiency in Climate Change Negotiations: A Scenario for World Emission Entitlements by 2030*. Cahier de recherche No. 26, Institute d'économie et de politique de l'énergie, Grenoble. <http://www.upmf-grenoble.fr/iepe>

#97: Worldwatch Institute. 2002. “Global war on global warming heats up. Press Release. <http://www.worldwatch.org/press/news/2002/08/01>

More Modernization – Energy-Related Change

#10: *USEA/USAID Handbook of Climate Change Mitigation Options for Developing Country Utilities and Regulatory Agencies*. 1999. Washington, DC: Energy Resources International, Inc.

#24: Hoffert, Martin I., Ken Caldeira, Gregory Benford, David R. Criswell, Christopher Green, Howard Herzog, Atul K. Jain, Haroon S. Kheshgi, Klaus S. Lackner, John S. Lewis, H. Douglas Lightfoot, Wallace Manheimer, John C. Mankins, Michael E. Mauel, L. John Perkins, Michael E. Schlesinger, Tyler Volk, and Tom M.L. Wigley. 2002. “Advanced technology paths to global climate stability: energy for a greenhouse planet.” *Science* 298(1 November):981-987.

#26: Kawashima, Yasuko. 2000. “Nuclear power and climate change: the current situation in Japan and a message to the United States.” *Resources for the Future*, <http://www.weathervane.rff.org/pop/pop9/kwashima.html>

#65: Porritt, Jonathan. 2003. “Take action or Climate Change Programme will fail to deliver.” Press Notice (12 February). <http://www.sd-commission.gov.uk/events/news/pressrel/030212.htm>

#68: *The World Energy Modernization Plan*. <http://www.heatisonline.org/contentserve>

#82: Global Environmental Facility and the United Nations Development Programme. 1997. “Capacity building for the rapid commercialization of renewable energy.” Project description.

#89: Kirby, Alex 1999 (June 4). “Nuking climate change.” *BBC News*. <http://news.bbc.co.uk/1/hi/sci/tech/368584.stm>

#95: German Advisory Council on Global Change (WBGU). 2003. *World in Transition – Towards Sustainable Energy Systems*. Executive Summary.
http://www.wbgu.de/wbgu_jg2003_kurz_engl.html

#96: Department of Energy, Office of Fossil Energy. No date, but after May 1999.
“Carbon Sequestration.” http://www.fe.doe.gov/coal_power/sequestration/index.shtml

#100: “Amory Lovins sees the future and it is hydrogen.” May 4, 1999. Donella Meadows’ *The Global Citizen*. <http://iisd.ca/pcdf/meadows/hydrogen.html>

More Modernization – Economic Solution

#15: Edmonds, Jae, and Michael J. Scott, et al. 1999. *International Emissions Trading and Global Climate Change*. Washington, DC: Pew Center on Global Climate Change.

#27: Toman, Michael A. n.d. *Climate Change Economics and Policies: An Overview*. Retrieved from Resources for the Future website (www.rff.org) 03/12/03. (Last date in reference list is 2000.)

#28: Inovent Strategic Value Advisors. 2002. “COE Briefing from *Climate Change and the Financial Services Industry*.” United Nations Environment Programme Finance Initiatives, <http://www.unepfi.net>

#51: Linden, Eugene. 2003. “Who’s going to pay for climate change?” *Time* (February 7).

#62: Shackleton, Robert G. 2003. *The Economics of Climate Change: A Primer*. Washington, DC: Congress of the United States, Congressional Budget Office. Also available at <http://www.cbo.gov>

More Modernization – Mitigation

#7: Meyerson, Frederick A.B. 2002. “Population and climate change policy.” Pp. 251-274 in *Climate Change Policy: a Survey*, edited by Stephen H. Schneider, Armin Rosencranz, and John O. Niles. Washington, DC: Island Press.

#40: Sathaye, Jayant A., and N.H. Ravindranath. 1998. “Climate change mitigation in the energy and forestry sectors of developing countries.” *Annual Review of Energy and the Environment* 23:287-437.

#47: Browne, John. 1997. “Climate change speech.” Given at Stanford University. Available at <http://icc370.igc.org/bp.htm>

#49: “Summary for Policymakers 2001.” Pp. 1-13 in *Climate Change 2001: Mitigation*. A report of Working Group III of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.

#69: Burnett, H. Sterling. 2002. “Ask the Expert.” Global Warming Hotline. National Center for Policy Analysis. <http://globalwarming.ncpa.org/askthex/>

#83: Johansen, Bruce E. 1999. Review of *Global Warming: The Essential Facts*. <http://nativeamericas.aip.cornell.edu/fall99/fall99r.html>

#88: Minnesotans for an Energy-Efficient Economy (ME3). 2002. *Policies for a Clean Future: Greening Our Electricity Industry*. <http://www.me3.org/issues/climate/withfire2002.html>

#91: “Clean water action.” No date, but internal evidence that it was written post-January 29, 2003. Renewable Energy/Climate Change. <http://www.cleanwateraction.org/ct/energy.html>

#93: Society, Religion and Technology Project. 1998. “International petition to governments of industrialised countries.” Church of Scotland. <http://www.srtp.org.uk/climpet2.htm>

#98: Hansen, James, Makiko Sato, Reto Ruedy, Andrew Lacis, and Valdar Oinas. 2000. “Global warming in the twenty-first century: an alternative scenario.” *Proceedings of the National Academy of Sciences* 97:9875-9880. Also available at <http://www.giss.nasa.gov/gpol/abstracts/2000/HansenSatoR.html>

More Modernization – Adaptation

#14: Rosenzweig, Cynthia, and Daniel Hillel. 1995. “Potential impacts of climate change on agriculture and food supply.” *Consequences: The Nature & Implications of Environmental Change* 1(2):22-32.

#32: Stakhiv, Eugene, and Kyle Schilling. 1998. “What can water managers do about global warming?” *Water Resources Update* 112:33-40.

#48: “Summary for Policymakers 2001.” Pp. 1-17 in *Climate Change 2001: Impacts, Adaptation, and Vulnerability*. A report of Working Group II of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.

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