

ISSUE BRIEF

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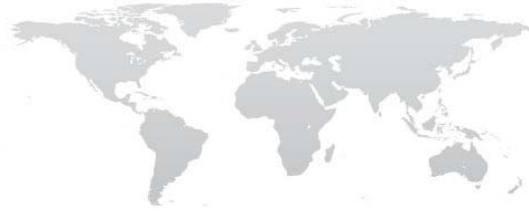
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Resources for the Future is an independent, nonpartisan think tank that, through its social science research, enables policymakers and stakeholders to make better, more informed decisions about energy, environmental, natural resource, and public health issues. Headquartered in Washington, DC, its research scope comprises programs in nations around the world.



A Legal Framework for Climate Adaptation Assessment

Daniel A. Farber¹

As defined by the Intergovernmental Panel on Climate Change, adaptation includes a set of actions to moderate harm or exploit beneficial opportunities in response to climate change. To date, little research has addressed public policy options to frame the nation's approach to adapt to a changing climate. In light of scientific evidence of extreme and unpredictable climate change, prudent policy requires consideration of what to do if markets and people fail to anticipate these changes, or are constrained in their ability to react. This issue brief is one in a series that results from the second phase of a domestic adaptation research project conducted by Resources for the Future. The briefs are primarily intended for use by decisionmakers in confronting the complex and difficult task of effectively adapting the United States to climate change impacts, but may also offer insight and value to scholars and the general public. This research was supported by a grant from the Smith-Richardson Foundation.

Policy Recommendations

Congress should adopt a National Adaptation Planning Act (NAPA), which would require that when climate change will have a significant impact on a proposed project, the agency would prepare a detailed statement of both impacts and options for reducing or eliminating the resulting harm. It would be modeled in part on existing requirements for environmental impact statements. But NAPA would go beyond those requirements in key ways:

- Each agency would be required to prepare a list of critical adaptation needs, specifically, major existing projects or activities or lands under its jurisdiction that will be significantly affected by climate change. The agency would be required to complete adaptation statements within a fixed time of listing.

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- Adaptation planning statements would be archived online in searchable form and be linked to a geographic information system (GIS) so that adaptation efforts in particular geographic areas can be easily tracked.
- Uncertainties requiring climate impacts would be clearly identified, including disagreements between models, areas of scientific disagreement, and gaps in necessary data. Rather than planning only for the scenario it considers most likely, an agency would consider a range of possibilities.

Introduction

Awareness of the significance of climate change will not necessarily translate into concrete plans for addressing future impacts. Federal agencies have crowded agendas and limited resources, which may prevent them from paying serious attention to adaptation needs. In addition, consideration of future climate impacts may require difficult adjustments in how agencies analyze and address problems. Finally, even agencies that want to address adaptation issues can benefit from a procedural template to structure their efforts.

For all these reasons, procedures for adaptation planning must be established to guide agency efforts. A model for this process can be found in the National Environmental Policy Act (NEPA), which mandates the preparation of environmental impact statements (EISs). The difference is that an EIS focuses on how agency efforts impact the environment, whereas adaptation planning focuses on how environmental changes will impact agency missions.

Some projects and regulations currently require EISs, and a discussion of how climate impacts affect the project can easily be integrated into the EIS. As a first step, the Council on Environmental Quality (CEQ) should mandate consideration of how climate change will affect projects as part of environmental impact statements.

But simply requiring the addition of a discussion of climate impacts to the existing EIS procedure is not enough, for several reasons (Farber 2009a). First, some government activities may be exempt from the EIS requirement. Second, no EIS is needed unless the government has already decided to take action; the EIS process does not provide a mechanism for forcing the government to consider new projects designed for climate adaptation. Third, the EIS process has troubles of its own, making it less than completely satisfactory even when it does apply.

Nevertheless, NEPA is a starting point in thinking about the design of a legal framework for climate adaptation planning. Understanding NEPA's shortcomings provides a roadmap for improvements. This issue brief advocates creating climate impact statements, which offer a number of improvements over EISs.



The Need for a Formal Process

Today's construction projects will face climate conditions later on that are quite different from those prevailing today (American Planning Association 2009). This is true for major projects such as dams, which may experience very different water supply patterns in future decades, as well as for more routine building projects, such as office buildings. As James Neumann's issue brief stresses, climate change poses multiple threats to infrastructure, and future infrastructure must be more resilient to anticipated climate change and extreme events (Neumann 2009).

Similarly, decisions about energy projects will have to be adaptable to different future technologies and climate conditions (Luers and Moser 2006). Climate change will affect wind patterns and thus affect both wind generators and the availability and efficiency of water-cooling systems for power plants. Climate change will result in changes in water availability, flood risks, energy prices, and other factors affecting federal projects (Bedworth and Hanak 2008). In terms of public lands, climate change may affect fire risks, impact currently endangered species or endanger new species, and impact forests and grazing lands. In short, there are few important federal projects that will *not* require consideration of climate impacts in their planning.

Water projects generally have long planning horizons, making future climate change particularly relevant. Moreover, many climate change impacts relate to water. Water projects are thus particularly in need of adaptation planning (California Resources Agency 2008).

For example, flood control projects in coastal areas obviously need to take account of sea level rise, lest their protection become quickly obsolete. Similarly, flood control on rivers will have to take more extreme weather into account. Flood control planning has typically been based on historical records that identify hundred-year floods. In a changing world, however, historical records may be deeply misleading as a guide to future conditions. These changes pose challenges for insurers and require new types of behavior from property owners (Kunreuther and Michel-Kerjan 2009). Similarly, a dam that provided satisfactory service in the past may not do so in the future.

Thus, existing water supply or flood control facilities may no longer provide the design-level of service, and new facilities will confront conditions far different from historical baselines. Adaptation issues will have central importance for these long-lived forms of infrastructure.

Future climate impacts are therefore important both in designing projects to specifically address them and in planning projects desired for other reasons (Neumann and Price 2009). Just as impact statements today require a detailed discussion of how the project affects the environment (Lawrence 2003), future project proposals must include a detailed discussion of how the environment (in the form of climate change) will affect the project. For instance, a conventional



impact statement might describe carbon emissions from a project and their link with climate change, whereas adaptation assessments might explain how a project was designed to cope with projected climate changes in the locale.

Sometimes, however, the problem is not that a proposed new project is ignoring climate change, but rather that existing programs and activities need to be rethought. Agencies have limited time and attention, so we need to devise ways to get problematic climate impact on their radar screens. The Bureau of Land Management (BLM), to take one example, has for many decades leased land for grazing. Climate change, however, will affect the sustainability of grazing in certain areas. Ranchers need adequate notice of potential changes in a key part of their operations. Similarly, existing levees may become increasingly inadequate in certain locations, and the Army Corps of Engineers, given the long lead-time on its projects, therefore needs to begin planning for upgrades.

Simply instructing agencies in blanket terms to reevaluate their programs and priorities in light of climate change will have limited traction. Many agencies will either not see the relevance of climate change or not consider it a priority. For them, the result of an open-ended mandate is likely to be a document that minimally satisfies the mandate and then is filed away forever. Those agencies that do take climate adaptation seriously need guidance about how to structure their consideration of the issue.

Consequently, we need a detailed framework for evaluating climate adaptation needs for use by all agencies of the federal government. Fortunately, it is not necessary to invent such a framework from scratch. NEPA provides a partially flawed but valuable model for a climate adaptation framework.

A Model for a Planning Process

More than 40 years ago, Congress enacted NEPA to force agencies to consider environmental aspects of their decisions. Obviously, such a requirement does not mean that the final decision will be environmentally ideal, but it does mean that the environment will at least get fair consideration. Because EISs are public documents, NEPA also provides the public the information needed to make informed judgments about government activities (Farber et al. 2006).

Specifically, section 102(2)(C) of NEPA requires agencies to “include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on (i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action.”



An agency cannot simply decide arbitrarily that a project lacks significant impacts. Instead, it must make a formal Finding of No Significant Impact (FONSI), which must be backed by facts.

The key elements of an EIS are a description of the project, an evaluation of the project's environmental impacts, consideration of alternative to the project, and discussion of measures that can be taken to mitigate the impacts if the project goes forward.

Although not specified by statute, a specific set of procedures has evolved from a combination of judicial rulings and executive branch rules (Farber et al. 2006; Lawrence 2003). Key aspects of the process are public notice and an opportunity to comment before the agency decides whether an EIS is needed and during the EIS preparation process; consultation with other federal and state agencies about the content of the EIS; and a staged process for determining the scope of the EIS, preparing a preliminary draft EIS and a final EIS, and supplementation of the EIS when required by new information. The adequacy of an EIS can be reviewed by a court, and so can an agency's decision that it does not even need to prepare an EIS because the project in question has no significant environmental impacts (Farber et al. 2006; Karkkainen 2004).

EIS Shortcomings to Avoid

Although the NEPA EIS process has had its successes, time has also revealed significant weaknesses that should be addressed in designing the process for climate impact assessments. We turn to a discussion of those weaknesses and how climate impact planning can improve on NEPA.

MAINSTREAMING ADAPTATION ASSESSMENT

The EIS process has been isolated from governments' primary decision processes. (Houck 2009). Too often, the EIS is marginalized as a burdensome paperwork requirement rather than being a real part of the planning process (Dreher 2005; Karkkainen 2004).

How can we encourage agencies to mainstream climate impact assessment? First, although consultants will often have valuable expertise, the preparation of climate assessments should not be outsourced. The agency needs to have in-house expertise and staff buy-in. Second, climate assessments should not await the proposal of particular projects. Instead, as discussed later, the agency needs to be proactive and consider climate impacts even before specific projects are on the table. Third, the agency's attention to climate issues should be monitored by a high-level official who reports directly to the agency head. All agencies should therefore have a climate officer or a deputy in charge of climate issues.



BETTER MONITORING

No requirement for monitoring and following up on EIS predictions exists, so the potential for testing predictions and improving methodologies is minimal (Karkkainen 2002). The absence of follow-up under NEPA is a serious problem in part because promised mitigation plans are not always implemented and, when they are, the results may differ from predictions.

Unlike NEPA, which provides few learning mechanisms, adaptation assessment must include consistent following up on and monitoring predictions. These follow-ups would be useful for planning other projects, but would also provide a basis for reevaluating and perhaps revising the project itself as new information develops.

BETTER ACCESS

Under NEPA, the government has not taken advantage of modern information technology to make all EIS documents easily available and connected with geographic information systems. The results have been unfortunate (Farber 2009b; Flournoy 2008). In designing a framework for climate adaptation, we should avoid making the same mistake.

The potential benefits of making climate adaptation statements available online are obvious. First, it would enable the public to readily obtain copies of information about projects and climate impacts affecting them. Second, data would be immediately searchable and usable. Third, follow-up on adaptation measures would be much easier if the assessments themselves were readily available.

INADEQUATE TREATMENT OF UNCERTAINTY

That uncertainty is not fully treated in impact statements is a key issue for adaptation because of the relative crudeness of regional downscaling of climate models (Clark and Weaver 2008; Stern 2007). Fortunately, more sophisticated ways of understanding risk are emerging, including those that give more attention to what are known as fat tailed probability distributions and other aspects of uncertainty that conventional risk assessments handle poorly. (Farber 2003; Kousky and Cooke 2009; Cooke and Kousky 2009).

Ultimately, we may need new methodologies for dealing with the kinds of uncertainties climate change poses. Until such methodologies are developed, some relatively simple and straightforward improvements in current practice should be implemented.

- Where possible, confidence intervals should be provided for critical data.
- When the agency relies on formal modeling, validation issues should be directly addressed.



- Whether or not a formal model is used, the agency should discuss the limitations of current understanding of system dynamics and conflicting models found in the scientific literature.
- Rather than relying solely on model output as a basis for evaluating risk, the agency should give explicit attention to model uncertainty.
- The agency's reasoning should be transparent and model assumptions should be clearly stated.

LIMITED TRIGGERING MECHANISM

Existing environmental assessment mechanisms are triggered by agency actions: that is, they do not require assessments of the status quo but only of proposed actions (*Weinberger v. Catholic Action of Hawaii* 1981). Yet inaction in the face of changing circumstances is one of the greatest risks, and the climate adaptation statement needs to be used as a lever to force agencies to consider these problems.

The reactive nature of the assessment process may be appropriate in contexts where the status quo is presumptively desirable, appropriate, or unchanging. It is definitely not acceptable, however, when dealing with climate adaptation, where the whole point is that the status quo will become unsustainable because of climate change. Yet it is difficult to craft a general mandate requiring agencies to identify the key areas under their jurisdiction where assessment of adaptation needs is a priority.

A starting point would be to require them to produce reports on adaptation planning on a regular basis, such as every five years, just as water agencies in states like California are required to consider certain drought possibilities in their planning. But even under such a mandate agencies may fail to produce adequate reports.

Several responses to this problem of policing agency failure to assess adaptation needs are possible:

- a petition process akin to that used under the Endangered Species Act for listing species, where citizens could petition the agency to list a "critical adaptation need" (to be effective, metrics to determine the significance of an adaptation need would be required);
- investigative reports by independent bodies such as the Government Accountability Office (GAO) or the National Academy of Science;



- a system of prizes for citizens who successfully identify high-priority needs for climate impact assessment (prizes awarded by an independent entity but funded out of the agency's operating budget, providing a small stick in addition to publicity impacts); or
- the use of risk markets (akin to presidential prediction markets) trading long-term risk contracts (such as bonds whose repayment is forgiven if droughts or floods exceed specified parameters).

Several of these techniques are promising. The use of outside reviewers such as GAO should be regularized as a way of checking for overlooked adaptation needs. A less conventional approach is awarding prizes, but this might open the process to broader public participation. In any event, we need to be attentive to the danger that agencies will take the status quo for granted and consider adaptation issues only when required to do so in the context of specific project proposals.

STREAMLINING THE PROCESS

It is no secret that environmental impact statements can be time-consuming and expensive to produce. To some extent, this is a necessary aspect of any planning process: it is always quicker and cheaper up-front to act without planning; only afterwards do the costs of this approach become apparent. But acknowledging this inevitable effect should not preclude efforts to limit the transactions costs created by climate adaptation statements. One key is to begin consideration of climate change as an integral part of project planning rather than waiting until later in the process, as too often happens with environmental impacts (Houck 2009). In addition, agencies have become increasingly sophisticated in finding ways to streamline NEPA compliance. For example, they may use mitigation to limit environmental impacts to a level considered insignificant, which allows them to substitute a compressed environmental assessment for a full-fledged impact statement (Karkkainen 2002). Similar techniques could be used in setting climate adaptation.

Conclusions

A climate adaptation statement should be required whenever climate change may have a significant impact on a proposed federal action or an existing federal program or an activity over which the federal government has statutory authority even if that authority is not currently being exercised. Adaptation statements should be archived on the Internet in searchable form, and should be the subject of periodic follow-up to determine the accuracy of predictions.

A National Adaptation Planning Act could be easily drafted by using NEPA as a template. The statute should begin with a statement of congressional policy regarding the need for climate adaptation, and it should designate the Council on Environmental Quality or some similar entity



as the lead implementer. Following NEPA, the statute could call for a detailed statement whenever climate change would have a significant impact on a proposed project, or a critically impact on ongoing programs. Additional language would require the detailed statement to explain the impacts, discuss alternatives to the proposal and whether they would be more robust, and explain uncertainties and how the proposal deals with them. Procedural provisions could cover matters such as disclosure, monitoring results, public participation, and judicial review. This provision could be designed as an amendment to the Administrative Procedure Act.

Ideally, the framework for assessing climate impacts and adaptation needs would be embodied in federal statute. This would provide permanency across presidential administrations and allow judicial enforcement of the requirement. But many of the benefits of framework legislation could be achieved, at least in the short run, by an executive order.

The president's authority to supervise administrative activities stems from his constitutional role as head of the Executive Branch and as the officer charged with ensuring that the laws be faithfully executed. This authority is ample basis for an executive order requiring agencies to discuss climate impacts in planning projects and to appraise their ongoing operations in light of climate change. Such an order could pave the road for legislation codifying this mandate and making it a permanent part of the U.S. legal system.

Climate change will be part of the context for government decision-making for decades to come. The sooner we create a well-defined process for considering future climate impacts, the fewer decisions we will have reason to regret later.



References

- American Planning Association. 2009. Integrating Energy and Climate into Planning. PAS Memo, January/February. <http://www.planning.org/pas/memo/open/jan2009>.
- Bedworth, Louise, and Ellen Hanak. 2008. *Preparing California for a Changing Climate*. San Francisco: Public Policy Institute of California. <http://www.ppic.org/main/publication.asp?i=755>.
- California Resources Agency. 2008. *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water*. Sacramento: California Department of Water Resources.
- Clark, Peter U., and Andrew J. Weaver. 2008. *Abrupt Climate Change: A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research*. Reston, VA: U.S. Geological Survey. <http://www.climatechange.gov/Library/sap/sap3-4/final-report>.
- Cooke, Roger, and Carolyn Kousky. 2009. *Adapting Risk Management: Micro-correlations and Tail Dependence*. Issues Brief. Washington, DC: Resources for the Future.
- Dreher, Robert G. 2005. *NEPA Under Siege: The Political Assault on the National Environmental Policy Act*. Washington, DC: Georgetown Environmental Law and Policy Institute.
- Farber, Daniel A. 2003. Probabilities Behaving Badly: Complexity Theory and Environmental Uncertainty. *U.C. Davis Law Review* 37, no. 1: 145–72.
- . 2009a. Adaptation and Climate Impact Assessments: Learning from NEPA's Flaws. *Environmental Law Reporter* 39: 10605–14.
- . 2009b. Confronting Uncertainty Under NEPA. Public Law Research Paper No. 1403723. Berkeley: University of California. <http://ssrn.com/abstract=1403723>.
- Farber, Daniel A., Jody Freeman, Ann E. Carlson, and Roger W. Findley. 2006. *Cases and Materials on Environmental Law*, 7th ed. St. Paul, MN: Thomson/West.
- Flournoy, Alyson C. 2008. Harnessing the Power of Information to Protect Our Public Natural Resource Legacy. *Texas Law Review* 86: 1575.
- Karkkainen, Bradley C. 2004. Whither NEPA? *New York University Environmental Law Review* 12: 333.
- Houck, Oliver A. 2009. How'd We Get Divorced? The Curious Case of NEPA and Planning. *Environmental Law Reporter* 39: 10645.
- Karkkainen, Bradley C. 2002. Toward a Smarter NEPA: Monitoring and Managing Government's Environmental Performance. *Columbia Law Review* 102: 903.



Kousky, Carolyn. 2009. Adapting to Extreme Events: Managing Fat Tails. Issues Brief. Washington, DC: Resources for the Future.

Kunreuther, Howard, and Erwann Michael-Kerjan. 2009. Risk-Based Insurance Pricing. Issues Brief. Washington, DC: Resources for the Future.

Lawrence, David P. 2003. Environmental Impact Assessment: Practical Solutions to Recurrent Problems. Hoboken, NJ: John Wiley & Sons.

Luers, Amy Lynd, and Susan C. Moser. 2006. Preparing for the Impacts of Climate Change on California: Opportunities and Constraints for Adaptation. Berkeley: California Climate Change Center.

Neumann, James E. 2009. Revisiting Infrastructure Norms. Issues Brief. Washington, DC: Resources for the Future.

Neumann, James E., and Jason C. Price. 2009. *Adapting to Climate Change: The Public Policy Response-Public Infrastructure*. Washington, DC: Resources for the Future.

Stern, Nicholas. 2007. *The Economics of Climate Change*. New York: Cambridge University Press.

Weinberger v. Catholic Action of Hawaii, 454 U.S. 139 (1981).

