

NOTES

NEPA AND CEQA: EFFECTIVE LEGAL FRAMEWORKS FOR COMPELLING CONSIDERATION OF ADAPTATION TO CLIMATE CHANGE

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I. INTRODUCTION

For years, global warming was discussed in the hypothetical—a threat in the distant future. Now it is increasingly regarded as a clear, observable fact. This sudden shift means that all of us must start thinking about the many ways global warming will affect us, our loved ones, our property and our economic prospects. We must think—and then adapt accordingly.¹

As the subject of global climate change occupies an increasingly prominent position in the current social and political discourse, competing voices clamor to predict the future effects of climate change and to propose solutions. While some environmentalists press the public to imagine catastrophic scenarios in which large cities will be inundated with rising seas or landscapes will be parched by persistent drought, some skeptics urge business as usual, insisting that no evidence unequivocally substantiates the existence of global climate change. How should the public

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1. Mark Hertsgaard, *On the Front Lines of Climate Change*, TIME, Mar. 29, 2007, <http://www.time.com/time/magazine/article/0,9171,1604879,00.html>.

react to these varying attitudes? On the one hand, drastically cutting the greenhouse gas (“GHG”) emissions known to cause climate change and enacting every possible precaution to protect against its impacts may be expensive and involve sacrifices in the near term that might ultimately prove unnecessary, given the uncertainty surrounding the future effects of climate change. On the other hand, failure to take action could result in devastation to the human community, irreversible damage to the environment, and astronomical expenses incurred to repair both. Perhaps, both views merit consideration, and the reality lies somewhere between these two extremes. Questions remain, however, concerning how communities should evaluate information regarding the projected impacts of climate change and which adaptive measures offer the best protection from its effects.

Unfortunately, no easy solution exists and the perceived future effects of climate change may arrive sooner than expected. Some scientists argue that the environmental effects associated with climate change are already appearing and will continue to grow in intensity. Recently, for example, the Alaska Native coastal village of Kivalina has become inundated by flooding believed to be the result of global climate change. Relentless ocean waves, once deterred from pummeling the shore by ice sheets that have melted away in the warmer climate, have caused a “massive erosion problem,” and Kivalina residents’ homes are dangerously close to slipping away into the ocean.² The four hundred residents must now relocate the whole village at an estimated cost of \$400 million.³ This example illustrates the large-scale economic and social problems that can develop when societies fail to adapt to the impacts of climate change. Absent effective mechanisms to address the site-specific causes and impacts of global climate change, some concerned parties are turning to the courts and environmental protection laws to compel action.

Going forward, when assessing new residential or commercial developments in areas vulnerable to the effects of climate change—such as low-lying coastal regions—can and should the impacts of the environment on the project be considered as a part of the environmental-impact review process? In this Note, I will argue that laws enacted to protect the

2. Felicity Barringer, *Flooded Village Files Suit, Citing Corporate Link to Climate Change*, N.Y. TIMES, Feb. 27, 2008, at A16.

3. *Id.* On February 26, 2008, attorneys for the four hundred residents of Kivalina filed suit in federal court against several oil companies, electric utilities, and a large coal company, alleging that the defendants, by emitting millions of tons of GHGs, contributed “to the public nuisance of global warming” and that some of the defendants conspired to “mislead the public about the science of global warming.” *Id.*

environment, the National Environmental Policy Act (“NEPA”) and its state counterparts (the “little NEPAs”), such as the California Environmental Quality Act (“CEQA”), offer an effective mechanism for integrating the issue of climate change into the collective legal framework; these laws can and should be construed to compel evaluation of the impacts of climate change *on* a proposed project. Part II addresses the basic science underlying global climate change, emphasizing what is known and what is uncertain. Specifically, it examines adaptation as a potential response to climate change, and it underscores the importance of both adaptation and its counterpart, mitigation, in fashioning a comprehensive plan to deal with the effects of climate change. In addition, it discusses the barriers and limitations associated with implementing effective adaptation measures. Part III outlines how NEPA and CEQA work, and examines how these laws have been used—successfully and unsuccessfully—to address and respond to the effects of climate change in general. Finally, Part IV argues that, while NEPA and CEQA have traditionally been viewed as governing only the effects *of* a proposed action on the environment, these laws can—and should—be utilized as one of many tools in an ongoing effort to compel the consideration of climate change effects *on* proposed projects.

II. GLOBAL CLIMATE CHANGE: WHAT DO WE KNOW AND WHAT IS UNCERTAIN?

In November 2007, the Intergovernmental Panel on Climate Change (“IPCC”), organized by the United Nations and composed of hundreds of scientists and cooperating governments, completed its Fourth Assessment Report (“FAR”) in which it concluded that “[w]arming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.”⁴ Acknowledging the existence of global climate change and its perceived impacts, the IPCC and other organizations now urge the global community to focus not only on mitigation, which includes measures taken to curb emissions and to diminish the human contribution to climate change, but also on adaptation, which involves physical and behavioral adjustments “in natural or *human systems* in response to actual or expected climatic stimuli or their effects, which moderate[] harm or exploit[] beneficial opportunities.”⁵ Yet, despite

4. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS 2 (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf [hereinafter SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS].

5. WORKING GROUP II, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION, AND VULNERABILITY *app.*, at 869, *available at*

the general consensus⁶ that the global community must address the challenge posed by climate change, substantial barriers and limitations to the successful implementation of adaptive measures remain. Many in the scientific community argue, however, that recognition of the problem is the first step given that “[y]ou can’t adapt to a problem you don’t admit exists.”⁷

A. THE BASIC SCIENCE OF GLOBAL CLIMATE CHANGE: CAUSES AND EFFECTS

According to the IPCC, climate change broadly “refers to a change in the state of the climate that can be identified . . . and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity.”⁸ While historical records show that “natural shifts” in global temperature have occurred in the past, scientists argue that “natural variability cannot account for” the “rapid rise in global temperatures” experienced at the end of the twentieth century.⁹ Rather, the recently observed trend toward increasing temperatures—often referred to as climate change or global warming¹⁰—results from an “enhanced

<http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-app.pdf> [hereinafter IMPACTS, ADAPTATION, AND VULNERABILITY].

6. The U.S. National Academy of Sciences, in conjunction with ten other science academies, has called for leaders around the world to take action with respect to climate change. See PEW CTR. ON GLOBAL CLIMATE CHANGE, CLIMATE CHANGE 101: THE SCIENCE AND IMPACTS 4 (2007), available at http://www.pewclimate.org/docUploads/101_Science_Impacts.pdf [hereinafter CLIMATE CHANGE 101]. In a survey of nine hundred articles concerning climate change, the Pew Center on Global Climate Change reports that “not one of the authors disagreed with the evidence showing that human greenhouse gas emissions impact the climate.” *Id.* at 4. *But see* RICHARD A. POSNER, CATASTROPHE: RISK AND RESPONSE 53 (2004) (noting that many skeptics deny that global warming exists or is the result of human activity and assert that environmentalists possess motivation to exaggerate the impacts of climate change in order to receive research grants).

7. Hertsgaard, *supra* note 1 (quoting Richard Klein, a coauthor of the IPCC FAR).

8. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT 30, available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf. The definition of “climate change” provided here by the IPCC differs slightly from the usage of the term by the United Nations Framework Convention on Climate Change “where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.” *Id.*

9. CLIMATE CHANGE 101, *supra* note 6, at 2.

10. Whereas global warming is an overall warming of the planet based on the average temperature of the earth’s surface, climate change encompasses changes in regional climate characteristics, including temperature, humidity, rainfall, wind, and severe weather events. However, the terms “‘climate change’ and ‘global warming’ often are used interchangeably to describe the same phenomenon.” *Id.*

greenhouse effect,” a process by which an increased amount of heat-trapping gases—chiefly carbon dioxide, methane, and nitrous oxide—produced by human activities build up in the earth’s atmosphere and prevent heat from escaping into space, thereby warming the earth’s surface.¹¹ The burning of fossil fuels¹² combined with alterations to the natural landscape, such as deforestation as well as agricultural and industrial land uses, account for much of the increase of GHG concentrations.¹³ There is “no doubt among scientists that the recent spike in carbon dioxide and other greenhouse gases in the atmosphere is the result of human activities.”¹⁴ In fact, the IPCC FAR asserts with 90 percent certainty that “[m]ost of the observed increase in global average temperatures since the mid-20th century” is attributable to increased GHG concentrations generated by human activity.¹⁵

Many scientists agree that the impacts of climate change have already begun to materialize, and projections indicate that they will intensify in the future.¹⁶ Observation of current trends reveals that sea levels, temperatures, and the rate of melting snow and ice, have increased at accelerated rates in recent years.¹⁷ Rising sea levels, resulting from melting glaciers and thermal expansion of the oceans, could profoundly impact communities in low-lying and coastal regions vulnerable to flooding.¹⁸ The IPCC’s

11. See *id.* at 2–3. Typically, the greenhouse effect produces a “warm and habitable” climate on the earth. *Id.* at 3. When the earth’s surface absorbs sunlight, heat in turn radiates from the surface and back into the atmosphere. GHGs, occurring naturally in the atmosphere, trap some of this heat while the rest escapes back into space. When human activities cause increased emissions of GHGs, more heat becomes trapped in the atmosphere, thereby resulting in a general rise in global temperatures. See *id.* at 2.

12. Scientists estimate that human activity has contributed to a 70 percent increase in the amount of GHGs from 1970 to 2004. See SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS, *supra* note 4, at 5. Annual emissions of carbon dioxide grew by a projected 80 percent during this period. See *id.* at 5.

13. See CLIMATE CHANGE 101, *supra* note 6, at 2–3.

14. *Id.* at 3.

15. See SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS, *supra* note 4, at 5.

16. According to the Pew Center on Global Climate Change, warming will have significant consequences for the United States, causing sea-level rise that will gradually inundate coastal areas and increase both beach erosion and flooding from coastal storms, changes in precipitation patterns, increased risk of droughts and floods, stronger hurricanes, threats to biodiversity, and a number of potential challenges for public health.

PEW CTR. ON GLOBAL CLIMATE CHANGE, ADAPTATION PLANNING—WHAT U.S. STATES AND LOCALITIES ARE DOING 1 (2007), available at http://www.pewclimate.org/docUploads/State-Adaptation-Planning-02-11-08_0.pdf [hereinafter ADAPTATION PLANNING]. For a general summary of the observed changes in climate and their effects as well as the projected future impacts of climate change, see SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS, *supra* note 4, at 2–4, 7–14.

17. See SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS, *supra* note 4, at 2.

18. See CLIMATE CHANGE 101, *supra* note 6, at 4. Melting of the polar ice caps could exacerbate warming because a greater amount of the earth’s surface will be exposed to absorb heat. *Id.* at 5. In

projections show that sea levels could rise anywhere from 0.18 meters to 0.59 meters by 2100.¹⁹ Further, warming will likely affect global weather patterns, yielding more drought or flooding,²⁰ extended heat waves, and more powerful storms.²¹ Projections show that global temperatures could increase by 1.1 to 6.4 degrees Celsius by the end of this century.²²

Historically, the United States has been slow to acknowledge the causes and effects of global climate change,²³ but this trend appears to be reversing with an increasing effort by the United States to become involved in seeking information and formulating solutions. Most notably, the United States contributed to the most recent IPCC report,²⁴ and at the 2007 Group of Eight meeting in Germany, “the current United States administration publicly acknowledged, on record, that global warming is a reality and that the administration would consider meeting definitive goals for the significant reduction of greenhouse gas emissions over the coming decades.”²⁵ As a result, the nation as a whole and many states individually are moving forward with plans to analyze and combat climate change and to cope with its inevitable effects.²⁶

addition, increased melting of mountain glaciers could impact water supply, as such glaciers represent the only source of irrigation and drinking water for some communities. *Id.*

19. See SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS, *supra* note 4, at 8. “In the United States, where 54 percent of the population lives in close proximity to the ocean, the most vulnerable areas are the Southeast and Mid-Atlantic coasts. Also at risk are low-lying areas and bays such as North Carolina’s Outer Banks, the Florida Coast, and much of southern California.” CLIMATE CHANGE 101, *supra* note 6, at 4.

20. CLIMATE CHANGE 101, *supra* note 6, at 5. Because climate change will likely produce different effects in different regions, some areas might be more vulnerable to water shortages while others will be vulnerable to increased precipitation and flooding. *See id.* at 6.

21. *Id.* at 5. Climate change is likely to produce intense hurricanes because such storms “draw their strength from the heat in ocean surface waters. Therefore, as ocean waters grow warmer, hurricanes will become more powerful on average, a trend that is already evident over the past 35 years.” *Id.*

22. See SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS, *supra* note 4, at 8. Some reports estimate that temperatures could increase by as much as 2.5 to 10.4 degrees Fahrenheit, with warmer temperatures in the United States. See ADAPTATION PLANNING, *supra* note 16, at 1.

23. See Kevin T. Haroff & Katherine Kirwan Moore, *Global Climate Change and the National Environmental Policy Act*, 42 U.S.F. L. REV. 155, 156 (2007) (noting that the United States “refused to ratify the 1997 Kyoto Protocol, which set mandatory greenhouse gas emission-reduction targets for signatory industrialized nations”).

24. *Id.* (citing James Kanter & Andrew C. Revkin, *Emissions Already Affecting Climate, Report Says*, N.Y. TIMES, Apr. 6, 2007, <http://www.nytimes.com/2007/04/06/science/earth/06cnd-climate.html>).

25. *Id.* (citing Michael A. Fletcher, *G-8 Leaders Back ‘Substantial’ Cuts in Gas Emissions; Bush Prevails Against Binding Targets*, WASH. POST, June 8, 2007, at A12).

26. See generally U.S. DEP’T OF STATE, U.S. CLIMATE ACTION REPORT 2002, available at <http://www.gcio.org/CAR2002> (addressing the impacts on human health and welfare caused by climate change). See also ADAPTATION PLANNING, *supra* note 16, at 3, 5–8 (providing examples of state

B. A DUAL RESPONSE TO CLIMATE CHANGE: MITIGATION AND ADAPTATION

A successful response to the complex challenges presented by climate change requires not only implementing actions to mitigate in the present and—on an ongoing basis—to cut the GHGs that contribute to warming, but also acknowledging that adaptation measures must still be employed to combat the impacts of climate change that will inevitably occur, despite the institution of heroic mitigation efforts.²⁷ Mitigation is “[a]n anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases,” and adaptation is an “[a]djustment in natural or human systems in response to actual or expected climatic stimuli or their effects.”²⁸ Accordingly, “mitigation reduces all impacts (positive and negative) of climate change and thus reduces the adaptation challenge.”²⁹

The presence of each concept in a comprehensive climate action plan enhances the probable success of the other because reducing emissions now means that fewer, or less drastic, adaptation measures may be required in the future. Mitigation “addresses . . . the front end of the global-warming problem Adaptation is the back end of the problem—trying to live with the changes in the environment and the economy that global warming has and will continue to generate.”³⁰ A society’s vulnerability to climate change depends on its “degree of exposure and its capacity to adapt.”³¹ In defining the “degree of exposure,” the “climatic conditions themselves, and the extent and character of the population, wealth, and development exposed to them” weigh heavily.³² Mitigation directly influences the climatic conditions, in that steps taken to reduce emissions should decrease

“Climate Action Plans” prepared in reaction to observed and anticipated climate change).

27. See AMY LYND LUERS & SUSANNE C. MOSER, CAL. CLIMATE CHANGE CTR., PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA: OPPORTUNITIES AND CONSTRAINTS FOR ADAPTATION 3 (2006), available at <http://www.energy.ca.gov/2005publications/CEC-500-2005-198/CEC-500-2005-198-SF.PDF> [hereinafter PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA]. See also SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS, *supra* note 4, at 22 (stating that “[r]esponding to climate change involves an iterative risk management process that includes both adaptation and mitigation and takes into account climate change damages, co-benefits, sustainability, equity and attitudes to risk”).

28. IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 750.

29. *Id.*

30. Hertsgaard, *supra* note 1.

31. IAN BURTON, ELLIOT DIRINGER & JOEL SMITH, PEW CTR. ON GLOBAL CLIMATE CHANGE, ADAPTATION TO CLIMATE CHANGE: INTERNATIONAL POLICY OPTIONS 3 (2006), available at http://www.pewclimate.org/docUploads/PEW_Adaptation.pdf [hereinafter ADAPTATION TO CLIMATE CHANGE].

32. *Id.*

the severity of future warming effects.³³ Actions taken to reduce GHGs, such as drawing energy from a wind turbine rather than from a coal-burning power plant,³⁴ may help societies to avoid, to reduce, or to delay the impacts of climate change.³⁵ Indeed, unmitigated climate change would “in the long term, be likely to exceed the capacity of natural, managed and human systems to adapt.”³⁶ As some warming impacts are already unavoidable, however, adaptation remains an essential part of responding to climate change.³⁷

Because adaptation requires “adjustments to reduce vulnerability or enhance resilience in response to observed or expected changes in climate . . . [and] involves changes in social and environmental processes, perceptions of climate risk, practices and functions to reduce potential damages,” such measures take a variety of forms in response to various stresses.³⁸ To some extent, “the added challenge posed by climate change is one of degree” and the “same types of policies and practical strategies already employed to adapt to natural climate variability—dams to control flooding, coastal defenses against cyclones, and irrigation projects to endure drought—will continue to be employed, though on a larger scale, in different locations, and at greater cost.”³⁹ Communities may adapt by taking “reactive” measures “informed by direct experience” in response to already observed climate impacts where “resources can be targeted to known risks,” such as providing emergency assistance to flood victims.⁴⁰ Alternatively, proactive measures, such as the construction of a sea wall to

33. *See id.*

34. *See* Hertsgaard, *supra* note 1.

35. *See* IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 20.

36. *Id.*

37. *Id.* at 19. In addition, “[t]here are some impacts for which adaptation is the *only* available and appropriate response.” *Id.* (emphasis added). *See also* Hertsgaard, *supra* note 1 (“The need for adaptation is rooted in the unhappy fact that we can’t turn global warming off, at least not anytime soon. The momentum of the climate system—carbon dioxide remains in the atmosphere for decades, while oceans store heat for centuries—ensures that no matter how much humanity cuts greenhouse-gas emissions, our previous emissions will keep warming the planet for decades. . . . So while we strive to green our economies, we must also mount a major new effort to strengthen our resilience against the impact on the climate that our past emissions have set in motion.”).

38. *See* IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 720.

39. ADAPTATION TO CLIMATE CHANGE, *supra* note 31, at 5. Adaptation measures combat the effects of climate change as well as climate variability, and often the “impact will not be entirely new and discrete, but rather the intensification of an underlying risk.” *Id.* at 11. *See also* Peter N. Spotts, *How to Fight a Rising Sea*, CHRISTIAN SCI. MONITOR, Nov. 15, 2007, at 13 (stating that “[a]daptation experts generally agree that scientists, engineers, and policymakers already know what needs to be done to adapt to global warming. . . . [I]t means doing what they already know how to do to reduce risks from natural hazards—it’s just doing more of it and a better job of it”).

40. ADAPTATION TO CLIMATE CHANGE, *supra* note 31, at 10.

protect low-lying areas against rising seas, offer communities the opportunity—and the challenge—to anticipate future impacts and to reduce potential exposure to risks not yet experienced.⁴¹ A history of adaptation shows that “a ‘wait and see’ or reactive approach is often inefficient and could be particularly unsuccessful in addressing irreversible damages, such as species extinction or unrecoverable ecosystem damages, that may result from climate change.”⁴²

Depending on their needs and resources, some communities may enact plans to eliminate vulnerability to the extent possible, while others may seek to make incremental changes and to increase resilience to the impacts of climate change without committing resources too heavily in the short term. In the Netherlands, where much of the country is below sea level and where some estimate that sea levels may rise significantly by the end of the century, the Dutch have enacted an aggressive flood control plan to protect densely populated river delta communities.⁴³ In addition to strengthening the protection provided by dikes and floodgates,⁴⁴ government officials are buying farmland that they will allow to flood in order to alleviate pressure on the dikes holding back flood waters.⁴⁵ Legislators in other low-lying, coastal areas of the country have proposed new zoning and development plans that would require homes to be built on higher ground or on stilts, or designed to float in place in the event of a flood.⁴⁶ Conversely, Britain has endorsed a more measured approach to combating rising sea levels. In 1983, when the British constructed the Thames Barrier, a floodgate eleven miles downriver from London, projections estimated that the Barrier would provide 1-in-2000 year protection, and a contingency plan allowed for additional protection to be added at a later date if necessary.⁴⁷ Using this

41. *Id.*

42. IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 721.

43. Spotts, *supra* note 39.

44. Hertsgaard, *supra* note 1. Dutch law requires that “river defenses deliver so-called 1-in-1,250 protection—that is, that they limit the odds of catastrophic system failure and consequent flooding to 1 in 1,250 years.” *Id.* Parliament wants to increase the degree of protection on the North Sea coast, where flood danger is greatest, from 1-in-10,000 years protection to 1-in-100,000 years level. *Id.* In comparison, New Orleans has 1-in-100 years protection. *See id.*

45. *See* Spotts, *supra* note 39. Similarly, in the San Francisco Bay area, studies indicate that due to rising sea levels “some bayside areas may need to be abandoned,” while other areas “could be developed so that new projects shield low-lying existing communities.” John King, *Climate Change Forces New Look at Bay Growth*, S.F. CHRON., Apr. 18, 2008, at A1. Some conservationists have suggested that “it might be cost-efficient to buy out some landowners along the bay” and restore the wetlands along the coast. *Id.*

46. *See* Spotts, *supra* note 39. For other examples of adaptive measures taken in reaction to various stimuli, see SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS, *supra* note 4, at 14–15.

47. *See* Hertsgaard, *supra* note 1.

incremental method, societies can deal with uncertainty by investing in some protections in the short term to meet immediate needs, while preserving the option to bolster those protections later in the long term.

These contrasting approaches to tackling the complex, site-specific impacts of climate change illustrate the need for coordination and cooperation among stakeholders in implementing adaptive measures on the ground, and for integrating adaptation into comprehensive development and proposed project plans. Anticipating and counteracting harmful effects “require[] action at multiple levels, from the local to the international, within both public and private spheres.”⁴⁸ Once planners identify problematic effects of climate change, they then must determine whether their adaptation measures will take account of “current variability; . . . observed medium and long-term trends in climate; and anticipatory planning in response to model-based scenarios of long-term climate change.”⁴⁹ Because climate change could exacerbate the effects of existing environmental stressors, a growing consensus of the scientific and planning community emphasizes the need to “integrate, or ‘mainstream,’ climate risk into ongoing decision and management processes.”⁵⁰ By integrating adaptation into development policies, it may “become part of or will be consistent with other well-established programs,”⁵¹ and thus facilitate the evaluation of climate change impacts in a way that looks forward to anticipated future challenges.

C. THE “BARRIERS” AND “LIMITS”⁵² TO DEVELOPING AND IMPLEMENTING EFFECTIVE ADAPTATION MEASURES

Once communities recognize the problems posed by the impacts of climate change and the need for adaptive solutions, significant obstacles may impede the ability to implement effective adaptation mechanisms. These obstacles include financial, informational, technological, “social and

48. ADAPTATION TO CLIMATE CHANGE, *supra* note 31, at 1.

49. IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 720.

50. PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA, *supra* note 27, at 11.

51. *See* IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 732. Adaptation measures may also be implemented “to address climate conditions as part of risk management, resource planning and initiatives linked to sustainable development.” *Id.* at 720. *See also* ADAPTATION TO CLIMATE CHANGE, *supra* note 31, at 2 (recommending the consideration of the impacts of climate change in mandatory climate risk assessments for proposed projects in the international context).

52. SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS, *supra* note 4, at 14 (concluding that a “wide array of adaptation options is available, but more extensive adaptation than is currently occurring is required to reduce vulnerability to climate change. There are barriers, limits and costs, which are not fully understood”).

cultural,” and “cognitive and behavioural” constraints.⁵³ Therefore, communities must confront “the need to adapt while recognizing and addressing the constraints or limits on adaptation over the long term. . . . Furthermore, although there remains much uncertainty around the specific impacts of climate change, it is important to remember that embedded in this uncertainty is the possibility of catastrophic change.”⁵⁴

1. Financial and Informational Obstacles: Costs and Uncertainty

Those resistant to adaptation often justify their reluctance to take action by arguing that, given the immense costs of adaptation combined with the uncertainty surrounding future impacts, significant investment to combat unknown risks that may never materialize is imprudent.⁵⁵ Undertaking adaptation will necessitate substantial financial commitments, either to provide emergency and rebuilding services in the wake of a climate-related catastrophe, or to invest in prophylactic measures intended to reduce the impacts associated with climate change.⁵⁶ For example, scientists estimate that the cost for global protection against one meter of sea-level rise is over \$1 trillion.⁵⁷ Notwithstanding the costs associated with adaptation, the uncertainty associated with the future effects of climate change, the uncertainty of specific impacts on particular regions or projects, and the uncertainty regarding the efficacy of adaptation measures may further undermine the will of society to take preventive action.⁵⁸

53. IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 719. *See also* PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA, *supra* note 27, at 26 (stating that “[t]he constraints on action are basically the opposites of the same factors that—in theory—enhance coping and adaptive capacity: lack of financial resources; technical or technological constraints; institutional constraints and inflexibilities; cultural norms that predispose individuals, communities, or entire societies to short-sighted and maladaptive responses; constraints arising from imbalances in political power or other positioning and delaying tactics; and—importantly—lack of social acceptability of different adaptation options”).

54. PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA, *supra* note 27, at 6–7.

55. *See* IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 733 (noting that “[d]espite increased attention to potential adaptation options, there is less understanding of their feasibility, costs, effectiveness, and the likely extent of their actual implementation”). *See also* POSNER, *supra* note 6, at 255 (acknowledging that questions remain concerning “what measures to take” and “how much cost to incur” in responding to climate change).

56. *See* IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 720–22.

57. *See id.* at 727. “There are preliminary estimates of the global costs of ‘climate proofing’ development, but the current literature does not provide comprehensive multi-sectoral estimates of global adaptation costs and benefits. The broader macroeconomic and economy-wide implications of adaptations on economic growth and employment remain largely unknown.” *Id.* (citation omitted).

58. *See id.* at 732–33. *See also* ADAPTATION TO CLIMATE CHANGE, *supra* note 31, at 1 (explaining that “reliable information and relevant experience are in short supply” concerning adaptation and that “[r]elative to mitigation, the adaptation challenge is much less well understood”); Kathleen A. Miller, *Climate Change and Water in the West: Complexities, Uncertainties, and Strategies*

Despite the potential for uncertainty and the significant financial commitment required for putting adaptation into practice, neither consideration should eliminate adaptive measures altogether. Addressing the issue of cost, many planners point out that proactive steps taken in advance based on estimations of future impacts are often more cost effective in the long run than reactive steps taken to rectify damages suffered due to a failure to think proactively.⁵⁹ While projecting the future effects of climate change seems like a complex and daunting task, this should not prevent scientists and planners from doing so if it means avoiding damage to society and to the environment in the future. Rather,

[i]f decision makers ignore the potential impacts of climate change when making long-term investment and policy decisions, they are more likely to achieve disappointing results than if they took into account what we do know about the future effects of climate change It is important to understand that while there are very real uncertainties, we are not totally in the dark. There are some types of . . . changes that we can predict with high confidence. It may be useful to focus on planning for those types of changes while enhancing our ability to cope with remaining uncertainties.⁶⁰

Even if multiple studies or models yield differing results and offer varying degrees of uncertainty, “some insights can be gained by considering the impacts of projected temperature changes, perhaps coupled with a range of hypothetical . . . changes.”⁶¹ Implementing effective adaptive measures will require explicitly addressing uncertainty, looking at past efforts to deal with climate-related stresses, and using innovation to ease future adjustments.⁶²

2. Institutional Constraints: Coordination and Cooperation Required Among National, Regional, Local, Public, and Private Entities

Institutional obstacles, such as a lack of coordination of efforts and

for Adaptation, 27 J. LAND RESOURCES & ENVTL. L. 87, 90 (2007) (“By far, the biggest source of uncertainty about future climate change comes from our inability to foresee the future course of human activities and resulting emissions of greenhouse gases. Those emissions will depend on how fast the world economy grows, how fast world population increases, how quickly our energy technology evolves, and how much our land uses change. Most importantly, greenhouse gas emissions will depend on the policies that we put in place to reduce the amount of climate change that will eventually occur.”).

59. See PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA, *supra* note 27, at 18–19.

60. Miller, *supra* note 58, at 87–88 (explaining how to approach the uncertainty related to climate change in the context of adapting to diminishing water supplies in the West).

61. *Id.* at 92.

62. See *id.* at 95–96.

policies on national, regional, and local levels, and among public and private actors, hinder the development and application of adaptive measures on the ground. To bring the greatest benefit, adaptation should “proceed at several levels simultaneously” because it is “in fundamental ways inherently ‘local’ . . . [but] for these efforts to be robust—or, in many cases, even possible—they must be guided and supported by national policies and strategies.”⁶³ As climate impacts are experienced locally, “response measures must be tailored to local circumstances,” but without national support, local entities may lack the information, resources, and initiative to act.⁶⁴ Challenges may also vary in size and complexity and may affect more than one region. Accordingly, “adaptation is dependent on numerous stakeholders from federal, state and local government, science and academia, the private sector, and community residents to develop solutions to complex problems for which prior solutions may not exist. Adaptation will require creativity, compromise, and collaboration across agencies, sectors and traditional geographic boundaries.”⁶⁵ National coordination is necessary because problems, as well as solutions, in one area can affect others.

3. Technological and Technical Constraints: Technology as Savior and Downfall

Technology fills a dual role in the adaptation process—on the one hand, technological innovation increases society’s capacity to defend itself against the impacts of climate change, but on the other hand, it may provide a false sense of security when communities rely too heavily on the promise of technology to solve the problems associated with climate change.⁶⁶ To be sure, technological advancements will undoubtedly enhance society’s capability to deal with the adverse consequences of climate change. For example, desalinization plants might be used to provide drinking water in the event that water shortages arise.⁶⁷ Those resistant to proactive

63. ADAPTATION TO CLIMATE CHANGE, *supra* note 31, at 9.

64. *See id.*

65. ADAPTATION PLANNING, *supra* note 16, at 1. *See also* Paula J. Schauwecker, *Land Use to Address Global Climate Change*, NAT. RESOURCES & ENV’T, Fall 2008, at 48, 48–49 (asserting that “[c]oordination between . . . planning organizations and local governments can improve choices for funding and prevent projects that encourage sprawl” and that “[c]ommunication and coordination is needed among all levels of government, utilities, planners, and scientists”).

66. *See* PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA, *supra* note 27, at 8; Richard J. Lazarus, *Environmental Law After Katrina: Reforming Environmental Law by Reforming Environmental Lawmaking*, 81 TUL. L. REV. 1019, 1039–41 (2007).

67. *See* A. Dan Tarlock & Sarah B. Van de Wetering, *Western Growth and Sustainable Water Use: If There Are No “Natural Limits,” Should We Worry About Water Supplies?*, 27 PUB. LAND & RESOURCES L. REV. 33, 46–47 (2006).

adaptation argue that technology will rescue society in the future; thus, no incentive exists to expend resources unnecessarily in the present.⁶⁸ Further, Judge Richard Posner notes that some rely on future technological innovation to offer a mechanism for decreasing the concentration of GHGs in the atmosphere, thereby eliminating the need for any mitigation or adaptation in the immediacy.⁶⁹ But, given the uncertainty concerning levels of climate change with potentially catastrophic impacts, this approach is a dangerous one.⁷⁰

As technological development facilitates the “exporting of the consequences of actions from now to distant locations or distant times,” the likelihood of complacency or an underreaction to problems increases.⁷¹ Comparing the Hurricane Katrina disaster in New Orleans to global climate change, Richard Lazarus reasons,

temporal distance undermines any strong sense of personal responsibility. . . . [W]hy act now at great personal sacrifice when it is quite possible that further technological advances in the distant future may render such sacrifices wholly unnecessary? The problem, of course, is that there is no such guarantee, especially because the natural tendency to push the problem off to a future generation makes it that much less likely that the incentives necessary to promote such technology on a timely basis will ever be present.⁷²

Unwavering faith in technology to defeat the effects of climate change induces society to discount too heavily the possibility of catastrophe, so that when disaster does occur, communities that are unprepared to face the challenge will inevitably suffer the greatest losses.⁷³ Understanding this tendency, communities must embrace the benefits of technology in adaptation and recognize that it represents part of the solution—and not the only mechanism—for combating the impacts of climate change.

4. Social and Cultural Constraints: Adaptation Indicative of Defeatist Mentality

Adaptation has not always held a prominent position in the discussion about responding to climate change because many believed the concept

68. See PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA, *supra* note 27, at 8.

69. POSNER, *supra* note 6, at 254.

70. *See id.*

71. Lazarus, *supra* note 66, at 1039.

72. *Id.*

73. *See id.* at 1035. “Technology has allowed for the construction of an illusion of an ever higher and stronger wall capable of defeating the laws of nature, thereby inviting even greater disaster when that wall invariably toppled.” *Id.* at 1040.

distracted attention from the mitigation effort and promoted a “defeatist” mentality.⁷⁴ Because adaptation can alleviate the impacts of climate change in the future, some have feared that focusing too heavily on the possibility of adaptation would give the government or policymakers an “excuse not to act” on mitigation in the near term.⁷⁵ Furthermore, Lazarus explains that “[a]s the war against terror transfigures into the war against Mother Nature and heeding the laws of nature becomes equated with surrender and cowardice,” society will endeavor, “perversely, to demonstrate our human spirit by rebuilding in flooded areas and our resolve by restoring the industrial, commercial, and residential activities ill-suited for those locations.”⁷⁶ When climate change becomes a foe to be defeated rather than a condition under which societies must work, the “reactive response” to rebuild a flooded area “perpetuates or exacerbates exposure to climate risks” in the long run and, in effect, becomes a maladaptation.⁷⁷

Social resistance to more dramatic adaptive strategies, such as migration, resettlement, and relocation, further encourages a propensity toward maladaptation that may increase exposure to climate change impacts in the long run.⁷⁸ For this reason, communities seem more accepting of adaptations that incorporate “marginal changes to material circumstances” as opposed to “wholesale changes in location and development paths.”⁷⁹ It remains unclear whether the “cultural implications of large-scale migration” might impose “significant limits to adaptation” because communities may perceive such socially and culturally disruptive actions as unacceptable in the range of adaptive options or as a failure to adapt.⁸⁰

74. See PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA, *supra* note 27, at 9.

75. Hertsgaard, *supra* note 1.

76. Lazarus, *supra* note 66, at 1037 (“There is instead more reason to assume that past mistakes will now be repeated and the problem will worsen rather than improve with further development in the Gulf Coast.”).

77. ADAPTION TO CLIMATE CHANGE, *supra* note 31, at 10. See also PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA, *supra* note 27, at 10–11 (“In cases where present-day weather extremes and climate variability cause damages, additional opportunities exist during the recovery period to rebuild in ways that are informed by the possibility of future climate change. . . . [S]ignificant efforts need to be made to improve forward thinking and to prevent maladaptations.”).

78. See IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 736.

79. *Id.*

80. See *id.*

5. Cognitive and Behavioral Constraints: Mental Resistance to Short-Term Sacrifices with Long-Term Benefits

Analysis suggesting that the inherent tendency of human nature to favor perceived gains in the short-term, at the expense of obtaining long-term benefits, has raised some concerns about the ability of societies to implement effective adaptation processes. Examining the response to the Hurricane Katrina disaster in New Orleans, Lazarus concludes that “[r]esponding to threats like Katrina (or global climate change) requires short-term sacrifice for the possibility of long-term gain or lack of injury.”⁸¹ He reasons that

[t]he here and now must take what appears to be an immediate economic hit, in other words, for the benefit of the there and then.

Katrina is strong testimony, however, that one cannot blithely rely on human nature to do this. The laws of nature, in short, may make clear that such short-term action is required in order to redress long-term catastrophic consequences that will otherwise occur, but human nature will undercut rather than promote that necessary action. Nature works within one time and spatial framework, while human nature works within an entirely different, far less reaching one.⁸²

The extent to which individuals are willing to act with respect to adaptation becomes influenced by “awareness of an issue, knowledge, personal experience, and a sense of urgency of being personally affected.”⁸³ Because most individuals perceive the impacts of climate change as occurring in the future—or not at all—they tend to ignore the magnitude and probability of the associated risks and thereby feel less pressure to take adaptive action.⁸⁴ Even when risks materialize in the form of disasters and an opportunity to evaluate the development of adaptive measures arises, evidence shows that communities often revert back to the status quo rather than correct past mistakes.⁸⁵

81. Lazarus, *supra* note 66, at 1034.

82. *Id.* at 1034–35. Lazarus points out a “disturbing cognitive dissonance” between “what everyone knew to be the case” and how “the government chose to govern, and how everyone chose to live their lives.” *Id.* at 1031. He argues that, despite “legions of scientific and engineering studies” that “described in detail and, in retrospect, fairly accurately, the extent and intensity of destruction likely to occur,” both public and private conduct actually served to exacerbate, rather than alleviate, the perceived risks. *Id.* at 1030–31.

83. IMPACTS, ADAPTATION, AND VULNERABILITY, *supra* note 5, at 735.

84. *See id.*

85. *See id.* at 733. The IPCC here discusses the “policy window hypothesis,” which refers to the “phenomenon whereby adaptation actions” occur in response to disasters when the political climate is “conducive to legal, economic, and social change which can begin to reduce structural vulnerabilities.” *Id.* Underlying this theory are the assumptions that, in the wake of a catastrophe, a new awareness of the risk will lead to a broad consensus, development agencies are reminded of the risks, and “enhanced

To address these cognitive and behavioral constraints, “[p]olicymakers need to be aware of these barriers, provide structural support to overcome them, and concurrently work towards fostering individual empowerment and action.”⁸⁶ Rather than viewing adaptation costs solely as financial resources committed up front, policymakers and planners must take into account future damage—financial or otherwise—that may result from failing to invest in adaptation.⁸⁷ Specifically, “decision-makers in the private and public sectors require greater *awareness* of the risks they face, increased capacity to *analyze* such information and use it in decision-making, and the ability to remove any institutional, financial, political, and other barriers in the way of turning good intentions into *actions*.”⁸⁸

By understanding how these barriers inhibit adaptation to climate change, decisionmakers can work to overcome them and to implement effective approaches to adaptation through the use of commonly available legal tools. NEPA and CEQA offer an effective mechanism for counteracting the barriers to adaptation to climate change because their environmental-impact assessment regimes facilitate an analysis of information and a balancing of factors to foster informed action. While NEPA and CEQA have traditionally been interpreted as strictly protecting the environment from proposed actions or projects, they can and should be construed to require consideration of the impacts of climate change on proposed projects.

III. THE ROLE OF NEPA AND CEQA IN THE LEGAL RECOGNITION OF CLIMATE CHANGE

NEPA, which sets forth the principles governing United States environmental policy, was signed into law by President Richard Nixon on January 1, 1970.⁸⁹ Several states followed the lead of the federal government by drafting state-level environmental policies, or “little NEPAs,”⁹⁰ and, one year later, CEQA was enacted.⁹¹ Both acts articulate

political will and resources [will] become available.” *Id.* More often, however, there is “pressure to quickly return to conditions prior to the event rather than incorporate longer-term development policies” and this, in turn, can lead to greater future vulnerability. *Id.*

86. *Id.* at 736.

87. *See id.* at 724 (explaining that “[a]daptation costs are usually expressed in monetary terms, while benefits are typically quantified in terms of avoided climate impacts, and expressed on monetary as well as non-monetary terms”).

88. PREPARING FOR THE IMPACTS OF CLIMATE CHANGE IN CALIFORNIA, *supra* note 27, at 14.

89. National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. §§ 4321–47 (2000).

90. *See* JUSTIN R. PIDOT, GEORGETOWN ENVTL. LAW & POLICY INST., GLOBAL WARMING IN THE COURTS 11 (2006), *available at* <http://www.rwu.edu/depository/law/mai/>

environmental policies, establish environmental-impact review processes for federal and state projects, respectively,⁹² and institute a “paradigm for making choices that sustain and enhance the quality and richness of human and nonhuman life.”⁹³ Recently, with growing concern regarding the intersection of climate change with planning and development and an apparent lack of comprehensive policies in place to address the issue, parties have turned to the courts to compel the evaluation of climate change in the environmental-impact review process,⁹⁴ thus far with mixed levels of success. Going forward, it remains unclear exactly to what extent and which—if any—climate change impacts require analysis in environmental-impact review documents under NEPA or CEQA.

A. PURPOSES, POLICIES, AND THE ENVIRONMENTAL-IMPACT REVIEW PROCESS

NEPA, described as “the natural environment’s Magna Carta,”⁹⁵ identifies the “vision[s] and values”⁹⁶ of the United States with regard to environmental policy,⁹⁷ institutes a legal mechanism to force all government agencies to evaluate the environmental consequences of the activities they approve and carry out,⁹⁸ and creates the Council on Environmental Quality (“CEQ”) in the Executive Office of the President to promulgate regulations and to provide guidance concerning compliance with federal procedures.⁹⁹ The stated purpose of NEPA is as follows:

To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important

GlobalWarmingReport.pdf.

91. CAL. PUB. RES. CODE §§ 21000–21178.1 (West 2006 & Supp. 2009). Several other states, including Massachusetts and New York, for example, have also passed mini-NEPAs—MEPA and SEQRA, respectively. See Michael B. Gerrard, *Climate Change and the Environmental Impact Review Process*, NAT. RESOURCES & ENV’T, Winter 2008, at 20, 20–23. For the purposes of this Note, I will primarily examine CEQA as an example of environmental policy at the state level.

92. See PIDOT, *supra* note 90, at 11.

93. MATTHEW J. LINDSTROM & ZACHARY A. SMITH, *THE NATIONAL ENVIRONMENTAL POLICY ACT: JUDICIAL MISCONSTRUCTION, LEGISLATIVE INDIFFERENCE, AND EXECUTIVE NEGLIGENCE* 3 (2001).

94. See Haroff & Moore, *supra* note 23, at 182.

95. See LINDSTROM & SMITH, *supra* note 93, at 4.

96. See *id.* at 7.

97. See 42 U.S.C. § 4331 (2000).

98. See *id.* § 4332(C).

99. See *id.* §§ 4342–47.

to the Nation; and to establish a Council on Environmental Quality.¹⁰⁰

NEPA explicitly “declares” the principles guiding the United States’ environmental policy when it calls for all agencies “to use all practicable means and measures . . . to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.”¹⁰¹ Further, NEPA contains “action-forcing” provisions¹⁰² that require federal agencies to prepare documents analyzing the environmental consequences of their decisions.¹⁰³ Finally, NEPA mandates the creation of the CEQ to oversee the implementation of the enumerated environmental principles and to issue regulations and guidance for use by the courts in interpreting the requirements of the Act.¹⁰⁴

In 1978, the CEQ issued a series of regulations to provide government agencies with guidance concerning NEPA compliance with the action-forcing provisions and to establish procedures for “preparing the requisite documents and undertaking the necessary analysis.”¹⁰⁵ The regulations clarify when an “environmental assessment” (“EA”) or an “environmental impact statement” (“EIS”) should be prepared.¹⁰⁶ An EIS must be prepared to assess the environmental impact of “major Federal actions significantly *affecting* the quality of the human environment.”¹⁰⁷ To determine whether a

100. *Id.* § 4321. *See also* Carla Mattix & Kathleen Becker, *Scientific Uncertainty Under the National Environmental Policy Act*, 54 ADMIN. L. REV. 1125, 1128 (2002) (noting that “[t]he purposes of NEPA are to prevent environmental damage and to make decision-makers aware of the impact of their decisions on the environment”).

101. 42 U.S.C. § 4331(a).

102. *See* 40 C.F.R. § 1500.1 (2008); James Allen, Note, *NEPA Alternatives Analysis: The Evolving Exclusion of Remote and Speculative Alternatives*, 25 J. LAND, RESOURCES & ENVTL. L. 287, 288 (2005).

103. 42 U.S.C. § 4332(C) (listing requirements for federal agencies to consider in evaluating the environmental consequences of proposed actions).

104. *Id.* §§ 4342–44.

105. Mattix & Becker, *supra* note 100, at 1128 & n.14 (explaining the history behind the establishment of NEPA regulations). *See* 40 C.F.R. §§ 1500–08.

106. 40 C.F.R. § 1501.3 (stating that a federal agency must prepare an EA “when necessary under the procedures” but need not prepare an EA if it prepares an EIS and may prepare an EA at any time to assist in planning and decisionmaking); *id.* § 1501.4(b) (stating that if an EIS is not automatically required, an EA must be prepared); *id.* § 1508.4 (defining “categorical exclusion” and stating that actions falling under this definition do not necessitate the creation of an EA or an EIS). *See also* RONALD E. BASS, ALBERT I. HERSON & KENNETH M. BOGDAN, *THE NEPA BOOK* 43–45 (2d ed. 2001) (summarizing the process of determining whether an EA, EIS, or finding of no significant impact must be synthesized).

107. 42 U.S.C. § 4332(C) (emphasis added). *See also* 40 C.F.R. § 1508.18 (defining “major Federal action”).

proposed project falls within the purview of this definition, the federal agency will produce an EA.¹⁰⁸ If the agency finds that the action does not have the potential to rise to the level of significantly affecting¹⁰⁹ the environment, the agency can halt its analysis and instead prepare a “finding of no significant impact” (“FONSI”).¹¹⁰ In the event that an EIS must be prepared, § 201 requires analysis of (1) “the environmental impact of the proposed action,” (2) “any adverse environmental effects which cannot be avoided should the proposal be implemented,” (3) “alternatives to the proposed action,” (4) “the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity,” and (5) “any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.”¹¹¹

While NEPA prohibits “uninformed” rather than “unwise” agency decisions, and while the courts have interpreted its mandate as largely procedural,¹¹² CEQA contains a “substantive mandate” that public agencies “refrain from approving projects with significant environmental effects if ‘there are feasible alternatives or mitigation measures’ that can substantially lessen or avoid those effects.”¹¹³ In contrast, NEPA requires federal agencies only to *consider* the potential significant adverse environmental impacts of major actions.¹¹⁴ The environmental-impact review processes of both acts follow relatively similar paths, although

108. See 40 C.F.R. § 1508.9(a) (defining the content and requirements of an EA). Note also that a federal agency will typically prepare an EA on its own but the agency may also rely on an assessment prepared by the “project applicant, consultant, or other agency, provided that the federal agency independently reviews the document, exercises independent judgment, and verifies that the EA meets the requirements of NEPA, the CEQ NEPA Regulations, and the federal agency’s specific NEPA regulations.” BASS ET AL., *supra* note 106, at 44–45.

109. See 40 C.F.R. § 1508.27 (defining “significantly” as applied in the NEPA context).

110. *Id.* § 1501.4(e)(i)–(v). See also *id.* § 1508.13 (providing a definition of a FONSI).

111. 42 U.S.C. § 4332(C) (emphasis added). The “effects” referenced in this requirement include direct effects and indirect effects that are “reasonably foreseeable.” See 40 C.F.R. § 1508.8. Reasonably foreseeable cumulative impacts also may be weighed when considering effects. See *id.* § 1508.7.

112. See *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1988). Some scholars, however, maintain that Congress intended NEPA to have substantive force, but subsequent court decisions have reduced the Act to merely a procedural hurdle. See LINDSTROM & SMITH, *supra* note 93, at 4 (“Substantively, NEPA’s authors articulated historically unparalleled ecological goals for the federal government and the nation as a whole. Procedurally, the statute introduced a new tool into federal decision making, the environmental impact statement, a procedure intended to require that ecological principles and values be included in federal agency planning.”).

113. MICHAEL H. REMY ET AL., GUIDE TO CEQA: CALIFORNIA ENVIRONMENTAL QUALITY ACT 1 (11th ed. 2007) (quoting *Mountain Lion Found. v. Fish & Game Comm’n*, 939 P.2d 1280, 1298 (Cal. 1997)) (emphasis omitted). See CAL. PUB. RES. CODE § 21002 (West 2007).

114. See 42 U.S.C. § 4332(B).

CEQA employs the term “environmental impact review” (“EIR”) in place of NEPA’s EIS.¹¹⁵ To date, however, attempts to use NEPA and CEQA to incorporate consideration of climate change in the environmental review process have yielded decidedly different results.

B. NEPA AND CEQA: (UN)SUCCESSFUL ATTEMPTS TO FORCE LEGAL RECOGNITION OF CLIMATE CHANGE AND THE NEED FOR RESPONSE

Much of the legal focus on climate change up to this point has focused on directly regulating vehicles and electric power plants, sources that contribute significantly to GHG emissions.¹¹⁶ But, “increasing attention is now being paid to buildings,” which figures show “account for 30 to 40 percent of the world’s energy use . . . [while] nearly half of the world’s flow of raw materials is used for the manufacturing of building products.”¹¹⁷ Because NEPA and CEQA can require environmental review of new buildings, some parties have attempted to use these statutes and their accompanying regulatory schemes to force agencies not only to consider a proposed project’s effects on the environment in light of scientific evidence corroborating the existence of climate change, but also to evaluate the extent to which climate change could impact a proposed project. In this very limited universe of cases, NEPA has shown some success in forcing evaluation of a proposed project’s impact on the environment with respect to climate change. Courts, however, have struggled to conduct CEQA review for similar cases. Nevertheless, one CEQA decision, *Natural Resources Defense Council v. Reclamation Board*,¹¹⁸ has addressed the issue of climate change’s effect on a project, suggesting that such impacts might be a proper subject for consideration.

1. NEPA Cases and Climate Change

Several federal courts have issued decisions indicating that NEPA compels consideration of climate change impacts in an EIS. The first case to tackle this subject was *City of Los Angeles v. National Highway Traffic Safety Administration*,¹¹⁹ in which the petitioners alleged that the National

115. See CAL PUB. RES. CODE §§ 21100, 21151; CAL. CODE REGS. tit. 14, §§ 15002(k), 15061, 15063–65, 15070, 15071 (2005). See also REMY ET AL., *supra* note 113, at 37–40, 181–84 (summarizing the major differences between NEPA and CEQA and describing the environmental-impact review process).

116. Michael B. Gerrard, *Climate Change and Impact Statements*, N.Y. L.J., May 25, 2007, at 3.

117. *Id.*

118. See Tentative Ruling on Petition for Writ of Mandate at 4, *Natural Res. Def. Council v. Reclamation Bd.*, No. 06 CS 01228 (Cal. Super. Ct. Apr. 27, 2007), available at www.martenlaw.com/webcasts/pdfs/NRDC-v-Reclamation-Bd-Tentative-Ruling.pdf.

119. *City of L.A. v. Nat’l Highway Traffic Safety Admin.*, 912 F.2d 478 (D.C. Cir. 1990),

Highway Traffic Safety Administration (“NHTSA”) should have prepared an EIS when it decided to set a lower corporate-average-fuel-economy standard because the increased emissions would exacerbate the effects of global warming, and thereby have a “significant effect upon the environment.”¹²⁰ The court found that the petitioners had standing to challenge the NHTSA’s decision to lower the fuel efficiency standard,¹²¹ but it declined to compel the production of an EIS, concluding that the proposed one-mile-per-gallon shift in the standard did not constitute a “significant environmental effect.”¹²²

It is notable, however, that in her dissent in *City of Los Angeles*, Chief Judge Wald expressed concern regarding the court’s decision, warning that the “future-oriented scheme adopted by Congress [in enacting NEPA] was designed explicitly to take account of impending as well as present crises,” such as the global warming problem.¹²³ In support of this contention, Chief Judge Wald explained that we must “anticipate environmental problems and develop strategies for their resolution before they reach the crisis stage. . . . It is far cheaper in human, social, and economic terms to anticipate these problems at an early stage and to find alternatives before they require . . . massive expenditure.”¹²⁴ Finally, she predicted to some extent the judicial challenge of incorporating climate change impacts into the NEPA framework, stating, “[t]his case presents a new and potentially catastrophic environmental phenomenon that fits squarely within the broad NEPA framework just described. Its novelty presents jurisprudential challenges precisely because it is not yet fully understood.”¹²⁵

The issue of global climate change was again addressed in *Border Power Plant Working Group v. Department of Energy*,¹²⁶ a NEPA case in which the petitioners challenged agency approval of permits for the construction of power lines to transport electricity from power plants in Mexico to power grids in Southern California.¹²⁷ The court held that NEPA required analysis of the impacts of carbon dioxide emissions on climate

overruled by Fla. Audubon Soc’y v. Bentsen, 94 F.3d 658 (D.C. Cir. 1996).

120. *Id.* at 482.

121. *Id.* at 485. Gerrard notes that the finding of standing is “itself a significant holding.” Gerrard, *supra* note 91, at 20.

122. *See City of L.A.*, 912 F.2d at 489–90.

123. *Id.* at 491 (Wald, C.J., dissenting).

124. *Id.* (quoting 115 CONG. REC. S3700 (daily ed. Feb. 18, 1969) (statement of Sen. Jackson)).

125. *Id.* at 492.

126. *Border Power Plant Working Group v. Dep’t of Energy*, 260 F. Supp. 2d 997 (S.D. Cal. 2003).

127. *See id.* at 1006.

change resulting from operation of some of the power plants.¹²⁸ Subsequently, the Department of Energy “skirted the issue” and dismissed the carbon dioxide emissions as negligible.¹²⁹ Later in 2003, the Eighth Circuit took up the subject of climate change in the EIS context when it issued a decision in *Mid States Coalition for Progress v. Surface Transportation Board*.¹³⁰ Here, the court found that an EIS, considering the environmental impacts stemming from a rail line proposed to be constructed to transport coal from mines in Wyoming to power plants in Minnesota and South Dakota, should have analyzed the potential increase of GHGs produced by the power plants.¹³¹ In response, the agency completed a supplemental EIS (“SEIS”), which included a cursory discussion of the environmental impacts resulting from the emissions of carbon dioxide.¹³² When the conclusions of the SEIS were challenged, the Eighth Circuit, in *Mayo Foundation v. Surface Transportation Board*,¹³³ held that the agency’s analysis of climate change impacts rendered the SEIS sufficient.¹³⁴

On March 30, 2007, the plaintiffs in *Friends of the Earth, Inc. v. Mosbacher*¹³⁵ overcame several procedural hurdles in their effort to compel the Overseas Private Investment Corporation (“OPIC”) and the Export-Import Bank (“Ex-Im”) to analyze, under NEPA, the effects of GHGs generated by projects financed abroad by the defendants.¹³⁶ The U.S.

128. See *id.* at 1016–17.

129. See Chris McChesney, *The Evolving Scope of Significant Effects on the Environment: The National Environmental Policy Act and Climate Change*, SUSTAINABLE DEV. L. & POL’Y, Winter 2007, at 30, 31–32.

130. *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520 (8th Cir. 2003).

131. See *id.* at 549–50.

132. See Gerrard, *supra* note 91, at 21 (characterizing the agency’s analysis of climate change impacts resulting from the proposed project). The SEIS claimed that the project would increase GHG emissions by “less than 1%.” *Mayo Found. v. Surface Transp. Bd.*, 472 F.3d 545, 555 (8th Cir. 2006). Given the lack of capability of its data and modeling systems, the Board explained in the SEIS that it could not assess with certainty the impacts that an emissions increase might have at the local level. *Id.* at 555–56. The court determined that the Board had properly followed CEQ Guidelines in undertaking its analysis. *Id.* at 556. Note that this outcome may be problematic for parties seeking to utilize NEPA to force consideration of climate change impacts because it “has the potential to allow all agencies to dismiss the impacts of [GHG emissions] as minor because each individual project does not emit a large percentage of total worldwide emissions.” See McChesney, *supra* note 129, at 32.

133. *Mayo Found.*, 472 F.3d at 545.

134. See *id.* at 556.

135. *Friends of the Earth, Inc. v. Mosbacher*, 488 F. Supp. 2d 889 (N.D. Cal. 2007).

136. See *id.* at 908, 920. The plaintiffs in this case survived an earlier motion for summary judgment which challenged the plaintiffs’ standing to bring the suit and also mounted several jurisdictional challenges. See *Friends of the Earth, Inc. v. Watson*, No. C 02-4106 JSW, 2005 WL 2035596, at *8 (N.D. Cal. Aug. 23, 2005). The change of the defendant’s name between the two cases resulted from a personnel change at OPIC. See PIDOT, *supra* note 90, at 13 n.47. For a more detailed

District Court for the Northern District of California, ruling on cross-motions for summary judgment from both parties, found that the case should proceed because the plaintiffs properly alleged that the defendants' projects, although located in foreign countries, generated global warming impacts that "significantly affect the *domestic* environment," and therefore should have been analyzed under NEPA.¹³⁷ The court also found "disputed issues of fact as to whether the federal actions in financing the projects were so significant that EISs should have been prepared."¹³⁸ Subsequently, the court certified "several key issues" in the case for interlocutory appeal to the Ninth Circuit.¹³⁹

Finally, at the close of 2007, with its decision in *Center for Biological Diversity v. National Highway Traffic Safety Administration*,¹⁴⁰ the Ninth Circuit invalidated the fuel economy standard for light trucks partially because the NHTSA's EA was "inadequate" and the petitioners had raised a "substantial question" regarding whether, given the substantial emissions generated by such vehicles, the standard may have a "significant impact on the environment."¹⁴¹ The court ordered the NHTSA to "promulgate new standards as expeditiously as possible and to prepare a full [EIS]."¹⁴² Notably, the court explained, "The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct."¹⁴³

2. CEQA Cases and Climate Change

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the Global Warming Solutions Act, which declared that climate change is

discussion of the standing issues in *Watson*, see Joseph M. Stancati, Note, *Victims of Climate Change and Their Standing to Sue: Why the Northern District of California Got It Right*, 38 CASE W. RES. J. INT'L L. 687, 708-31 (2007).

137. *Mosbacher*, 488 F. Supp. 2d at 908. The court also noted that the defendants "[did] not claim that the decisions about whether or not to support such projects occur abroad." *Id.* Plaintiffs also "assert[ed] that GHG emissions from projects financed by OPIC and Ex-Im amount to 7.3% of annual world wide emissions, and they argue that Defendants' calculations do not account accurately for all indirect emissions and do not include estimates of all direct emissions." *Id.* at 902.

138. Gerrard, *supra* note 91, at 21. See *Mosbacher*, 488 F. Supp. 2d at 912-20.

139. See Gerrard, *supra* note 91, at 21.

140. *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 508 F.3d 508 (9th Cir. 2007), *vacated*, 583 F.3d 1172 (9th Cir. 2008).

141. *Id.* at 514.

142. *Id.*

143. *Id.* at 550. See also *City of L.A. v. Nat'l Highway Traffic Safety Admin.*, 912 F.2d 478, 501 (D.C. Cir. 1990) (Wald, C.J., dissenting) ("If global warming is the result of the cumulative contributions of myriad sources, any one modest in itself, is there not a danger of losing the forest by closing our eyes to the felling of the individual trees?"), *overruled by Fla. Audubon Soc'y v. Bentsen*, 94 F.3d 658 (D.C. Cir. 1996).

“a serious threat to the economic well-being, public health, natural resources, and the environment of California”¹⁴⁴ and instructed the California Air Resources Board to decrease GHGs to 1990 levels by 2020.¹⁴⁵ While AB 32 provides little guidance concerning how CEQA and climate change intersect, additional legislation requires the governor’s Office of Planning and Research (“OPR”) to develop new CEQA Guidelines explaining how to evaluate GHGs in environmental impact assessments by July 1, 2009.¹⁴⁶ These CEQA Guidelines will then be certified and adopted by January 1, 2010.¹⁴⁷ In the interim, the OPR has released a technical advisory providing guidance for addressing climate change effects through CEQA.¹⁴⁸ On June 25, 2008, the California Air Resources Board presented an initial draft of the AB 32 scoping plan, which outlines the state’s main strategies for reducing GHGs and combating climate change. This plan is currently under review. Finally, in September 2008, Governor Schwarzenegger signed into law SB 375, which acts as an extension of AB 32 and represents “the nation’s first law to control greenhouse gas emissions by curbing [urban] sprawl.”¹⁴⁹ In order to reach the goals set out in AB 32, SB 375 directly links land-use planning with emissions reduction and provides incentives for cities and counties to implement sustainable development strategies.¹⁵⁰

CEQA litigation has followed a slightly different course from NEPA litigation in addressing climate change, most likely due, in part, to the fact that the California legislature has taken affirmative steps to curb GHGs independent of judicial intervention, leaving the courts unsure of their role in the process.¹⁵¹ In the limited field of cases that do address the issue of

144. CAL. HEALTH & SAFETY CODE § 38501(a) (West Supp. 2009).

145. *See id.* § 38550.

146. *See* CAL. PUB. RES. CODE § 21083.05 (West Supp. 2009).

147. *See id.*

148. *See generally* GOVERNOR’S OFFICE OF PLANNING & RESEARCH, TECHNICAL ADVISORY: CEQA AND CLIMATE CHANGE: ADDRESSING CLIMATE CHANGE THROUGH CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) REVIEW (June 19, 2008), *available at* <http://www.opr.ca.gov/ceqa/pdfs/june08-ceqa.pdf> (providing professional planners, land-use officials, and CEQA practitioners with technical guidance concerning the role of CEQA in addressing climate change and GHG emissions).

149. Press Release, Office of the Governor of the State of California, Governor Schwarzenegger Signs Sweeping Legislation to Reduce Greenhouse Gas Emissions Through Land-Use (Sept. 30, 2008), *available at* <http://gov.ca.gov/press-release/10697/>.

150. *Id.* Most notably, SB 375 offers “substantial CEQA exemptions” for those that voluntarily participate. *See California to Enact First-Time Restrictions on Land-Use GHGs*, CARBON CONTROL NEWS, Sept. 8, 2008, <http://carboncontrolnews.com>.

151. *See* Joshua T. Bledsoe et al., *CEQA and Climate Change: One Year After AB 32*, ENERGY L. 360, Jan. 14, 2008, at 2, http://www.lw.com/upload/pubContent/_pdf/pub2095_1.pdf.

climate change, the courts appear unsure how to apply CEQA, especially in cases where only a project's effects on the environment are disputed.

In April 2007, a California superior court decided *Natural Resources Defense Council v. Reclamation Board*, the first case asking a court to contemplate whether CEQA requires consideration of climate change impacts on a project.¹⁵² The plaintiffs, in petitioning the court to reject the Board's approval of a development project in the San Joaquin Delta in northern California, alleged that the Board failed to prepare a "full subsequent or supplemental Environmental Impact Report" in part because it was "required to take into account new information regarding the impact of climate change on the region in which the project is located."¹⁵³ Specifically, the plaintiffs argued that the Board should have analyzed new information about how the impacts of climate change on the project would in turn exacerbate the project's negative impacts on the surrounding environment.¹⁵⁴ In finding the plaintiffs' claim unpersuasive because they had "not demonstrated that significant new information has become available with regard to the effects of climate change on this particular project," the court emphasized that its ruling was a "narrow one" and "not a ruling that the effects of potential changes in climate are not a proper subject for consideration under CEQA."¹⁵⁵ The court further concluded,

[p]etitioners have made a persuasive showing that there is a growing consensus on the issue that has caused state environmental agencies to give it closer attention. As the projected effects of climate change become clearer and can be related to specific sites, there is little doubt that those effects will have to be factored into the analysis of many projects under CEQA. The present ruling in no way detracts from that reality.¹⁵⁶

This case is the closest that a court has come to grappling with the precise issue of this Note—whether agencies must consider the impacts of climate change on a project.

152. See Tentative Ruling on Petition for Writ of Mandate, *supra* note 118, at 4.

153. *Id.* at 3 (emphasis added).

154. See *id.* at 4–5. See also PIDOT, *supra* note 90, at 14 (explaining the plaintiffs' argument that the EIR is "inadequate because it assesses the project's impact on the Delta in its current condition without considering whether global warming is likely to alter the Delta ecosystem in the future. Plaintiffs allege that global warming will reshape the Delta environment and, in turn, the project's environmental consequences, significantly increasing its negative impacts. According to plaintiffs' novel argument, the Board has a legal obligation under California's version of NEPA to consider how global warming may exacerbate the negative environmental consequences of development projects over time").

155. Tentative Ruling on Petition for Writ of Mandate, *supra* note 118, at 10.

156. *Id.*

Similarly, in *American Canyon Community United for Responsible Growth v. City of American Canyon*, a Napa County superior court rejected the plaintiffs' demand for supplemental environmental review of a proposed Wal-Mart Supercenter to include evaluation of climate change impacts, which they suggested constituted "new information" the defendants were obliged to consider.¹⁵⁷ Specifically, the court, in stating that AB 32 did not constitute new information that could be tied to the particular project's effects as contemplated by the statute in question, explained that the plaintiffs "failed to provide any authority currently requiring the City to have undertaken such an analysis."¹⁵⁸ While acknowledging that AB 32 did not constitute new information triggering review in this case, the court conceded that "it is possible that the promulgation of new climate change regulations may trigger further environmental review of projects undergoing . . . scrutiny in the future."¹⁵⁹

Demonstrating the state's commitment to cutting GHGs, California Attorney General Jerry Brown brought a CEQA lawsuit against San Bernardino County alleging that the County's EIR, prepared to evaluate the impacts of a newly adopted General Plan, was inadequate for failing not only to analyze the adverse effects of the General Plan on air quality and climate change, but also to adopt mitigation measures to minimize such adverse effects.¹⁶⁰ In August 2007, the parties settled the suit and agreed to terms requiring the County to "develop an inventory of GHG emissions related to land use decisions and county operations, set emissions reduction goals, and adopt mitigation measures."¹⁶¹ At the end of a thirty-month period, the County, using "best efforts," will adopt the amendments for its General Plan and Greenhouse Gas Emissions Reduction Plan.¹⁶²

On January 29, 2008, a Riverside County superior court ruled on a Writ of Mandate involving a CEQA challenge to a development project

157. See Order Discharging the Writ of Mandate at 7–8, *Am. Canyon Cmty. United for Responsible Growth v. City of Am. Canyon*, No. 26-27462 (Cal. Super. Ct. May 22, 2007), available at <http://www.arnoldporter.com/resources/documents/AmericanCanyonCommunityvCityAmericanCanyon.pdf>.

158. *Id.* at 7.

159. *Id.* at 8.

160. See Order Regarding Settlement at 2, 4–5, *State v. County of San Bernardino*, No. CIVSS 0700329 (Cal. Super. Ct. Aug. 28, 2007), available at http://ag.ca.gov/cms_pdfs/press/2007-08-21_San_Bernardino_settlement_agreement.pdf.

161. Gerrard, *supra* note 91, at 22 (summarizing the contents of the Settlement Agreement between the parties). Gerrard also notes that the lawsuit was "so controversial that critics, who feared that GHG analysis would make it harder to build new housing and other needed projects, held up passage of the state budget hoping to obtain a prohibition on CEQA climate litigation." *Id.*

162. Order Regarding Settlement, *supra* note 160, at 3–4.

EIR for failure to consider GHGs and climate change impacts in *Highland Springs Conference and Training Center v. City of Banning*.¹⁶³ While the court struck down the EIR as inadequate on several grounds asserted by the plaintiffs, it refused to interpret CEQA as requiring an assessment of climate change impacts with respect to the project.¹⁶⁴ In its terse reference to the subject, the court concluded, “Again, the court understands the importance of greenhouse gas emissions, but . . . no law required the Banning City Council to consider global warming at the time it approved this project.”¹⁶⁵ Critics of the ruling, in an effort to downplay its significance, stated that “legislation and state policies adopted since the project’s approval would make similar future rulings unlikely.”¹⁶⁶ An attorney for the Center for Biological Diversity objected to the ruling, arguing that CEQA “itself is the law that requires climate change analysis” independent of AB 32 and other legislation.¹⁶⁷

Most recently, several more cases have been decided at the superior court level indicating the unsettled nature of evaluating climate change impacts under CEQA.¹⁶⁸ These decisions signal that the courts are taking the issue of climate change seriously and will likely end up requiring an analysis of GHG emissions as a component of the CEQA process. How (and how much) the courts will take account of GHG emissions remains uncertain.

163. See Ruling on Submitted Matter at 1–2, *Highland Springs Conference & Training Ctr. v. City of Banning*, No. 460950 (Cal. Super. Ct. Jan. 29, 2008), available at [http://www.arnoldporter.com/resources/documents/HighlandSprings-v-CityOfBanningOrder\(1-29-08\)\(00128844\).pdf](http://www.arnoldporter.com/resources/documents/HighlandSprings-v-CityOfBanningOrder(1-29-08)(00128844).pdf).

164. See *id.* at 19, 24.

165. *Id.* at 19.

166. *Activists Downplay California Ruling on GHGs from Development*, CARBON CONTROL NEWS, Jan. 30, 2008, <http://carboncontrolnews.com>.

167. See *id.* Another source added, “Ultimately, with a one-sentence analysis, this decision is of limited legal significance especially given the rapid evolution of the treatment of greenhouse gases under CEQA since this project was approved.” *Id.*

168. See Ruling on Petition for Writ of Mandate, *Ctr. for Biological Diversity v. City of Desert Hot Springs*, No. RIC 464585 (Cal. Super. Ct. Aug. 6, 2008), available at http://www.arnoldporter.com/resources/documents/CenterForBioDiversity-vCityOfDesertHotSprings_Ruling.pdf; Decision on Ruling on Respondent’s Motion for Summary Adjudication, *Natural Res. Def. Council, Inc. v. S. Coast Air Quality Mgmt. Dist.*, No. BS 110792 (Cal. Super. Ct. July 28, 2008), available at http://latimesblogs.latimes.com/greenspace/files/prii_order_72808.pdf; Decision on Petitions for Writ of Mandate, *Westfield, LLC v. City of Arcadia*, No. BS 108937 (Cal. Super. Ct. July 23, 2008), available at <http://www.arnoldporter.com/resources/documents/ArcadiaFirst-v-CityOfArcadia.pdf>; Minute Order, *Envtl. Council of Sacramento v. Cal. Dep’t of Transp.*, No. 07CS00967 (Cal. Super. Ct. July 15, 2008), available at http://www.arnoldporter.com/resources/documents/EnvCouncilOfSacramento-v-CalDeptOfTrans_ECOSRuling.pdf.

C. IN FLUX: THE STATE OF THE LAW AND CLIMATE CHANGE

Based on the case law discussed above, it is clear that the law concerning NEPA and CEQA and the assessment of climate change impacts are in a state of flux. Michael Gerrard¹⁶⁹ asserts that “there is no settled method for analyzing climate change in the impact assessment of a project,”¹⁷⁰ but he distills five different types of climate change effects that may require consideration under the NEPA or CEQA frameworks: (1) operational impacts, (2) purchased electricity and energy, (3) induced trips, (4) construction impacts, and (5) impact of climate change on the project.¹⁷¹ Much of the information currently generated to assist agencies and developers in analyzing climate change impacts focuses on quantifying the first four types of impacts.¹⁷² Examples of the fifth type of impact—the impact of climate change on the project—might include “the effects of rising sea levels and water tables, increased flooding, greater temperature variations, water shortages, reduced snowpack, and activities needed to adapt to climate changes. Another possible factor in this category is the effect of anticipated future regulations of GHG emissions.”¹⁷³ While Gerrard suggests that this particular impact may be properly considered under NEPA or CEQA, he provides no analysis to support this contention, most likely because few, if any, cases have yet addressed this subject.¹⁷⁴

169. Michael Gerrard is Professor of Professional Practice and Director of the Center for Climate Change Law at Columbia Law School and Senior Counsel at Arnold & Porter LLP. Arnold & Porter LLP, Attorney Biography, <http://www.arnoldporter.com/attorneys.cfm?u=GerrardMichaelB&action=view&id=189&CFID=33191873&CFTOKEN=37868731> (last visited Apr. 6, 2009). In addition to being recognized on numerous occasions for his outstanding work as an environmental lawyer, Mr. Gerrard has written or edited seven books, including his most recent work, *GLOBAL CLIMATE CHANGE AND U.S. LAW* (2007). *Id.*

170. Gerrard, *supra* note 91, at 23. Gerrard notes that “litigation is not the only avenue opened by NEPA and its state equivalents to those wishing to reduce projects’ GHG impacts. The impact assessment process offers numerous opportunities for public participation.” *Id.* Participation from the public during the comment period may exert pressure on the project applicants and agencies to take account of climate change in their assessments without resorting to litigation. *See id.*

171. *Id.* at 23–24. Gerrard also points out several other key issues or questions that federal and state agencies might consider in developing procedures for analysis of climate change in environmental-impact review. *See id.* at 24.

172. *See, e.g.,* CAL. AIR POLLUTION CONTROL OFFICERS ASS’N, *CEQA & CLIMATE CHANGE: EVALUATING AND ADDRESSING GREENHOUSE GAS EMISSIONS FROM PROJECTS SUBJECT TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT 10* (2008) (white paper stating that it focuses on adverse impacts on climate change of proposed new land development projects rather than the “potential adverse impacts resulting from climate change that may affect a project,” but acknowledging that “CEQA also requires an assessment of significant adverse impacts a project might cause by bringing development and people into an area affected by climate change” (citing CAL. CODE REGS. tit. 14, § 15126.2 (2005))).

173. Gerrard, *supra* note 91, at 24.

174. *See id.*

This Note aims specifically to fill the gap and show that the impact of climate change on a project or “how climate change affects the project, rather than the other way around,”¹⁷⁵ can and should be considered during the environmental-impact review process.

Accordingly, because NEPA and CEQA have traditionally been interpreted as regulating only the effects of a project on the environment, some have questioned whether the impacts of climate change on a project are “cognizable” under existing environmental-impact assessment regimes.¹⁷⁶ But, after closely reading the underlying law, this option should not be foreclosed due to the forward-looking nature of the Act. Wendy Lee Bogdan¹⁷⁷ contends that CEQA requires agencies to evaluate only “potentially significant impacts caused by a project,” and cites *Baird v. County of Contra Costa*¹⁷⁸ to support this proposition.¹⁷⁹ *Baird*, however, holds that CEQA “does not require an environmental impact report (EIR) for a project that might be affected by *preexisting* environmental conditions but will not change *those* conditions or otherwise have a significant effect on the environment.”¹⁸⁰ In *Baird*, neighborhood residents brought a CEQA lawsuit challenging an EIR for a proposed structure to house recovering drug addicts and alcoholics, alleging “adverse socioeconomic impacts on the area” and that the area of proposed construction was contaminated by oil from a mercury mine and by wastewater.¹⁸¹ The court used specific language in articulating its decision—arguably to limit the scope of its holding—and rejected the challenge to the EIR reasoning that “*preexisting* physical conditions . . . [that] will have *an adverse effect on the proposed facility and its residents* . . . [are] beyond the scope of CEQA and its requirement of an EIR.”¹⁸² While the court appeared open to the plaintiffs’

175. *Id.*

176. *See, e.g.*, Wendy Lee Bogdan, *Greenhouse Gas Emissions and Climate Change: CEQA Catches up with Science, Celebrities, and Product Placement*, CAL. LAND USE LAW & POL’Y REP. 243, 247 (2007).

177. Wendy Lee Bogdan is a partner at the firm of Downey Brand LLP in Sacramento, California, and the Chair of the Energy, Land Use and Minerals Practice Group. She represents public lead agencies and private proponents of residential, commercial, pipeline, terminal, natural gas electric generation, mining, recreational resort, hydro-electric, water supply, and flood control projects on CEQA and NEPA compliance. *See* Downey Brand LLP, Attorney Profile, <http://www.downeybrand.com/attorneys/profiles/anderson.php?1/0/0/0/0> (last visited Apr. 6, 2009).

178. *Baird v. County of Contra Costa*, 38 Cal. Rptr. 2d 93 (Ct. App. 1995).

179. Bogdan, *supra* note 176, at 247.

180. *Baird*, 38 Cal. Rptr. 2d at 94 (emphasis added).

181. *See id.*

182. *Id.* at 95–96. The court added that “[t]he purpose of CEQA is to protect the environment from proposed projects, not to protect proposed projects from the existing environment.” *Id.* at 96. In addition, the court rejected outright the plaintiffs’ “claim of increased crime problems” and

claim that the project “may expose or exacerbate the existing ground contamination,” it concluded that no evidence existed to support this argument in this particular case.¹⁸³ Although Bogdan believes that the decision in *Baird* diminishes the likely success of such a claim, she concedes that the CEQA Guidelines could be interpreted to support such an argument.¹⁸⁴ Furthermore, the authors of the definitive CEQA guide assert that interpreting *Baird* to mean that CEQA may never be construed to allow consideration of environmental impacts on a project contradicts “numerous CEQA Guidelines provisions that, taken together, embody long-settled principles requiring environmental documents to address potential problems that ‘the environment, [sic] ‘whether natural or altered by people,’ might create for new development.”¹⁸⁵

On February 28, 2008, in an attempt to clarify the state of the law surrounding the assessment of climate change impacts in the NEPA environmental-impact review process, the International Center for Technology Assessment, the Natural Resources Defense Council (“NRDC”), and the Sierra Club submitted to the CEQ a *Petition Requesting that the Council on Environmental Quality Amend Its Regulations to Clarify that Climate Change Analyses Be Included in Environmental Review Documents*.¹⁸⁶ While the petitioners argue that NEPA and the existing regulations broadly encompass climate change analysis even in the absence of amendments, they request that the CEQ make changes to the regulations making clear that such analysis is required and that the CEQ issue a guidance memorandum clarifying “that climate change effects clearly fall within the ambit of ecological, economic, and health effects” and explaining how to integrate climate change analyses into long-term

acknowledged that “economic or social change *by itself* shall not be considered a significant effect on the environment.” *Id.* at 96 n.2 (emphasis added).

183. *See id.* at 95 n.1. *See also* Complaint at 4, Minn. Ctr. for Env'tl. Advocacy v. Holsten, No. 31-CV-07-3338 (D. Minn. Sept. 10, 2007), available at <http://www.arnoldporter.com/resources/documents/MCEAvHolsten.pdf> (making, in a MEPA lawsuit, a similar argument that an EIS failed to account for the projected impacts of climate change in its evaluation and analysis of the proposed project's impact on the environment).

184. Bogdan, *supra* note 176, at 247.

185. REMY ET AL., *supra* note 113, at 440. Some critics of the decision in *Baird* argue that the principle announced, “when further reviewed by future courts in other decisions, may well be construed narrowly, or may be repudiated altogether. To date, the reasoning of *Baird* has not been adopted by any appellate district other than the First, or by the California Supreme Court.” *Id.* at 441.

186. *See* Int'l Ctr. for Tech. Assessment, Nat'l Res. Def. Council & Sierra Club, *Petition Requesting that the Council on Environmental Quality Amend Its Regulations to Clarify that Climate Change Analyses Be Included in Environmental Review Documents* (Feb. 28, 2008), available at <http://www.icta.org/doc/CEQ%20Petition%20Final%20Version%2028-08.pdf> [hereinafter *Petition to the CEQ*].

planning.¹⁸⁷ Because it “requires all federal agencies to identify and consider environmental *impacts, alternatives, and mitigating measures prior* to approving a project,”¹⁸⁸ NEPA, “our nation’s basic environmental charter . . . [and] the mechanism incorporating environmental considerations into federal decision-making,”¹⁸⁹ represents a valuable tool in tackling “the worldwide and long-range character of environmental problems.”¹⁹⁰

IV. NEPA AND CEQA AS EFFECTIVE LEGAL FRAMEWORKS FOR ADDRESSING ADAPTATION TO CLIMATE CHANGE

NEPA and CEQA offer effective legal frameworks for analyzing the impacts of climate change on a proposed project, and thus for integrating the concept of adaptation into the environmental-impact review process. The CEQ itself echoed this sentiment in a 1997 Draft Guidance Memorandum that, although never finalized, was circulated to all federal agency NEPA liaisons regarding consideration of global climate change:

Because of the potentially substantial health and environmental impacts associated with climate change, the Council on Environmental Quality is issuing this guidance today calling on federal agencies to consider, in the context of the NEPA process, both how major federal actions could influence the emissions and sinks of greenhouse gases and *how climate change could potentially influence such actions.*

The NEPA process provides an excellent mechanism for consideration of ideas related to global climate change. . . . Consideration of the potential impact of climate change on these projects may be *critical* to avoiding costly operation and maintenance problems in future decades.

. . . .

. . . Global climate change is a serious environmental concern which, given the current state of scientific knowledge, must be viewed under NEPA as a reasonably foreseeable impact . . . [A]nalyzes [of such impacts] can best be done in the context of NEPA and should look at how federal actions may affect global climate change and, to the extent possible given the current state of scientific knowledge, *how federal actions may be affected by global climate change.*¹⁹¹

187. *Id.* at 47.

188. *Id.* at 5 (emphasis added).

189. *Id.* at 2.

190. *Id.* at 5–6.

191. *Id.* at 46 (emphasis added) (quoting Draft Memorandum from Kathleen A. McGinty, Chairman, CEQ, to Heads of Federal Agencies 1–2, 8 (Oct. 8, 1997), available at <http://www.mms.gov/eppd/compliance/reports/ceqmemo.pdf>).

To overcome the barriers impeding adaptation and to incorporate the concept into national consciousness, both NEPA and CEQA can and must be construed to mandate consideration of the impacts of climate change on a project because the spirit and purpose of the laws support this interpretation and the effects of climate change in turn influence the assessment of a project's environmental impacts as well as viable alternatives and mitigating measures.

A. CONSISTENT WITH SPIRIT AND PURPOSE

Interpreting NEPA and CEQA to require evaluation of the impacts of climate change and subsequent adaptive measures is consistent with the forward-looking nature inherent in the spirit and purpose of the laws. NEPA regulations encourage agencies to integrate the NEPA process “into early planning to insure appropriate consideration of NEPA’s policies”¹⁹² and to identify “at an early stage the significant environmental issues deserving of study”¹⁹³ in order “to foster excellent action.”¹⁹⁴ In addition, NEPA calls on an agency to employ an interdisciplinary approach in its analysis to integrate “use of the natural and social sciences and the environmental design arts in *planning* and in *decisionmaking* which *may* have an impact on man’s environment.”¹⁹⁵ Likewise, CEQA states explicitly that its purpose is not only to ensure the “long-term protection of the environment,”¹⁹⁶ but also to promote conditions in which “present and future generations”¹⁹⁷ can thrive by balancing “qualitative factors as well as economic and technical factors and long-term benefits and costs, in addition to short-term benefits and costs.”¹⁹⁸ Similarly, successful implementation of adaptation to climate change depends on the ability of

192. 40 C.F.R. § 1501.1(a) (2008).

193. *Id.* § 1501.1(d). *See also* 42 U.S.C. § 4331(a) (2000) (stating an environmental policy of using “all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans”). *But see* Haroff & Moore, *supra* note 23, at 160 (claiming that “some of the more recent attempts to use NEPA as a means of responding to climate change have taken the law beyond anything Congress likely intended when it was enacted”).

194. 40 C.F.R. § 1500.1(c) (explaining that the “NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment”).

195. 42 U.S.C. § 4332(A) (emphasis added).

196. CAL. PUB. RES. CODE § 21001(d) (West 2007).

197. *Id.* § 21001(e) (asserting the goal of creating and maintaining “conditions under which man and nature can exist in productive harmony to fulfill the social and economic requirements of present and future generations”).

198. *Id.* § 21001(g).

the current generation to use and evaluate the knowledge at its disposal and to take proactive measures to decrease the environmental, health, and economic consequences for future generations.

B. DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

The impacts of climate change on a project should be considered when analyzing the direct, indirect, and cumulative effects in the environmental-impact review process because the extent to which the project is affected by climate change in turn determines the significance of the project's impact on the environment in a number of ways. Under both NEPA and CEQA, an EIS/EIR must describe any environmental consequences imposed by the project,¹⁹⁹ including significant direct effects and significant indirect²⁰⁰ and cumulative effects, that are reasonably foreseeable.²⁰¹ Climate change impacts may act as indirect effects that are "reasonably foreseeable," despite any remaining uncertainty, because they are "sufficiently likely to occur" and "a person of ordinary prudence would take [them] into account in reaching a decision."²⁰² In fact, in their recent Petition to the CEQ, the International Center for Technology Assessment, the NRDC, and the Sierra Club requested that the NEPA regulations defining environmental consequences²⁰³ be amended to include discussions of "[t]he effects of reasonably foreseeable changes in the climate on the proposed action and alternatives, and measures to mitigate those effects."²⁰⁴

Climate change impacts may influence the modeling of a proposed project's impacts and determine whether the environmental consequences of the project rise to the level of significantly affecting the environment. The plaintiffs in *Natural Resources Defense Council v. Reclamation Board*²⁰⁵ made this argument in the CEQA context, alleging that cumulative climate change impacts would alter the nature of the environment surrounding the project over time and, as a result, exacerbate the negative impacts of the project on the environment.²⁰⁶ Although the

199. See 40 C.F.R. § 1502.16; CAL. CODE REGS. tit. 14, § 15126 (2005).

200. See 40 C.F.R. § 1508.8; CAL. CODE REGS. tit. 14, § 15126.2.

201. See 40 C.F.R. § 1508.7; CAL. CODE REGS. tit. 14, § 15130.

202. See Petition to the CEQ, *supra* note 186, at 28–29 (quoting *City of Shoreacres v. Waterworth*, 420 F.3d 440, 453 (5th Cir. 2005)).

203. 40 C.F.R. § 1502.16.

204. Petition to the CEQ, *supra* note 186, at 44.

205. See Tentative Ruling on Petition for Writ of Mandate, *supra* note 118, at 2–3.

206. See PIDOT, *supra* note 90, at 14. See also BASS ET AL., *supra* note 106, at 106 (explaining that cumulative effects may be relevant to describing the affected environment and to determining the environmental consequences that will in turn affect that environment).

court refused to grant relief in that case, it narrowly limited its holding and acknowledged that climate change impacts represent a proper subject for CEQA consideration.²⁰⁷ Significance, as defined in NEPA, requires consideration of the context and intensity of the impacts.²⁰⁸ Climate change may function to increase the intensity—or the severity—of environmental, economic, or social impacts.²⁰⁹

Moreover, a proposed project's "ecological . . . , economic, social, or health"²¹⁰ effects—whether direct, indirect, or cumulative—may be triggered or exacerbated by climate change. CEQA regulations specifically indicate that an EIR must analyze "any significant environmental effects the project might cause by bringing development and people into the area affected."²¹¹ For instance, a development located on or adjacent to an active fault line "should identify as a significant effect the seismic hazard to future occupants of the subdivision" because the development might attract people to the location, thereby increasing exposure to the hazards.²¹² Similarly, Hurricane Katrina, the type of storm that scientists expect will increase in severity due to climate change,²¹³ flooded 80 percent of New Orleans, spread toxic contaminants and debris over much of the city, and will require the destruction of "[h]undreds of thousands of homes" in the cleanup effort.²¹⁴ In addition to the ecological and health consequences of the disaster, Katrina has brought substantial economic and social upheaval associated with the rebuilding and relocation efforts occurring in the storm's wake. Both NEPA and CEQA recognize economic and social consequences as impacts on the environment, as long as they stem from physical changes in the environment.²¹⁵

207. See Tentative Ruling on Petition for Writ of Mandate, *supra* note 118, at 10.

208. See 40 C.F.R. § 1508.27.

209. See Petition to the CEQ, *supra* note 186, at 42 (proposing to amend 40 C.F.R. § 1508.27 to include an evaluation of climate change in determining significance).

210. 40 C.F.R. § 1508.8.

211. CAL. CODE REGS. tit. 14, § 15126.2(a) (2005).

212. *Id.*

213. See WORKING GROUP I, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 15, available at <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf> (acknowledging that "[b]ased on a range of models, it is likely that future tropical cyclones (typhoons and hurricanes) will become more intense, with larger peak wind speeds and more heavy precipitation associated with ongoing increases in tropical sea surface temperatures").

214. See Lazarus, *supra* note 66, at 1024–25.

215. See 40 C.F.R. § 1508.8; CAL. CODE REGS. tit. 14, § 15131(b) ("Economic or social effects of a project may be used to determine the significance of physical changes caused by the project. For example, if the construction of a new freeway or rail line divides an existing community, the construction would be the physical change, but the social effect on the community would be the basis for determining that the effect would be significant.").

Despite recognition that the surrounding environment can intensify a project's effects on the environment, little has been done to rectify this shortcoming. Resistance to assessing the environmental impacts on a project still remains. Lazarus highlights this fact in examining the Hurricane Katrina disaster: "Little or no effort has been made to have land uses more compatible or less threatened by the flood potential. Instead, threatened areas have become the sites of chemical and petroleum industries, thereby ensuring that, when flooded, the waters will be contaminated by pollutants."²¹⁶ By evaluating the character of the surrounding environment and implementing adaptive measures during the environmental assessment phase, harmful ecological, health, economic, and social effects brought on by climate change may be addressed before they occur and, thus, are avoided, mitigated, or eliminated.²¹⁷

C. MITIGATION MEASURES AND ALTERNATIVES

Realizing that climate change impacts may intensify the effects of the project on the environment, it follows that the impacts of climate change on a project would also be a proper subject for consideration when assessing viable measures to mitigate a project's effects. In other words, understanding how climate change heightens the negative impacts of a project might allow applicants and agencies to consider and implement methods that minimize those aggravating factors. Mitigation measures essentially act as solutions to counteract environmental problems created by a project.²¹⁸ NEPA and CEQA both require discussion of potential mitigation measures to address a project's adverse environmental impacts.²¹⁹ Under NEPA, although the act and regulations do not specifically discuss feasibility of mitigation measures, generally an EIS should address the "economic, environmental, logistical, technological, legal, and social feasibility of each mitigation measure."²²⁰ The articulated criteria offer an opportunity for agencies to take account of climate change impacts on a project and to determine whether implementing adaptive measures might diminish the project's harmful effects on the environment. For example, adaptive measures taken in response to climate change

216. Lazarus, *supra* note 66, at 1027.

217. *See id.* at 1025–27.

218. *See* 40 C.F.R. § 1508.20.

219. *See id.* §§ 1502.14, 1502.16, 1508.20; CAL. CODE REGS. tit. 14, §§ 15126(e), 15126.4. Note that NEPA requires discussion of mitigation measures for all adverse impacts. 40 C.F.R. § 1502.16(h). However, CEQA requires a discussion of mitigation measures only for adverse environmental impacts that are significant. CAL. CODE REGS. tit. 14, § 15126.4(a)(3).

220. BASS ET AL., *supra* note 106, at 118.

impacts, such as the development of wetlands to absorb floodwaters in an area prone to increased flooding, may mitigate a project's harmful effects on the environment by decreasing its vulnerability to the environment.

Furthermore, the impacts of climate change on a project should be evaluated when weighing alternatives to the proposed project. Although both NEPA and CEQA require consideration of a range of reasonable alternatives that could accomplish the proposed action's purpose and need,²²¹ the analysis of alternatives is often characterized as the "heart of the environmental impact statement," at least in the NEPA context.²²² The CEQA Guidelines explicitly provide that the alternatives discussed should "feasibly attain" the "basic objectives" of the proposed project but "avoid or substantially lessen" the significant effects of the project, even if the "alternatives would impede to some degree the attainment of the project objectives, or would be more costly."²²³ In determining the "feasibility" of alternatives, an agency may evaluate numerous factors, including "site suitability, economic viability, availability of infrastructure, general plan consistency," and site availability.²²⁴ Inevitably, agencies must balance the benefits and detriments of the proposed project and its alternatives as, "[i]n each individual case, the particular economic and technical benefits of planned action must be assessed and then weighed against the environmental costs; alternatives must be considered which would affect the balance of values."²²⁵ In the climate change context, for instance, locating a project in an area vulnerable to future impacts of climate change because it appears environmentally and economically feasible in the short term may result in increased environmental damage and expense in the future. It is consistent with the forward-looking policies of NEPA and CEQA to consider the environmental and economic impacts of a proposed action in the long term as well as the short term when weighing

221. See 42 U.S.C. § 4332 (2000); CAL. CODE REGS. tit. 14, § 15126.6.

222. See 40 C.F.R. § 1502.14.

223. See CAL. CODE REGS. tit. 14, § 15126.6(a)–(b).

224. *Id.* § 15126.6(f)(1).

225. Calvert Cliffs' Coordinating Comm., Inc. v. U.S. Atomic Energy Comm'n, 449 F.2d 1109, 1123 (D.C. Cir. 1971). While cost-benefit analyses are not required under NEPA, they may be considered when relevant to the choice among alternatives. See 40 C.F.R. § 1502.23.

For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. In any event, an environmental impact statement should at least indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision.

Id. For an example of NEPA alternatives analysis in practice, see Shawna M. Bligh, *Did NEPA Sink New Orleans?*, NAT. RESOURCES & ENV'T, Spring 2006, at 60, 61–62 (discussing the evaluation of alternatives in New Orleans flood defenses prior to Hurricane Katrina).

alternatives.

D. OVERCOMING THE BARRIERS TO ADAPTATION: INSTITUTIONAL
INTEGRATION WITH A RESEARCH AND EVALUATION REGIME

While the environmental-impact review process offers one potential vehicle for forcing consideration of climate change impacts and implementing potential adaptive measures to mitigate such effects, NEPA and CEQA should function as one of many available legal tools for addressing adaptation.²²⁶ EISs need only be prepared for “major actions” that “significantly” affect the environment and therefore reach only a limited number of projects. Further, because NEPA and CEQA only require agencies to *consider* the effects of proposed actions, some have expressed concern that including consideration of climate change impacts in the environmental-impact review process without also determining definable standards for assessing the significance of those effects may ultimately result in their trivialization by agencies that choose to disregard them as negligible.²²⁷ Nevertheless, despite these perceived shortcomings, NEPA and CEQA provide constructive frameworks that increase awareness of the climate change challenge, encourage interdisciplinary analysis of the problem, and promote informed decisions.

Requiring consideration of climate change impacts on proposed projects through NEPA and CEQA, environmental-impact assessment regimes can counteract some of the financial, informational, institutional, social, cultural, cognitive, and behavioral barriers preventing adaptation to climate change.²²⁸ Accounting for the impacts of climate change at an early

226. Critics of the national response to climate change have argued that existing environmental institutions are ill equipped to take on the challenge of adaptation to climate change. *See* Haroff & Moore, *supra* note 23, at 182 (“Given the gap between the problem as now recognized and the capacity of available policy tools to confront the problem, the impulse to fill that gap through judicial action under statutes like NEPA is entirely understandable. . . . Nevertheless, the courts should be careful to recognize that NEPA-based environmental review and litigation strategies have inherent limitations as weapons to be used in the war against global warming—both domestically and internationally.”); Matthew D. Zinn, *Adapting to Climate Change: Environmental Law in a Warmer World*, 34 *ECOLOGICAL L.Q.* 61, 85 (2007) (“Environmental impact assessment regimes such as the National Environmental Policy Act (NEPA) imperfectly fill the role of minimizing the impacts of competing plans. The impact assessment process typically focuses slavishly on individual projects and this shortchanges evaluation of cumulative impacts. It also suffers from the problem of fragmented jurisdiction, as agencies focus solely on their own projects and programs. In any event, the track record of environmental assessment is less than reassuring, even absent the complications posed by climate adaptation. In sum, adaptation’s environmental effects are unlikely to get the comprehensive evaluation necessary to ensure that they are minimized.” (footnotes omitted)).

227. *See* McChesney, *supra* note 129, at 31–33.

228. For a discussion of some barriers and limits to adaptation, see *supra* notes 52–88 and

stage may encourage investment in proactive adaptation measures that prevent significant costs that will be incurred in the future due to a failure to adapt. Moreover, as NEPA and CEQA stress the importance of interdisciplinary research and analysis, requiring analysis of climate change impacts will likely stimulate further study of the problem and facilitate the transfer of useful information between agencies and to the public. While some uncertainty may remain regarding the future effects of climate change, both NEPA and CEQA contain established mechanisms for decisionmaking subject to incomplete or unavailable information²²⁹ and acknowledge that uncertainty does not negate the need for action. This feature is particularly suited to the subject of climate change where decisions must be made despite incomplete or continually evolving information. As the amount of available information and awareness increases, more advanced technology may develop to combat the challenge of climate change. Finally, integrating climate change into environmental legislation on the national, regional, and local levels will likely incorporate the concept into social consciousness and enhance institutional coordination, cooperation, and consistency.

V. CONCLUSION

As scientific evidence accumulates to substantiate the existence of climate change and its potentially devastating effects, communities can no longer afford to ignore the problem by failing to consider adaptive measures because “[t]he current absence of meaningful effort to address the threat of global climate change can be characterized fairly as inaction, even as it becomes increasingly clear how misguided such inaction is.”²³⁰ Indeed, to meet this considerable challenge, communities must not only take steps to mitigate climate change by curbing GHG emissions, but they must also develop and implement effective strategies for adaptation to combat the already inevitable impacts of climate change. While there remain significant barriers to enacting necessary adaptive measures, “the stakes are huge and the price of failing to undertake the necessary changes may well be catastrophic.”²³¹ NEPA and CEQA are two possible legal tools available to aid in the adaptation effort and to compel consideration of the impacts of climate change in the land-use and development context.

accompanying text.

229. See 40 C.F.R. § 1502.22 (describing how to account for incomplete or unavailable information); CAL. CODE REGS. tit. 14, §§ 15144–45.

230. Lazarus, *supra* note 66, at 1034.

231. *Id.* at 1043.

Although the NEPA and CEQA environmental-impact assessment regimes have generally been construed as forcing consideration of only the impacts of a proposed project *on the environment*, these legal frameworks can and should be utilized to require consideration of the impacts *of the environment on a proposed project* in the climate change context. Reflecting back on the example first posed in the introduction of this Note, a new commercial and residential development planned in a low-lying coastal area, which may be vulnerable to climate change induced sea-level rise or flooding but does not emit significant amounts of GHGs or otherwise result in harmful effects on the environment, would escape environmental-impact review under this traditional view of NEPA or CEQA. A close reading of the statutes and their accompanying regulatory guidelines, however, demonstrates that the impacts of climate change on a project can influence the assessment of a project's environmental effects as well as potential alternatives and mitigation measures. Furthermore, given the profound environmental, economic, and social effects that climate change may bring, communities should recognize that NEPA and CEQA represent an available legal mechanism for analyzing the impacts of climate change on proposed projects and for ultimately developing adaptive solutions to moderate or eliminate harm. While they alone may not solve the adaptation problem, NEPA and CEQA "provide[] a tested method and established framework for weighing competing plans assisted by multidisciplinary expertise,"²³² and communities would be well served to utilize this potential as one of many existing tools in an ongoing effort to combat the impacts of climate change.

232. Bligh, *supra* note 225, at 63.